IEC 60264-4-1

Edition 2.1 2009-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Packaging of winding wires –
Part 4-1: Methods of test – Delivery spools made from thermoplastic materials

Conditionnement des fils de bobinage –
Partie 4-1: Méthodes d'essai – Bobines de livraison faites de matériau thermoplastique

IEC 60264-4-1:1997-12+AMD1:2009-06 CSV(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org
Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 21 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC 60264-4-1

Edition 2.1 2009-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Packaging of winding wires –
Part 4-1: Methods of test – Delivery spools made from thermoplastic materials

Conditionnement des fils de bobinage –
Partie 4-1: Méthodes d'essai – Bobines de livraison faites de matériau thermoplastique

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.060.10; 55.060

ISBN 978-2-88910-082-8

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PACKAGING OF WINDING WIRES –

Part 4-1: Methods of test – Delivery spools made from thermoplastic materials

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60264-4-1 has been prepared by IEC technical committee 55: Winding wires.

This consolidated version of IEC 60264-4-1 consists of the second edition (1997) [documents 55/617+617A/FDIS and 55/643/RVD] and its amendment 1 (2009) [documents 55/1100/FDIS and 55/1135/RVD].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 2.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

The committee has decided that the contents of the base publication and its amendments 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

This part of IEC 60264 is one of a series which deals with insulated wires used for windings in electrical equipment. The series has three groups describing:

1) Winding wires – Test methods (IEC 60851);
2) Specifications for particular types of winding wires (IEC 60317);
3) Packaging of winding wires (IEC 60264).

PACKAGING OF WINDING WIRES –

Part 4-1: Methods of test – Delivery spools made from thermoplastic materials

1 Scope

This part of IEC 60264 defines methods of test for delivery spools for winding wires made from thermoplastic materials in order to determine conformity with the established performance requirements for their properties.

2 General notes on methods of test

Unless otherwise specified, all tests shall be carried out within a temperature range from 15 °C to 35 °C and a relative humidity from 45 % to 75 %.

In case of dispute, the spools shall be preconditioned at a temperature of (23 ± 2) °C for 24 h.

3 Spool irregularities

The surface and construction shall be visually inspected.

4 Spool marking

The spool marking shall be visually inspected.

5 Mass

The mass of the spool shall be measured by an apparatus capable of determining the mass with the accuracy required in the relevant specification.

6 Spool dimensions

The spool dimensions shall be checked using standard measuring instruments.

7 True running deviation

The true running deviation of the inside faces of the flanges and of the surface of the barrel shall be determined with a measuring device as shown in Figure 1.

8 High temperature test

The spool shall be conditioned for a period of 4 h in an oven with forced air circulation at a temperature specified in the relevant specification.

The spool shall be allowed to cool to room temperature before the dimensional checks, as specified in clause 6, and the true running deviation checks in clause 7 are carried out.

9 Impact test on flanges

9.1 At normal ambient conditions

After conditioning the spool for a minimum of 24 h at a temperature of (20 ± 5) °C the spool shall be tested in the apparatus as shown in Figure 2.

For practical reasons the hammer shall be dropped on the flanges as indicated in either Figure 3a (cylindrical barrelled spool) or Figure 3b (taper barrelled spool) or Figure 3c (cylindrical barrelled spool with conical flanges). The hammer shall be a solid cylinder with a minimum diameter of 40 mm. The surface that strikes the flange shall be flat and smooth.

9.2 At low temperature

The spool shall be conditioned for a period of 24 h at a temperature specified in the relevant specification. Following conditioning, the spool shall be tested within 10 min in the apparatus as shown in Figure 2.

10 Deformation under load

The spool shall be subjected to a deformation test in the "as received" condition which shall be carried out at a temperature of (20 ± 5) °C, using a suitably equipped tensile machine. The spool flanges shall be clamped with the test jigs as shown in Figure 4. The half disks in each jig shall be in contact with the surface of the two sides of each flange. The clearance between the disk and the barrel, when using Figure 4a, shall be (1,5 ± 0,5) mm.

When using Figure 4b, the clearance between the disk and the barrel shall be $(0,5\ ^{+0,5}_{-0})$ mm.

When using Figure 4c for cylindrical or tapered barrelled spools with one conical flange, the clearance between the disk and the barrel for the flat flange shall be $(1,5\ ^{+0,5}_{-0,5})$ mm and for the conical flange $(0,5\ ^{+0,5}_{-0})$ mm.

The edges of the disks shall not be sharp. The deformation test shall be carried out with an initial elongation speed from 10 mm/min to 15 mm/min up to the specified load.

After the specified load is reached, the spool shall remain under load for 30 min.

When using Figure 4a, the distance between the half disks along the barrel of the spool shall then be measured.

When using Figure 4b or 4c, the spool shall be unloaded, and measured after 60 min.

11 Flexibility test on flanges

11.1 Spools with flat flanges

The test shall be carried out according to Clause 10, except that the half disks are shown in Figure 5.

The inside diameter of the half disks shall be (94 ± 0,2) % of the diameter of the flanges.

After the specified load is reached the spool shall remain under load for 30 min. The distance between the flanges at the inside diameter of the half disks of the stressed spool shall then be measured.

Sixty minutes after removing the load, the distance between the flanges shall be measured again at the same place as before.

11.2 Spools with conical flanges

Every single conical flange shall be tested. The flange shall be placed between the two fixing parts as shown in Figure 6.

The size "*a*" of the fixing parts shall be 0,3 times the flange diameter, and the size "*r*" of the fixing parts shall be twice the diameter of the flange. The flange shall be compressed together at a rate of 50 mm/min.

The forces necessary to get a reduction of the flange diameter of 4 %, 8 % and 14 % shall be measured.

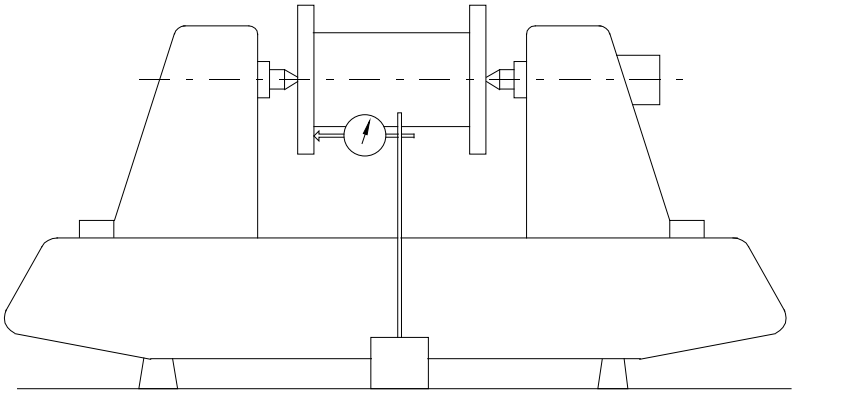

Figure 1 – Measuring device for true running deviations

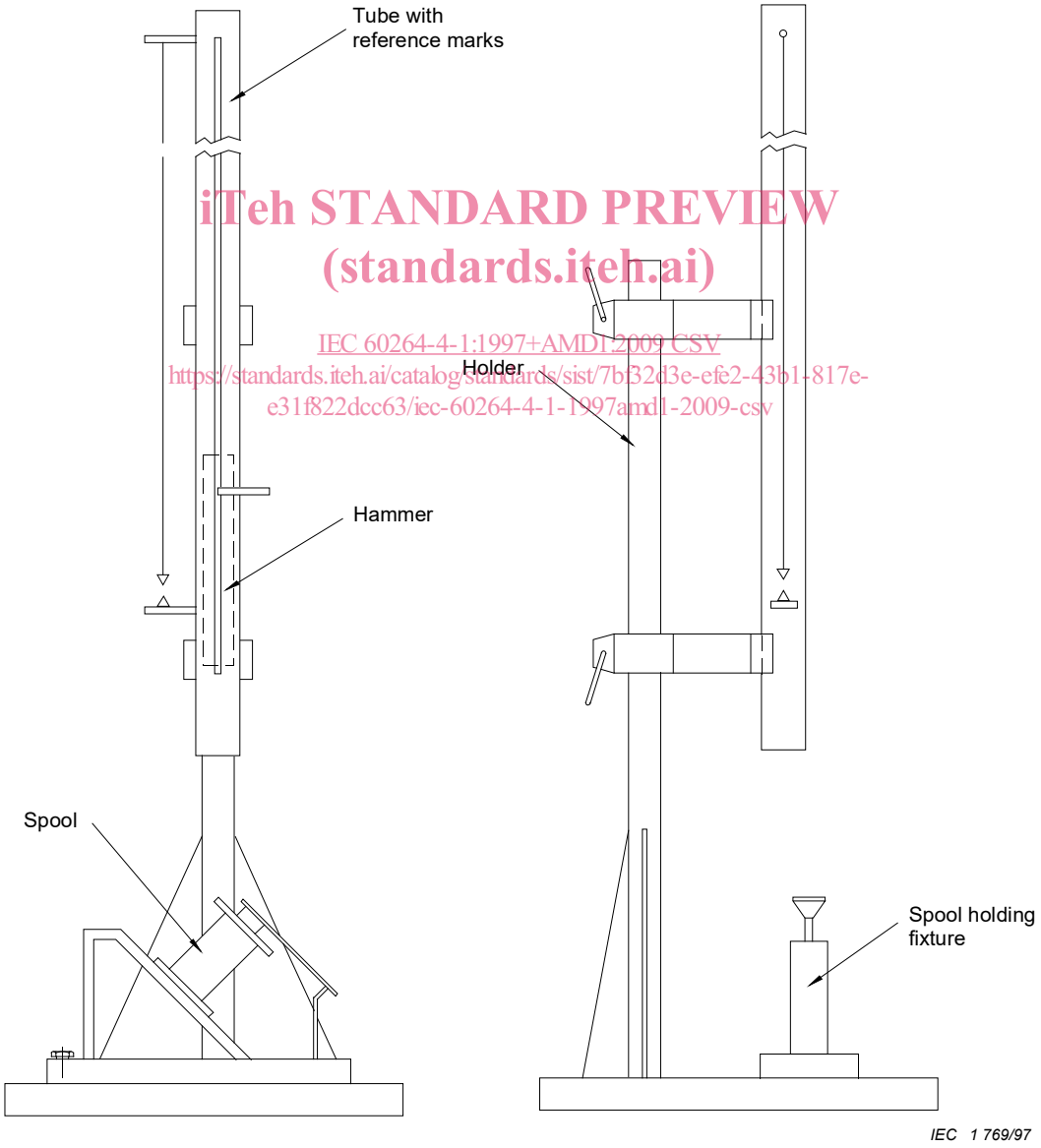

Figure 2 – Flange impact test apparatus

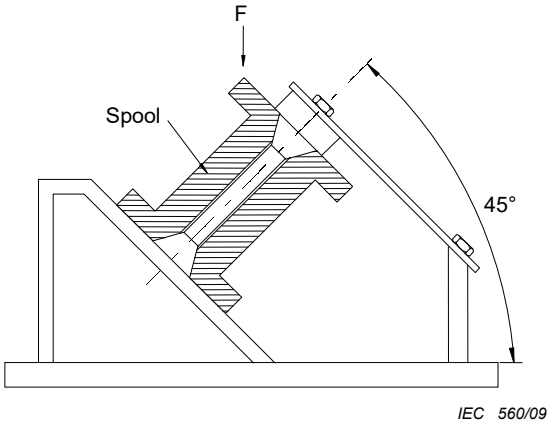

Figure 3a – Cylindrical barrelled spool

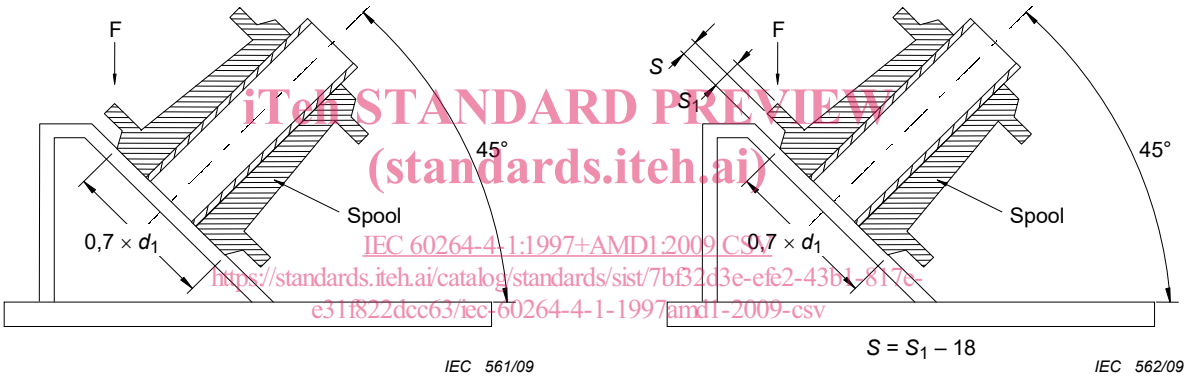

Figure 3b – Tapered barrelled spool

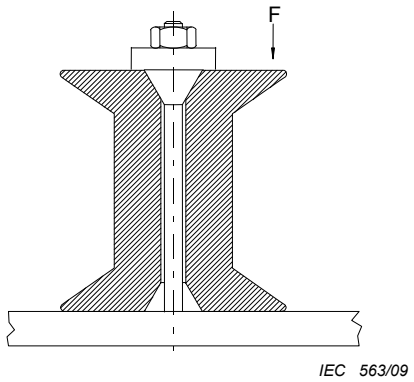

Figure 3c – Cylindrical barrelled spool with conical flanges

Figure 3 – Spool holding fixture (detail of Figure 2)