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| IEC/TC or SC TC109 | Secretariat Germany | Date |
|-----------------------|------------------------|------|

Please ensure this form is annexed to the Report to the Committee of Action if it has been prepared during a meeting, or sent to the Central Office promptly after its contents have been agreed by the committee.

Title of TC
Insulation coordination for low-voltage equipment

A. Background**Scope:**

To prepare International Standards on the principles of insulation coordination applicable to all low-voltage equipment.

To provide IEC Technical Committees with :

- rules for the determination of voltage ratings for insulation coordination and
- physical data for dimensioning of insulations to given voltage ratings.

Horizontal Safety Function

Insulation coordination for voltages up to and including 1000 V a.c. and 1 500 V d.c., including dimensioning of clearances and creepage distances and requirements for solid insulation. This includes all methods of dielectric testing with respect to insulation coordination.

History:

TC109 was formed when SC28A was separated from its parent committee, TC28 in 2001.

SC28A was founded in 1972.

The first document was published in 1980 as IEC 60664 TR, in 1981 the supplement IEC 60664A.

As an update IEC 60664-1 was published as IS in 1992.

Working groups:

MT1 "Principles, requirements and tests for clearances, creepage distances and solid"

MT2 "Coating, potting or moulding for protection against pollution"

WG3 "High-frequency voltage stress with respect to insulation coordination of equipment within low-voltage systems"

Number of publications issued: 5

IEC 60664-1 Ed 1.2: Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests

IEC 60664-2-1 TR3 Ed. 1.0: Insulation coordination for equipment within low-voltage systems – Part 2-1: Application guide - Dimensioning procedure worksheets and dimensioning examples

IEC 60664-2-2 TR Ed. 1.0: Insulation coordination for equipment within low-voltage systems – Part 2-2 Application guide - Interface considerations

IEC 60664-3 Ed. 1.0: Insulation coordination for equipment within low-voltage systems - Part 3: Use of coatings to achieve insulation coordination of printed board assemblies

IEC 60664-4 TR3 Ed. 1.0: Insulation coordination for equipment within low-voltage systems - Part 4: Considerations of high-frequency voltage stress

Number of projects in development: 4**P-members (22):**

Australia; (AU); Belgium; (BE); Canada; (CA); China; (CN); Czech Republic; (CZ); Denmark; (DK); Finland; (FI); France; (FR); Germany; (DE); India; (IN); Italy; (IT); Japan; (JP); Netherlands; (NL); Norway; (NO); Poland; (PL); Romania; (RO); Russian Fed.; (RU); Spain; (ES); Sweden; (SE); U.S.A.; (US); United Kingdom; (GB), South Africa (ZA)

Liaison:

As a Horizontal Safety Committee TC 109 distributes documents to all identified Technical Committees dealing with insulation coordination in low-voltage equipment in their standards. Liaison has been established with committees SC37A, TC 64, and TC 98.

B. Environment

B.1 Business environment

Due to progress made in technologies over the last years there is a strong demand to reduce the size of equipment. This demand not only affects the size of components used in equipment but also leads to a reduction of all dimensions including those related to insulation distances and thickness of solid insulation. In addition to this it is noted that several types of insulation may be used within modern equipment in order to reduce the costs of production or to better take into account the influence of the environmental conditions. .

It is therefore the responsibility of TC109 to provide the rules that allow a better design with a minimum dimensioning of insulation of products without impairing safety. Many Technical Committees use the rules established by TC109 that impact on the design of a large number of equipment.

B.2 Market demand

The technologies of data processing, telecommunication, and use and control of electrical energy, among others, are merging. Therefore, the market demands a principle of insulation coordination, which can be applied in each part of an equipment.

Modern insulating materials and recent technologies of electrical engineering (e.g. electronic circuitry) call for insulation coordination based on all external conditions: electrical and others.

To achieve good applicability by easy reference in Product Standards, so that Technical Committees need add only a minimum of specific requirements, representatives of Technical Committees are active in the working groups of TC109.

B.3 Trends in technology and trade

Physical data are available for dimensioning clearances. For creepage distances, dimensioning data for resistance to tracking had been evaluated from experience, whereas printed circuit board creepage distances were based on research. Dimensioning data for maintaining minimum insulation resistance is available from a research programme, giving also information for a critical review of the earlier experience with regard to tracking. An increasing amount of equipment is designed using printed circuit boards with various designs of surface protection with regard to insulation coordination. Application of fast switching techniques such as voltage converters or switched mode power supplies etc. cause high-frequency voltage stress in equipment. This calls for a basic safety standard to give guidance for dimensioning and tests.

B.4 Ecological environment

no effect

C. Work programme

Current work

IEC 60664-1 had been published to provide Technical Committees with dimensioning data for clearances and creepage distances, and with requirements and basic principles for dimensioning of solid insulation. Work is in the course of being completed by giving rules for dimensioning to withstand steady-state voltages, temporary overvoltages or recurring peak voltages, and for dimensioning of reinforced insulation. Items marked as "under consideration" in IEC 60664-1 are dealt with now in Amendment 2.

The work of TC109 is being continued by preparation of an application guide (part 2: IEC 60664-2) consisting of the following sections:

- 1 Dimensioning procedure worksheet and dimensioning examples
- 2 Interface considerations

Revision of IEC 60664-3 is in the course of being completed. The title of this standard was modified to "Use of coating, potting and moulding for protection against pollution " to indicate that the new scope is no longer limited to coating.

Work on IEC 60664-5 "A comprehensive method for determining clearances and creepage distances up to 2 mm" takes into account the evaluation of the research data available, providing for physical data with regard to insulation resistance of creepage distances, of their impulse withstand capabilities under conditions of moisture, and dimensioning data to avoid flashover. IEC 60664-4 "Considerations of high frequency voltage stress" was started in 1992 and published as TR3 in 1997. Additional information has become available by recent research work. Work was started again to prepare an IS based on the need of the market for a horizontal safety standard as a common basis with regard to insulation coordination for the increasing amount of equipment incorporating high-frequency circuits.

Further work may result from feedback from Technical Committees having incorporated IEC 60664 in their publications.

The committee generally meets every two years preferably in conjunction with the General Meeting.

C.2 Resources/infrastructure needed

For MT 1 preparing a draft for IEC 60664-2-1 further experts especially from other Technical committees are requested

For WG3 preparing a draft for IEC 60664-4 further experts are requested

D. Future work

Future work of TC109 will be the updating of their publications as the need may arise from

- new technologies;
- new information on external conditions (electrical and others) becoming available;
- new data becoming available for dimensioning of insulation.
- feedback from Technical Committees having incorporated IEC 60664 in their publications.

E. Maintenance cycle

| Publication no. | Date of publication | Review date | Maintenance cycle result date. | Responsibility (Maintenance Team) |
|----------------------|---------------------|-------------|--------------------------------|-----------------------------------|
| 60664-1 Ed.1.2 | 2002-06 | 2003 | 2006 | MT1 |
| 60664-2-1 TR Ed. 1.0 | 1997-11 | -* | 2002 | MT1 |
| 60664-2-2 TR Ed. 1.0 | 2002-01 | 2005 | 2007 | MT1 |
| 60664-3 Ed. 1.0 | 1992-10 | -* | 2003 | MT2 |
| 60664-4 TR Ed. 1.0 | 1997-09 | -* | 2003 | WG3 |

* Indicates that there is on-going maintenance activities in the work programme.

Name or signature of the secretary

G. Krauss

ANNEX B
TC109 – P-member participation

| P-member | No. | Participation at plenary committee meetings | | | Number of experts in WGs/MTs/PTs | Participation to the votes (NP, CDV, FDIS) (%) | | | |
|--------------------|-----------|---|-------------------|-----------------|----------------------------------|--|--------------|--------------|--------------|
| | | Houston 1999-10 | Stockholm 2000-09 | Beijing 2002-10 | | 1999 (2 doc.) | 2000 (1 doc) | 2001 (4 doc) | 2002 (1 doc) |
| AUSTRALIA | 1 | | | | 0 | 100 | 100 | 75 | 0 |
| BELGIUM | 1 | | | | 1 | 100 | 100 | 100 | 0 |
| CANADA | 1 | | | | 0 | 100 | 100 | 75 | 100 |
| CHINA | 1 | X | | X | 0 | 100 | 100 | 100 | 0 |
| CZECH REPUBLIC | 1 | | | | 0 | 100 | 100 | 100 | 100 |
| DENMARK | 1 | X | X | X | 2 | 100 | 100 | 100 | 100 |
| FINLAND | 1 | X | X | | 0 | 100 | 100 | 100 | 100 |
| FRANCE | 1 | X | X | X | 4 | 100 | 100 | 100 | 100 |
| GERMANY | 1 | X | X | X | 4 | 100 | 100 | 100 | 100 |
| INDIA | 1 | | | | 0 | 0 | 100 | 0 | 0 |
| ITALY | 1 | X | X | X | 2 | 100 | 100 | 100 | 100 |
| JAPAN | 1 | X | X | X | 1 | 100 | 100 | 100 | 100 |
| NETHERLANDS | 1 | | | X | 1 | 100 | 100 | 100 | 100 |
| NORWAY | 1 | | | | 0 | 0 | 0 | 0 | 0 |
| POLAND | 1 | | | | 0 | 50 | 100 | 100 | 0 |
| ROMANIA | 1 | | | | 0 | 50 | 0 | 0 | 100 |
| RUSSIAN FEDERATION | 1 | | | | 0 | 0 | 100 | 100 | 100 |
| SOUTH AFRICA 1) | 1 | - | - | X | - | - | - | - | |
| SPAIN | 1 | | | X | 0 | 100 | 100 | 100 | 100 |
| SWEDEN | 1 | | X | | 0 | 100 | 100 | 100 | 100 |
| UNITED KINGDOM | 1 | X | X | X | 3 | 100 | 100 | 100 | 100 |
| USA | 1 | X | X | X | 3 | 100 | 100 | 80 | 100 |
| | 22 | | | | 21 | | | | |

1) New P-member

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| | IEC CO has been requested to send letter to these inactive P-members |
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