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**Title of TC**

Electromechanical components and mechanical structures for electronic equipment

**A Background****A.1 Date of establishment of the Technical Committee and a brief historical background**

IEC TC 48 (formerly a sub-committee of the original TC 40 established in 1954 as the parent committee for electronic components) was established in 1961 with the title "Electromechanical components for electronic equipment". The present title was decided in 1992 to reflect the needs of industry in this area.

**A.2 Current title, scope, and sub-committees**

TC 48 is responsible for the standardization of electric connectors, connecting devices and mechanical structures for electronic and electrical equipment. The standardization projects are handled in two subcommittees.

SC 48B, "Connectors" is responsible for standardization activities related to electric connectors, connecting devices and value added devices with definite allocation of interface and usage. These could be, for example, cable assemblies and specific value added connectors. Sockets for components are considered in cooperation with the relevant technical committee. SC 48B's activities also include the development of test methods for connecting devices and standards for solderless connections shall be prepared.

SC 48D, "Mechanical structures for electronic equipment" has two main fields of activities; the first one is related to the standardization of indoor mechanical structures for electronic equipment. This activity includes the development of standards on environmental (test) criteria. The second activity deals with the standardization of outdoor mechanical structures and their environmental (test) criteria used for electronic equipment, such as outdoor cabinets for telecommunications purposes.

**B Business Environment****B.1 General**

Electromechanical components are basic elements used in the assembly of a wide range of electrical and electronic equipment. Connectors are intended to fulfil external interface requirements of modular designs and interchangeability of sub-assemblies in case of replacement. Mechanical structures for electronic equipment are intended for the mechanical packaging of connectors, printed board and backplane assemblies including active components, their wiring, and for solderless connections.

In general the connector and enclosure industry business model has been dramatically transformed in the past 5-8 years. In the old way of conducting business, products were designed and manufactured in one country and shipped to customers typically in the same country or region and perhaps 10% of the time to customers in other regions. Real standardization of products occurred at a low rate. In this new global world, many companies "design" products in one country and "manufacture" them in a different country, then ship them to customers around the world.

The rapid spread of electronics products around the world has increased the number of countries where TC 48 products are designed and manufactured. This has created large new groups of

engineers and non-engineers who need to learn how to design and manufacture the products. Electromechanical components manufactured in different countries are often not interchangeable with regard to form, fit and function. The objective of TC 48's work is to prepare standards improving this situation.

Worldwide market (estimated sales for 2006 year)

For Connectors: the estimated worldwide market is approximately 32 billion Euro. It is served by >1000 companies in over twenty-five countries. Geographic segmentation of IEC SC 48B connectors: 25% Americas, 50% Asia/Pacific and 25% Europe. The opportunity and value for standardization has increased significantly.

For Enclosures: the estimated worldwide market of above mentioned enclosures (bare enclosures without integration, IEC SC 48D related) = 6 billion Euro. Another 6 billion Euro is estimated for non standard enclosures, but potentially a market for standard products. Value added system integration, such as backplanes, power supplies, thermal management and cabling estimated 12 billion Euro (value of integration sold with standard related enclosures). Therefore, total worldwide revenue with standard related enclosures, including integration = 18 billion Euro. Geographic segmentation of IEC SC 48D related enclosures and integration : 30% Americas, 30% Asia/Pacific and 40% Europe and Mid East

## **B.2 Market demand**

The market of electromechanical components has moved from a national & regional market to a global market having three dominant segments - North America, Europe, and Asia-Pacific.

This globalization has created a greater demand for harmonized national standards on components with quality conformance assessment and has supported the trend towards international standards. Other influencing factors are the European Single Market, the world-wide integration of the market place that is promoted by multinational companies desiring world-wide procurement from multiple sources including a growing distribution network who in turn source from multiple sources, and the permanent quest for cost minimization. From these influences as well as from a steady growth of the main user markets such as consumer electronics, electronic data processing, telecommunications, office automation and industrial control equipment as part of factory automation, the requirement for standardized products has increased considerably.

Therefore, users of TC48 standards include international and national standards organizations, electronic equipment designers & manufacturers, testing laboratories and other groups.

In many countries, TC48 standards are used "as published" or with "defined differences" in equivalent national standards. It is important to note that some standardization organizations or consortias publish standards that are quickly adopted internationally (several from the USA in recent years). This impacts the work of the committee to publish equivalent IEC standards in shorter time frames.

## **B.3 Trends in technology**

Major technical trends in the industries served by TC 48 are results of the dramatic changes due to the Internet, mobile communication, office and industrial Ethernet technology. These new technologies are particularly noted in those industries mostly served by TC 48, which are telecommunication, consumer electronics, electronic data processing, office automation and industrial process measurement and control equipment.

Technology trends continue to demand more product functionality & less power consumption in a smaller size (cellular telephones, laptop computers, and personal-digital-assistants (PDAs) for example).

The above-referenced trends demand that TC 48 and its sub-committees develop standards that reflect improved interchangeability, higher functional integration, smaller size, improved shielding. The international standards produced by TC 48 must be sufficiently flexible to adapt to improvements in manufacturing processes, materials, and innovations, in order to comply with the user equipment.

In addition, the above-referenced trends on the design of connectors and mechanical structures for electronic equipment these trends in turn require the development of new test procedures for:

- High speed signal transmission and shielding measurements.
- Power contact test methods and test schedules.
- Improved and smart interchangeability / Intermateability / interoperability test schedules.
- New and update standards to new requirements on thermal management, signal integrity and shielding for the enclosure of SC 48D to serve the user with test standards.
- Qualification tests for new enabling functionality based on MST (micro system technology) and NT (nano technology) of interconnection products and enclosures with this new functionality

#### **B.4 Market trends**

A recent trend in many markets, (notably network server & storage, telecommunications and data communications) is to mix power and signal contacts in the same connector housing. Along with a trend toward increasing current levels per contact is driving a need for improved product testing requirements for the connector manufacturers.

Telecom & Datacom markets continue to move in the direction of high speed devices/equipment, that are smaller in size and consuming less power per function. Hot spots (high temperature locations) are common. However thermal management for connectors and enclosures continues to be an important need in the industry.

Voice & data information are merging across many markets. The boundaries defining separate markets are becoming less clear. There is a proliferation of video and text information going into new places (television mounted in the refrigerator door for example) creating new and/or additional performance requirements.

TC48 needs to analyze this “mixing of markets/applications that were formerly separate”, in order to establish closer liaison with the IEC TC’s who are also dealing with such market trends, (e.g. including but not limited to TC23, TC61, TC100).

#### **B.5 Ecological environment**

Laws in different countries focus on restrictions on the usage of hazardous materials, substances and processes. These are mainly: fully halogenated chlorofluorocarbons, ethylene-based compounds, cadmium, lead, and hexavalent-chromium. These substances could be included in many metals, plastics, plating baths, solvents, colour coatings, etc. It will be critical for TC 48 to monitor regulations under consideration that would further restrict materials or compounds commonly used in it’s products such as Halogen compounds, specifically Bromine and Chlorine & Antimony compounds (used for flame retardant characteristics in the resin housing), Beryllium (contact base material), PVC and Phthalate compounds.

Other regulations and laws are either in force or under consideration which impact the handling, recycling and removal of packing/package material and electronic scrap (especially electronic equipment such as computers, television sets, populated printed circuit boards, electronic components and electromechanical components.)

TC48 relies on the P-members and WG experts to bring information related to the above regulations to the TC/SC plenary meetings and working group meetings respectively so that TC48 members/experts can be properly informed. Then revisions to the standards that are under preparation and published can be considered.

TC 48 believes that in order to reduce the quantity of disposed materials impacting the environment, the reuse or recycling of electrical and electronic parts is necessary. TC 48 also believes that packing/package material should be reusable or easy to be recycled.

## C System approach aspects

TC 48 will actively continue to promote the establishment of liaisons to other committees; cooperation with system committees is still in our focus.

<b>System Committees (TC 48 as a supplier of standards)</b>	<b>JTC1/SC 25</b>	<b>Interconnection of information technology equipment</b>
	<b>SC 65C</b>	<b>Industrial networks</b>
	<b>TC 100</b>	<b>Audio, visual, multimedia systems and equipment</b>
<b>System Committees (TC 48 as a customer of standards)</b>	<b>TC 113</b>	<b>Nanotechnology standardization for electrical and electronic products and systems</b>
<b>Other Committees (horizontal committees that produce standards used by TC 48)</b>	<b>TC 70</b>	<b>Degrees of protection provided by enclosures</b>
	<b>TC 91</b>	<b>Electronics assemblies technology</b>
	<b>TC 104</b>	<b>Environmental conditions, classification and methods of test.</b>
	<b>TC 111</b>	<b>Environmental standardization for electrical and electronic products and systems</b>
<b>Other Committees (committees that produce standards similar to TC48 to be in liaison with for technical consistency)</b>	<b>TC 46</b>	<b>Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories</b>

Cooperation established:

- Exchange documents, e.g. JTC1/SC 25
- Liaison officers, experts participating in product/system committees, e.g. JTC1/SC 25, ISO TC 22/SC3, SC 65C,
- Joint Project Teams, e.g. SC 86B
- Experts working in other TC/SCs and reporting to TC 48/SC 48B/SC 48D for information, e.g. TC 113, TC 111, TC 91, TC 70, SC 23F, SC 23G

## D Objectives and strategies

### D.1 Objectives – Connectors and Enclosures

1. Reduce the time to develop TC 48 deliverables and improve the consistency of the content.
2. Keep TC 48 standards up to date to reflect new/changing technologies and user requirements both in the marketplace and customer IEC and ISO Technical committees.
3. Prepare additional guidance documents for (new) engineers to have as reference materials.
4. Create technical content on the IEC TC & SC micro-sites to encourage (new) engineers to visit these sites as a source for information and hence encourage the use of IEC standards.
5. Increase the awareness of TC 48 publications.

## **D.2 Strategies**

### **D.2.1 Connectors**

1. Identify & review standards developed by sister committees to incorporate their best practices into TC 48 documents.
2. Identify SC 48B standards to review and prepare list of clauses to add/update. Initiate MCR forms to update the standards.
3. Identify additional guidance documents that would be useful to project leaders.
4. Discuss with IEC Central Office about having the contents above available on the website.
5. Discuss with IEC Marketing staff effective methods to increase awareness of TC 48 publications.

### **D.2.2 Enclosures**

1. Review standards developed by sister committees to incorporate their best practices into TC 48 documents.
2. Review SC 48D standards and prepare list of clauses to add/update.
3. Discuss with IEC Marketing staff effective methods to increase awareness of TC 48 publications.

## **E Action plan**

### **E.1 Connectors**

1. Evaluate preparing new & updating existing “template” documents (e.g. Blank detail specifications) for the 60512 and 61076 series respectively to make it faster and easier for project leaders to prepare standards. *Identify at WG meetings in the fall 2008 and spring 2009. Initiate MCR or NP forms as appropriate.*
2. Prepare new and update existing test schedules & test methods to reflect new technologies and materials being used in the industry. Also, prepare new and update existing solderless termination standards to reflect newer (smaller) termination technologies (IDC and PF) and new materials. *Identify at WG meetings in the fall 2008 and spring 2009. Initiate MCR or NP forms as appropriate.*
3. Prepare test schedules for power contacts/connectors, and other items. *Identify at WG meetings in the fall 2008 and spring 2009. Initiate MCR or NP forms as appropriate.*
4. Update existing test schedules for termination technologies (soldered and solderless). *Identify at WG meetings in the fall 2008 and spring 2009. Initiate MCR or NP forms as appropriate.*
5. Discuss with IEC CO to have some guidance or information documents available for download on the website to encourage new engineers to visit the IEC SC 48B micro-site as a source for information and hence encourage the use of IEC standards. *Chairman SC 48B – complete for discussion at SC 48B Plenary meeting in Fall 2009.*

### **E.2 Enclosures**

1. Prepare new and update existing standards to new requirements on thermal management, signal integrity and shielding due to the rapid increase of equipment power dissipation and signalling speed in the industry.
2. Prepare additional guidance documents to have as reference materials.

3. Discuss with the IEC Central Office to have some guidance or information documents available for download on the website to encourage new engineers to visit the IEC SC 48D micro-site as a source for information and hence encourage the use of IEC standards.
4. Discuss the Strategies above to develop action items for the coming year. Publish detailed action items as part of SC 48D and WG meeting minutes as appropriate.

**F Useful link to IEC web site**

[TC 48 home page](#) giving access to Membership, TC Officers, Scope, Liaisons, WG/MT/PT structure, Publications issued, Work and Maintenance programmes and similar information for SCs, if any.

Name or signature of the secretary

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