ISBN 978-0-626-37283-5

# SANS 1019:2014

Edition 2.6

# SOUTH AFRICAN NATIONAL STANDARD

## Standard voltages, currents and insulation levels for electricity supply

**WARNING**
**This standard references other documents normatively.**

**Published by the South African Bureau of Standards**
**1 Dr Lategan Road Groenkloof ✉ Private Bag X191 Pretoria 0001**
**Tel: +27 12 428 7911 Fax: +27 12 344 1568**
**www.sabs.co.za**

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**Table of changes**

| Change No. | Date | Scope |
|---|---|---|
| Amdt 1 | 1992 | Amended to update and expand the requirements for limits of voltage variations, and to change certain requirements concerning standard voltages not exceeding 1 100 V. |
| Amdt 2 | 1993 | Amended to add certain definitions. |
| Amdt 3 | 1997 | Amended to bring the voltage tolerance in line with new legislation. |
| Amdt 4 | 2001 | Amended to update referenced standards and to include an editorial correction. |
| Amdt 5 | 2008 | Amended to change the designation of SABS standards to SANS standards, and to move references to legislation to the foreword. |
| Amdt 6 | 2014 | Amended to add the definition of "impulse" and update applicable standards. |

## Acknowledgement

The South African Bureau of Standards wishes to acknowledge the valuable assistance derived from publications of the International Electrotechnical Commission.

## Foreword

This South African standard was approved by National Committee SABS/TC 067/SC 05, *Electricity distribution systems and components – Electricity distribution*, in accordance with procedures of the South African Bureau of Standards, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in March 2013.

This document supersedes SANS 1019:2008 (edition 2.5).

A vertical line in the margin shows where the test has been technically modified by amendment No.6.

A reference is made in the last paragraph of the Preface to "legislation". In South Africa this is the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (as amended from time to time). **Amdt 5**

A reference is made in table 1 to "Regulations to legislation". In South Africa this is the Electricity Act, 1987 (Act No. 41 of 1987) (as amended from time to time) and the Regulations promulgated in terms of the Act. **Amdt 5**

**This document is referenced in the Local Government Municipality Systems Act, 2000 (Act No. 32 of 2000).**

**Compliance with this document cannot confer immunity from legal obligations.**

**Reaffirmed and reprinted in March 2019.**
**This document will be reviewed every five years and be reaffirmed, amended, revised or withdrawn.**

## Preface

This specification was revised in 1985 in order to bring it into line with IEC 60038:1983. **Amdt 4**

IEC 60071-1 specifies a range of standard insulation levels which have found general acceptance in South Africa. On the basis of experience and applications in the South African electricity supply industry, agreement has been reached regarding IEC insulation levels which shall be accepted for South Africa. The following comments cover the major aspects of the revision of this specification: **Amdt 4**

a) **Standard voltages**. The ideal of a single international standard voltage in low voltage distribution systems has always been an attractive proposition to ensure rationalization of distribution networks and associated equipment and to assist international trade.

   SANS 780, *Distribution transformers*, specifies a standard no-load voltage of 230/400 V and requires the transformer to operate continuously, without deleterious effect, at a primary voltage of 105 % of rated voltage. **Amdt 4**

   Therefore, with adequate design, the supply voltage at the consumer terminals under light load conditions would be within the 230 V +6 % limit recommended in IEC 60038. At the other end of the range, under full load conditions with rated voltage on the primary, the supply voltage could drop without it being less than the lower limit of 230 V −10 %, thereby achieving compliance with the international standard voltage of 230/400 V. **Amdt 4**

b) **Standard insulation levels**. Standard insulation levels for nominal voltages exceeding 1 100 V have now been included in this specification. The list 2 insulation levels for the medium voltage range (range A) have been taken from IEC 60071-1, table 1 but, because of a high altitude of up to 1 800 m and ground flash densities commonly reaching values of 8 flashes/km$^2$/year or more in large areas of South Africa, it has been considered necessary to introduce a list 3 of insulation levels based on the standard values given in IEC 60071-1, table 2. **Amdt 4**

   List 1 values have not been included in this specification.

   The derating effect on voltage withstand values at altitudes greater than 1 000 m affects external insulation only. By the application of the recommendations in IEC 60071-2 and the correct choice of protective levels of surge arresters, it has generally been found possible to adopt the same values for external insulation as for internal insulation. **Amdt 4**

c) **Test procedures**. Because many test laboratories are situated at a high altitude, it was considered necessary to give guidance on the following:

   1) testing at altitudes above 1 000 m with reference to insulation levels specified for altitudes up to 1 000 m; and

   2) testing at altitudes up to 1 000 m in those cases where it has been found necessary to specify a higher insulation level for external insulation than the corresponding level for internal insulation.

   The test procedures for the simultaneous testing of internal and external insulation are covered in an appendix.

d) **Clearances and creepage distances**. The committee charged with the revision of SANS 1019:1975 did not consider it necessary to include clearances and creepage distances in this revision.

Clearances are covered in legislation (see foreword) and creepage distances in SANS 60137, *Insulated bushings for alternating voltages above 1 000 V*. **Amdt 4; amdt 5**