SLOVENSKI STANDARD
SIST EN 60700-1:2015/oprA1:2021

01-april-2021

Tiristorski ventili (elektronke) za visokonapetostni enosmerni prenos (HVDC) električne energije - 1. del: Električno preskušanje

Thyristor valves for high voltage direct current (HVDC) power transmission - Part 1: Electrical testing

Thyristorventile für Hochspannungsgleichstrom-Energieübertragung (HGÜ) - Teil 1: Elektrische Prüfung

Valves à thyristors pour le transport d'énergie en courant continu à haute tension (CCHT) - Partie 1: Essais électriques

Ta slovenski standard je istoveten z: **EN 60700-1:2015/prA1:2021**

ICS:

19.080	Električno in elektronsko preskušanje	Electrical and electronic testing
29.200	Usmerniki. Pretvorniki. Stabilizirano električno napajanje	Rectifiers. Convertors. Stabilized power supply
31.080.20	Tiristorji	Thyristors

SIST EN 60700-1:2015/oprA1:2021 **en,fr,de**

22F/604/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 60700-1/AMD1 ED2	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2021-02-05	**2021-04-30**
SUPERSEDES DOCUMENTS:	
22F/582/CD, 22F/587A/CC	

IEC SC 22F : POWER ELECTRONICS FOR ELECTRICAL TRANSMISSION AND DISTRIBUTION SYSTEMS	
SECRETARIAT: Russian Federation	SECRETARY: Mr Lev Travin
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 115	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Amendment 1 - Thyristor valves for high voltage direct current (HVDC) power transmission - Part 1: Electrical testing

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

As the plenary meeting of SC 22F was cancelled in 2020 due to COVID-19 pandemic (see 22F/591/INF), comments and proposals of National Committees on 22F/582/CD contained in 22F/587A were discussed by correspondence by a group consisting of Mr. Huigao Zhou, the Chair of SC 22F, Mr. Lev Travin, SC 22F secretary, Mr. Shigeru Tanabe, the convenor of SC 22F/MT 9 and MT 9 members.

The decision to develop the current CDV, based on the results of this discussion was taken by Mr. Huigao Zhou, the Chair of SC 22F (supported by Mr. Lev Travin, SC 22F secretary).

FOREWORD

This amendment has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment.

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

FDIS	Report on voting
22F/xxx/FDIS	22F/xxx/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability 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.

2 Normative references

Replace IEC 61803: 1999 and IEC 61803: 1999/AMD1: 2010 by:

IEC 61803, *Determination of power losses in high-voltage direct current (HVDC) converter stations with line commutated converters*

Replace ISO/IEC Guide 25: 1990 by:

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

Add to the end of Clause **2**:

IEC 60700-2, *Thyristor valves for high voltage direct current (HVDC) power transmission – Part 2: Terminology*

Delete the existing footnotes "1" and "2" accordingly.

3 Terms and definitions

3.1.4
valve protective firing

Delete.

3.2.1

valve support

Delete.

3.2.2

valve structure

Delete.

3.2.3

redundant thyristor level

Delete.

3.2.4

valve base electronics

Delete.

3.2.5

thyristor level

Delete.

3.2.6

valve section

Delete.

3.2.7

multiple valve unit

Delete.

6 Dielectric tests on valve support

6.3.2 Valve support d.c. voltage test

*Replace words "*50% of the maximum text voltage*" by "*50% of 1 min test voltage*" in the second sentence of the first paragraph.*

*Delete "*in approximately 10 s*" in the second sentence of the first paragraph.*

6.3.3 Valve support a.c. voltage test

*Replace words "*50% of the maximum text voltage*" by "*50% of 1 min test voltage*" in the second sentence of the first paragraph.*

*Replace words "*within approximately 10 s*" by "*in approximately 10 s*" in the second sentence of the first paragraph.*

7 Dielectric tests for multiple valve units (MVU)

7.2 Test object

Replace the second paragraph by:

Individual valves may have to be short-circuited depending on the configuration of the MVU and objectives of the tests. The stresses on the different valves in the MVU depend on whether those valves belong to the same phase or to different phases".

7.3.1 MVU d.c. voltage test to earth

*Replace words "*50% of the maximum text voltage*" by "*50% of 1 min test voltage*" in the first sentence of the second paragraph.*

*Delete "*in approximately 10 s*" in the first sentence of the second paragraph.*

7.3.3 MVU switching impulse test

Replace the existing note by the following new paragraph:

Subject to agreement between the purchaser and supplier, the MVU switching impulse test need not be performed, if it can be shown by other means that:

a) the external air clearances to other valves and to earth are adequate for the switching impulse voltage withstand level required, and

b) the switching impulse withstand between any two terminals of the MVU is adequately demonstrated by other tests.

7.3.4 MVU lightning impulse test

Replace the existing note 1 by the following new paragraph:

Subject to agreement between the purchaser and supplier, the MVU lightning impulse test need not be performed, if it can be shown by other means that:

a) the external air clearances to other valves and to earth are adequate for the lightning impulse voltage withstand level required, and

b) the lightning impulse withstand between any two terminals of the MVU is adequately demonstrated by other tests.

8 Dielectric tests between valve terminals

8.1 Purpose of tests

Add to the end of 8.1:

It should be also noted that the atmospheric correction is not needed in dielectric tests between valve terminals. However for valves installed at an altitude exceeding 1 000m the valve internal air clearance shall be verified by additional tests under the atmospheric corrected test voltages. Thyristors and snubber circuits may be replaced by insulating blocks in these tests.

8.3.1 valve d.c. voltage test

*Replace words "*50% of the maximum text voltage*" by "*50% of 1 min test voltage*" in the first sentence of the second paragraph.*

*Replace words "*within approximately 10 s*" by "*in approximately 10 s*" in the first sentence of the second paragraph.*

Replace the formula by:

$U_{tdv} = \pm U_{dn} \times k_7$

8.3.2 Valve a.c. voltage test

*Replace words "*50% of the maximum text voltage*" by "*50% of 15 s test voltage*" in the second sentence of the first paragraph.*

*Replace words "*within approximately 10 s*" by "*in approximately 10 s*" in the second sentence of the first paragraph.*

8.3.3 Valve impulse tests (general)

Replace the existing V_{DSM} by:

V_{DSM} is the non-repetitive peak off-state voltage of the thyristors;

9 Periodic firing and extinction tests

9.3.2.4 Heat-run test

Replace words (see 5.1.4 of IEC 61803, 1999) *by words* (see 5.1.5 of IEC 61803 ED2, 2020) *under the formula.*

9.3.6 Intermittent direct current tests

Replace b) by:

b) rectifier minimum α operation with minimum a.c. voltage (see 9.3.4.2)

Add at the end of the last paragraph:

In case of any insufficient number of current loops during the test to verify the gate firing function adequately, additional evidences shall be given.

11 Valve fault current tests

11.3.3 Multi-loop fault current test without re-applied forward voltage

Replace the second paragraph from the bottom by:

The peak value and conduction duration of the fault current loops shall be determined in the same manner as defined in 11.3.2 except that, for all fault loops after the first, the delay angle of initiation shall be set to 0°.

16 Presentation of type test results

Replace the first paragraph by:

The test report shall be issued in accordance with the general guidelines as given in ISO/IEC 17025, and shall include the following information: