



IEC/TC OR SC:	SECRETARIAT:	DATE:
IEC/TC 91	JAPAN	2020-12

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

A. STATE TITLE AND SCOPE OF TC

Are there any new or emerging trends in technology that will impact the scope and work activities of the TC? Please describe briefly.

Do you need to update your scope to reflect new and emerging technologies? If yes, will these changes impact another TC's scope or work activities?

If yes, describe how these will impact another TC(s) and list the TC(s) it would impact

Title of TC 91:

Electronics assembly technology

Scope of TC:

TC91 was established in 1990 with the aim to develop standards relating to surface mount technology (SMT). The Japanese National Committee took the responsibility for the secretariat work. Its first meeting was held in September 1991 in Kyoto, Japan.

TC91 had been discussing matters concerning surface mount devices and assembly technology of the devices, however, eventually changed its name in 1997 from "Surface Mount Technology" to "Electronics Assembly Technology" to cope with the advancement of assembly technology that could not be confined only to the surface mounting technology.

In 2000, the work of TC 52, "Printed Circuit" was combined with TC 91 to cover the entire assembly technology as the production technology could not be discussed separately for each component of the technology. Safety and environmental issues are also of keen interest of TC 91. In this sense, TC 91 needs to work in collaboration with committees such as but not limited to TC 40 for passive components, TC 47 for semiconductor devices, TC 86 for fibre optics and its subcommittee regarding optoelectronic products, TC 93 for design automation, TC 111 for environmental issues. In 2012, the work of TC 93, "Design Automation" was combined with TC 91.

TC 91 Advisory Group 16 discussed to modify the scope of TC 91 in 2016 to include the scope of former TC 93 (circuit board design).

The new scope of TC 91 is:

To prepare international standards on design, manufacturing and testing of electronic assemblies including the requirements and tests for materials and components used to manufacture circuit boards and electronic assemblies, as well as the formats of electronic data and libraries for describing these products and processes.

B. MANAGEMENT STRUCTURE OF THE TC

Describe the management structure of the TC (use of an organizational chart is acceptable) (should be integrated by CO automatically) and, if relevant (for example an unusual structure is used), provide the rationale as to why this structure is used.

Note: Check if the information on the IEC website is complete.

When was the last time the TC reviewed its management structure? Describe any changes made. When does the TC intend to review its current management structure? In the future, will the TC change the current structure, for example due to new and emerging technologies, product withdrawal, change in regulations etc. Please describe.

Make sure the overview includes:

- any joint working groups with other committees,
- any special groups like advisory groups, editing groups, etc.

Structure of TC 91

Working Groups

WG 1 Requirements for electronic components

WG 2 Requirements for electronics assemblies

WG 3 Measuring and test methods for electronics assemblies

WG 4 Printed boards and materials

WG 5 Terms and definitions

WG 6 Device Embedding assembly technology

WG 10 Measuring and test methods for printed boards and printed board materials

WG 12 Design methodology and data transfer of circuit boards and circuit board assemblies

WG 13 Design Automation: Component, Circuit and System Description Language

WG 15 Design Automation: Testing of Electrotechnical Products

Joint Working Groups

JWG 9 Optical functionality for electronic assemblies Managed by TC 86

Advisory Groups

AG 16 Standardization Strategy

C. BUSINESS ENVIRONMENT

Provide the rationale for the market relevance of the future standards being produced in the TC.

If readily available, provide an indication of global or regional sales of products or services related to the TC/SC work and state the source of the data.

Specify if standards will be significantly effective for assessing regulatory compliance.

Almost all electronic products are now smaller in size and light weighted. The standards being developed by TC 91 is the basis of technology in production of such products. Now most products are not single function products but have multiple functions especially in the area of information and communication technology.

Electronic assembly technology is the basis of electronic products used in the market. The electronic circuit board production of various types, key components of all electronic products has

the market all over the world and had a market size in 2018 of well in excess of 62 B USD though it is very difficult to estimate actual market size. It should also be noted that electronic production is now mostly in Asian countries especially for consumer uses. Some niche products are being made in some developed countries but their market size is not very large compared to consumer products, certainly it is still true that development of many key technologies is still made in such developed countries. Activity of TC 91 may become a basis of transfer of production technology at least for the coming decade.

Not only in the surface mounting devices and assembly technology, TC 91 has been very active to incorporate emerging technology. The discussion on solders used in electronics assembly and reliability of soldered connection both for lead and lead-free solders has been made in TC 91 for more than a decade. The green technology is one of the major targets of discussion in TC 91 including halogen-free board materials.

The development of production technology had driven TC 91 to consider marriage of electronics and optoelectronics assembly technologies when one considers the signal frequencies would certainly exceed 10 GHz and even above 60 GHz. TC 91 had started discussion on optoelectronics assembly technologies since the turn of century. Some trade organizations in P-member countries have been very much active to develop guidelines in this direction. In this aspect, a joint working group with TC 86 (Fibre optics) was organized to develop documents on optical wiring boards.

Optoelectronic production technology now discussed together with TC 86 is the technology we must incorporate within half a decade or so. We should prepare technology basis for engineers developing products of coming decade.

D. MARKET DEMAND

Provide a list of likely customers of the standards (suppliers, specifiers, testing bodies, regulators, installers, other TC/SC's etc.). Do not specify company names, only categories of customers.

Basic standards and test methods prepared by IEC are widely used, however, the standards developed by the IPC of the US (Association Connecting Electronics Industry, was originally "the institute of Printed Circuits") have been widely used in the assembly industry in the world especially in some private companies that do not have close interaction with IEC and are not aware of the significance of IEC activities. IPC, a C-Liaison to TC 91, have many of its standards submitted to IEC and converted as international standards. The situation is similar for other organizations. Specifications prepared by many other industrial organizations and/or private companies are still used in various areas of industries. IEC/TC 91 have been intensively working to develop IEC standards based on the technology in developed countries.

As TC 91 is responsible to develop publications relating to electronics assembly technology, many of its publications are cited in the normative references of IEC product TC/SCs, particularly the IEC 60068 series relating to Environmental Testing in soldering.

Existence of various consortia is sometimes competing with IEC activities. The industry should be aware of the importance of IEC standards and approval systems such as IECQ. Some groups in some countries try to establish their own test and approval systems but they should try to work with IECQ for the best interest and customers. TC 91 especially should work closely with the industry for their interest and eventually recruit experts to work together to gather necessary information and also to develop needed standards and specifications.

E. SUSTAINABILITY DEVELOPMENT GOALS

INDICATE THE SUSTAINABLE DEVELOPMENT GOALS (SDGs) THAT ARE ADDRESSED BY WORK WITHIN THE TC/SC. INDICATE EACH SDG INDICATOR AFFECTED (REFERENCE SPREADSHEET AVAILABLE AT <https://www.iec.ch/SDG/>, AND PROVIDE SPECIFIC INFORMATION ABOUT HOW THE TC/SC IS ADDRESSING THE SDG. CONSIDER BOTH DIRECT AND INDIRECT IMPACTS OF THE WORK OF THE TC/SC.

- | | |
|--|--|
| <input type="checkbox"/> GOAL 1: No Poverty | <input type="checkbox"/> GOAL 10: Reduced Inequality |
| <input type="checkbox"/> GOAL 2: Zero Hunger | <input type="checkbox"/> GOAL 11: Sustainable Cities and Communities |
| <input checked="" type="checkbox"/> GOAL 3: Good Health and Well-being | <input checked="" type="checkbox"/> GOAL 12: Responsible Consumption & Production |
| <input type="checkbox"/> GOAL 4: Quality Education | <input type="checkbox"/> GOAL 13: Climate Action |
| <input type="checkbox"/> GOAL 5: Gender Equality | <input type="checkbox"/> GOAL 14: Life Below Water |
| <input type="checkbox"/> GOAL 6: Clean Water and Sanitation | <input type="checkbox"/> GOAL 15: Life on Land |
| <input checked="" type="checkbox"/> GOAL 7: Affordable and Clean Energy | <input type="checkbox"/> GOAL 16: Peace, Justice Strong Institutions |
| <input type="checkbox"/> GOAL 8: Decent Work & Economic Growth | <input checked="" type="checkbox"/> GOAL 17: Partnerships to achieve the Goals |
| <input checked="" type="checkbox"/> GOAL 9: Industry, Innovation & Infrastructure | |

The Sustainable Development Goals indicated above by a “X” are addressed by the work of TC 91.

Although assembly technologies for use in design, manufacturing and testing of electronic equipment, as being part of the TC91 scope, have a direct or indirect involvement in (nearly) all SDG areas, a limited selection has been made of those SDG’s that are influenced by TC 91 the most.

A distinction is made between “general SDGs” and “specific SDGs”, specifically being addressed from TC 91 standing point.

General SDGs

SDG 12: Responsible Consumption & Production – (Sustainable consumption and production)
TC 91 develops International Standards, Guidelines and Technical Reports supporting an increase of equipment reliability and providing guidance, how to prevent quality losses and creation of waste by defects caused by inadequate selection of materials and processing of electronic components in manufacturing of electronic assemblies.

SDG 17: Partnerships to achieve the Goals - (Better access to technology and innovation)
The use of TC 91 documents, as part of the overall IEC standards portfolio, facilitates participation in global trade for all countries. TC 91 develops International Standards, Guidelines and Technical Reports supporting access to technology and innovation, for example on the basis of knowledge transfer and harmonization of requirements and procedures throughout globalized supply chains.

Specific SDGs

SDG 3: Good Health and Well-being – (Safe medical devices)
TC documents form the basis to design and manufacture electronic products, especially interconnecting structures, and technologies for medical equipment. They are key factors to guarantee the electrical and functional safety of these equipment.

SDG 7: Affordable and Clean Energy – (Mobility, Energy efficiency, renewable energy)
TC documents form the basis to design and manufacture electronic products used in energy-efficient powertrain mobility solutions as well as renewable energy solutions (e.g. convertors). They are key factors to guarantee the electrical and functional safety of such equipment.

SDG 9: Industry, Innovation & Infrastructure – (Infrastructure and distribution)
TC 91 documents and projects promote new technologies and methods, fostering the reduction of resource consumption, e.g. by miniaturization. The major TC91 topics are related to:

- Materials and components for electronic packaging and its performance requirements
- Assembly processes and interconnecting structures
- Quality and reliability of electronic packaging, manufacturing and assembly

In that context continuous reduction of waste and replacement of hazardous material is achieved.

F. TRENDS IN TECHNOLOGY AND IN THE MARKET

If any, indicate the current or expected trends in the technology or in the market covered by the products of your TC/SC.

Trends in technology:

The electronic equipment of the present day is becoming lighter in weight and smaller in size which requires high density packaging of products. Moreover, signal processing speed is getting faster and faster to above the GHz range, requiring state of the art technology even in consumer commodity products.

Users of products, both professional and general consumers, request products of smaller, lighter, faster, less expensive and still of very high reliability in a very wide range of applications. Shelf life of products is very short as in for cell phones and personal computers, which are less than half a year in some cases. The common knowledge of a decade ago can no longer survive in the present society of very fast changes. Technological borders do no longer exist. Optical signal transmission that has been widely used in especially trunk line communications is now coming into consumer commodity in a few years. The communications area can no longer be isolated from the production technology of consumer commodity products, especially communication and audio/video technologies are merging each other even in home environment. Production techniques to manufacture products which users need must make full use of available technology, regardless of electronic, acoustic, optic even biological techniques in the coming decade.

We see significant new trends in assembly technology are coming in. One of them is the embedded passive and active devices board technology as seen in the formation of WG 6 in TC 91. Embedding passive and active devices in one package may change the assembly technology of electronic products significantly. Just one assembly package may perform as a sub-system or even an entire system Electronics production may be considerably changed in a few years. The task of WG 6 is to develop international standards and other deliverables in the area of device embedding assembly technology, which covers device embedded substrates and modules using such substrates, however, since it does not include the product itself, standards and other deliverables related to modules will be developed in close liaison with the relevant product committees, such as TC 47, SC 47A, SC 47D, TC 40, TC 86 and any other relevant TCs.

Other new trends are the introduction of the large area electronics and printed electronics. Display device are now becoming of very large areas of employing liquid and electro-chromatographic techniques. Solar cell applications also need the large area electronics. These applications are just a few examples of the large area applications. Printed electronics may introduce wearable systems new production techniques especially in the large area electronics including the examples just shown here. Both the terms of large area electronics and printed electronics will be included in the 6th edition of IEC-60194, in terms and definition in assembly technology.

Trends in the market:

The price competition is very severe, especially in electronics components and products. Some producers in developed countries where wages are comparatively high may have their businesses affected unless serious restructuring is made both in production systems and organizations. And yet, synergy of collaboration crossing borders is a must for an organization to survive in the electronics industry. It is a must to work together crossing borders both in technology and business environment around the world. The environmental consideration is another must for the industry. Unless one can cope with the demand of the society, e.g. of lead-free or other hazardous substances, the organization may just cease from the society. TC 91 needs to collaborate not only between IEC and ISO, but also with others including trade organizations especially with organizations having C-Liaison with TC 91 such as IPC and JEITA (Japan Electronics and Information Technology Industries Association), professional organizations such as IEEE or other independent organizations like the JIC (Jisso International Council) to develop useful IEC documents. Participation of experts from countries where much production is being made but has not been very much active in IEC is highly required

G. SYSTEMS APPROACH ASPECTS (SEE DIRECTIVES PART 1 ANNEX SP)

Does your TC/SC have a need for a systems approach?

If so:

- Will the Systems work be in a single TC or in multiple TCs?
- Will a Standardization Evaluation Group (SEG), Systems Committee (SyC), or Systems Resource Group be required?
- Is your TC/SC work of relevance to ISO?
- Is or are there fora or consortia working in parallel to IEC? Is there a chance to integrate this work in your TC/SC?

This should not only be restricted to the customer/supplier relationships with other TC/SCs indicating types of co-operation (e.g. liaisons, joint working groups) but be of a more generic nature.

As IEC/TC 91 is responsible to prepare standards and specifications necessary in production of electronic products, it will actively continue to promote the establishment of liaisons with other committees and organizations. TC 91 has established the following liaisons:

Internal IEC Liaison: SC 3C, TC 40, TC 47, SC 47A, SC 47D, SC 47E, SC 48B, TC 49, TC 51, TC 86, TC 104, TC 107, TC 111, TC 119, TC 124, ISO/IEC/JTC 1/SC 41

Liaison ISO: ISO/TC 44/SC 12, ISO/TC 69/SC 5

Liaison C:

IPC: WG 1, WG 2, WG 3, WG 4, WG 5, WG10, WG12

JEITA: WG 1, WG 2, WG 3, WG 4, WG 5, WG10, WG12

EDIFICE: WG 1

The system approach matrix shows the interdependence of TC 91 with other Committees.

TC 91 as a customer of standards	TC 40	Capacitors and resistors for electronic equipment
TC91 as a supplier of standards	TC 100	Audio, video and multimedia systems and equipment
Other committees which TC 91 works in close collaboration with	TC 86	Fibre optics
	TC 111	Environmental standardization for electrical and electronic products
	ISO/TC 44/SC12	Solders

It may be further necessary to develop specification in collaboration with other organizations including IEC and ISO committees in the area of Jisso, defined as “Total solution of production technology including design and manufacturing, assembly, packaging and mounting”. Assembly is not based on a single field of technology but must be a total solution of technology from design to development and selection of components and requirements in production lines, even testing of final products and any problem arising from use of such a product in the field.

H. CONFORMITY ASSESSMENT

With reference to Clause 33 of Part 2 of the ISO/IEC directives, are all you publications in line with the requirements related to conformity assessment aspects?

Will the TC/SC publications be used for IEC Conformity Assessment Systems (IECEE, IECEx, IECQ, IECRE)?

Will any of your standards include test specifications, reproducible test requirements, and test methods?

Are there likely to be special conformity assessment requirements generated by any standards projects? If yes, list which projects.

All TC 91 publications are in line with the requirements related conformity assessment aspects.

TC 91 publications have never been used for IEC Conformity Assessment Systems.

TC 91 standards include test specifications and test methods, but there are no likely to be special conformity assessment requirements generated by any standards projects.

I. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES

STRATEGIC OBJECTIVES 3-5 YEARS	ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES	TARGET DATE(S) TO COMPLETE THE ACTIONS
<p>1. Provide the industry with energy efficient and environment friendly information and standards necessary in electronics assemblies and printed wiring board assemblies.</p> <p>For that, monitor related industry and technology developments and initiatives that may affect the areas of electronics and printed board assemblies.</p>	<p>1) Revision of IEC 61760-1 to reflect the requirements of state of the art assembly technology to electronic components</p> <p>2) Develop guidelines for handling of mechanically sensitive components</p> <p>3) Develop guidelines for the specification of cleanliness of components</p> <p>4) Ask and collect new terms and definitions from other WGs for new edition</p> <p>5) Analyse and Add the terms swiftly to the next edition</p> <p>6) Develop a measurement method of GHG emission from PCB production.</p> <p>7) Develop a series of test methods such as durability, quality assurance, & others in consideration of new process, new material, and others.</p>	<p>1) Completed 2020-07</p> <p>2) Target publication date of TR is 2021</p> <p>3) Completed 2020-07</p> <p>4) October 2016 (Completed)</p> <p>5) September 2017 (Complete)</p> <p>6), 7) TBA</p>
<p>2. Respond to actual market needs in timely manner.</p> <p>For that, keep close cooperation with industry consortia, for instance through C-liaison, and seek opportunities to adopt</p>	<p>1) Intensify cooperation with IPC and JEDEC via the Liaison Coordination Group.</p> <p>2) Continue cooperation with EDIFICE for automatic data exchange systems (e.g. bar code label and future advanced</p>	<p>1), 2) Completed</p>

<p>industry standards.</p>	<p>systems)</p> <p>3) Decrease the volume of the terms for speedy handling</p> <p>4) Divide the pool of terms into multiple groups to match with markets</p> <p>5) Establish a tight connection with the technology roadmap organizations (or obtain roadmap function internally) to provide an answer before a question.</p>	<p>3) October 2015 (Completed)</p> <p>4) February 2017 (Completed)</p> <p>5) In progress, Jasbir Bath (iNEMI) introduced Board assembly technology chapter of "iNEMI Roadmap" in JIC meeting in May 2018.</p>
<p>3. Reduce the time in developing TC 91 publications.</p> <p>For that, collaborate with other IEC TCs to exchange information and to harmonize concept so that all work is coordinated, where appropriate, to avoid duplicate development of deliverables.</p>	<p>1) Determine the pool of terms for collaboration with other TCs</p> <p>2) Work with other TCs to reconcile the differences in definitions</p> <p>3) Establishing a portal page for the testing documents. It is possibly searched by number, name, function, development status, and so on.</p> <p>4) Liaison reports shall be put to CTP; CO will be asked to shift the existing documents and folders to the newly established</p> <p>5) Utilization of collaboration tool</p> <p>We prepare a proposal for folder structure and naming convention.</p> <p>6) List of existing standards including review dates and PWI to determine and adjust resources needed</p> <p>7) Tools for project management (e.g. Excel application, which contains all project stages and calculates target dates automatically).</p>	<p>1) May, 2018 (Complete)</p> <p>2) April, 2019 (In process)</p> <p>3) TBA</p> <p>4) November 2015 (Complete)</p> <p>5) December 2015 (Complete)</p> <p>6) TBA</p> <p>7) Complete</p>
<p>4. Seek more expert participation in the standardization work of TC 91.</p> <p>For that, partnering industry players to promote the use of IEC standards worldwide and recruit experts to participate in the development of needed standards and specifications, especially in developing</p>	<p>1) Recruit more experts from Chinese and English speaking countries for members</p> <p>2) Cooperate with NEASF or the relation organization of each country, and guides the practical use method of related standard and/or technology.</p> <p>3) Make industry network active</p>	<p>1) March 2017 (Complete)</p> <p>2), 3) TBA</p>

countries where many manufacturing plants are located presently.	through SCC20 experts.	
Note: The progress on the actions should be reported in the RSMB.		