

### SLOVENSKI STANDARD SIST EN 60855-1:2017

01-april-2017

Nadomešča: SIST EN 60855:2001

## Delo pod napetostjo - Izolacijske s peno polnjene cevi in polne palice - 1. del: Cevi in palice s krožnim prerezom

Live working - Insulating foam-filled tubes and solid rods - Part 1: Tubes and rods of a circular cross-section

### iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 60855-1:2017 https://standards.iteh.ai/catalog/standards/sist/9ef46223-bae1-4f05-b458-Ta slovenski standard je istovetenaž:6052/si**EN-60855-1**2:2017

### ICS:

13.260 Varstvo pred električnim Protection against electric udarom. Delo pod napetostjo shock. Live working

SIST EN 60855-1:2017

en

SIST EN 60855-1:2017

## iTeh STANDARD PREVIEW (standards.iteh.ai)

#### SIST EN 60855-1:2017

## EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

### EN 60855-1

February 2017

ICS 13.260; 29.240.20; 29.260

Supersedes EN 60855:1996

**English Version** 

### Live working - Insulating foam-filled tubes and solid rods - Part 1: Tubes and rods of a circular cross-section (IEC 60855-1:2016)

Travaux sous tension - Tubes isolants remplis de mousse et tiges isolantes pleines - Partie 1: Tubes et tiges de section circulaire (IEC 60855-1:2016) Arbeiten unter Spannung - Isolierende schaumgefüllte Rohre und massive Stäbe - Teil 1: Rohre und Stäbe mit kreisförmigem Querschnitt (IEC 60855-1:2016)

This European Standard was approved by CENELEC on 2016-06-01. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

#### SIST EN 60855-1:2017

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



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

#### European foreword

The text of document 78/1147/FDIS, future edition 2 of IEC 60855-1, prepared by IEC/TC 78 "Live working" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60855-1:2017.

The following dates are fixed:

•	latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-08-10
•	latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-02-10

This document supersedes EN 60855:1996.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

### **Endorsement notice**

The text of the International Standard IEC 60855-1:2016 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated.

IEC 61477

NOTEISTHarmonized as EN/61477. https://standards.iteh.ai/catalog/standards/sist/9ef46223-bae1-4f05-b458c273aafl 6052/sist-en-60855-1-2017

### Annex ZA

(normative)

## Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60060-1	-	High-voltage test techniques Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60060-2	-	High-voltage test techniques Part 2: Measuring systems	EN 60060-2	-
IEC 60212	2010	Standard conditions for use prior to and during the testing of solid electrical insulating materials	EN 60212	2011
IEC 61318	-	Live working - Conformity assessment applicable to tools, devices and equipment	EN 61318	-

### iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 60855-1:2017

SIST EN 60855-1:2017

## iTeh STANDARD PREVIEW (standards.iteh.ai)



Edition 2.0 2016-04

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Live working – Insulating foam-filled tubes and solid rods W Part 1: Tubes and rods of a circular cross-section

Travaux sous tension – Tubes <u>isolants remplis</u> de mousse et tiges isolantes pleines – https://standards.iteh.ai/catalog/standards/sist/9ef46223-bae1-4f05-b458-Partie 1: Tubes et tiges de section circulaire<sup>55-1-2017</sup>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 13.260; 29.240.20; 29.260

ISBN 978-2-8322-3348-1

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.

 Registered trademark of the International Electrotechnical Commission Marque déposée de la Commission Electrotechnique Internationale

### CONTENTS

FC	DREWO	RD	4
IN	TRODU	CTION	6
1	Scop	e	7
2	Norm	ative references	7
3	Term	s and definitions	7
4		irements	
	4.1	Materials and design	
	4.2	Electrical requirements	
	4.3	Mechanical requirements	
	4.4	Diameters of foam-filled tubes and solid rods	
	4.5	Marking	9
	4.6	Packaging	9
5	Tests	5	9
	5.1	General	9
	5.2	Type test conditions	9
	5.2.1	General	9
	5.2.2		
	5.3	Visual and dimensional checks D.A.R.D. PREVIEW	10
	5.3.1	General	10
	5.3.2		
	5.3.3		
	5.4	Electrical tests	11
	5.4.1	c273aaf16052/sist_en_60855_1_2017	11
	5.4.2		
	5.4.3		
	5.5 5.5.1	Mechanical tests Bending test	
	5.5.1	•	
	5.5.2		
	5.5.4		
	5.5.5		
	5.5.6		
6		ormity assessment of foam-filled tubes and solid rods having completed the	
-		uction phase	28
7	Modi	fications	29
Ar	inex A (	normative) Plan of carrying out of the type tests	30
		normative) Classification of defects and associated requirements and tests	
		ý hy	
2	onograp	,	
Fid	oure 1 -	- Typical dielectric test arrangement	12
	-	- Assembly set-up of the test piece to the guard electrodes	
	-	- Constructional drawings for guard electrodes and parts	
	-		
	-	- Drawings for guard electrode parts according to test piece diameters	17
	-	<ul> <li>Alternative dielectric test under dry condition – Example of a typical test ent</li> </ul>	19

IEC 60855-1:2016 © IEC 2016 – 3 –	
Figure 6 – Wet test	21
Figure 7 – Bending test	23
Figure 8 – Torsion test – Examples for fixing foam-filled tube and solid rod	25
Figure 9 – Crushing test	27
Table 1 – Specified diameters	8
Table 2 – Maximum current I1 before exposure to humidity	18
Table 3 – Values of $F_d$ , $f$ and $F_f$ for bending test	24
Table 4 – Values of $C_d$ , $a_d$ and $C_r$ for torsion test	26
Table 5 – Values of $F_d$ and $F_r$ for crushing test	26
Table A.1 – Chronological order of the type tests	30
Table B.1 – Classification of defects and associated requirements and tests	31

## iTeh STANDARD PREVIEW (standards.iteh.ai)

– 4 –

#### INTERNATIONAL ELECTROTECHNICAL COMMISSION

#### LIVE WORKING - INSULATING FOAM-FILLED TUBES AND SOLID RODS -

#### Part 1: Tubes and rods of a circular cross-section

#### 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.
- 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. SIST EN 60855-1:2017
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to LEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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 60855-1 has been prepared by technical committee 78: Live working.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- reintroduction of specific diameters of foam-filled tubes and solid rods of circular crosssection with its tolerances;
- reintroduction of the dielectric tests before and after exposure to humidity, as included in IEC 60855-1:2009;
- specification of an alternative test (after exposure to immersion) in case of foam-filled tubes and solid rods having completed the production phase;
- review of phase angle maximum specified values;

IEC 60855-1:2016 © IEC 2016

review of the wet test procedure and the improvement of the associated test arrangement.

- 5 -

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

FDIS	Report on voting
78/1147/FDIS	78/1156/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 publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60855 series, published under the general title Live working -Insulating foam-filled tubes and solid rods, can be found on the IEC website.

Terms defined in Clause 3 are given in *italic* print throughout this standard.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed, •
- withdrawn,
  - iTeh STANDARD PREVIEW replaced by a revised edition, or
- (standards.iteh.ai)
- amended.

#### - 6 -

IEC 60855-1:2016 © IEC 2016

#### INTRODUCTION

This part of IEC 60855 has been prepared in accordance with the requirements of IEC 61477.

The product covered by this part of IEC 60855 may have an impact on the environment during some or all stages of its life cycle. These impacts can range from slight to significant, be short-term or long-term, and occur at the global, regional or local level.

This part of IEC 60855 does not include requirements and test provisions for the manufacturers of the product, or recommendations to the users of the product for environmental improvement. However, all parties intervening in its design, manufacture, packaging, distribution, use, maintenance, repair, reuse, recovery and disposal are invited to take account of environmental considerations.

Technical committee 78 is considering the preparation of IEC 60855-2, which would cover foam-filled tubes and solid rods of cross-section other than circular.

### iTeh STANDARD PREVIEW (standards.iteh.ai)