SMB/7424/R

STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
TC 90	**Japan**	**2021-08-31**

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

The present scope of TC90 committee is "to prepare international standards (IS) related to "superconducting materials and device". No change is required.

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.

The management structure of the TC90 has been unchanged.

It is divided in working groups that are specialized on measurement techniques of different superconducting properties such as critical current, superconducting/matrix ratio, resistive ratio etc.... The works are implemented to new superconducting materials when required. As an example, recent works on critical currents and mechanical properties of a new emerging wires made out from MgB2 material has been started within the relevant WGs.

In general, TC90 objective is to work with the relevant TC that is involved on the standardization of a device (e.g. power cables) In this case we are using a joint working group organization. Some standards specifics to superconducting devices are also specifically studied such as current leads or superconducting detectors.

For example, measurement technic of superconducting AC cable was studied with TC20 electrical power cables.

Special groups like advisory groups, editing groups, etc.: IEEE (related to Superconductor electronic devices)

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.

Superconducting products have the potential to bring a breakthrough technically and/or economically to the market, because superconductors wires and devices have unique performances that are not possible to reach with electrically resistive materials.

LTS (Low Temperature superconducting) wires are key components necessary for the well-established MRI magnet business with incomes of 6-7 B€/year. For such wires measurements standards are already existing and are daily used for the business. However they still need to be reviewed to integrate new LTS materials (MgB2) or new control possibilities (image analysis...)

Beside the MRI market, HTS (High Temperature superconducting) materials will sooner or later be deployed at a large scale despite they are still facing today some cost issues. For these emerging materials standards are key helping tools to convince end-users of the maturity of the technology.

As a first example, a HTS cable combines a compact design with high current-capacity and with low energy-loss at the same time. Such demands are complementary to normal electrical resistive cables and makes the superconducting cable very attractive technologies for power demanding areas such as city centres.

As another example, superconductor electronic devices will enable the design of ultrahigh sensitive detectors that are unrivalled for space industries.

Especially, “measurement standards” for specific properties of superconductors, such as critical current (Ic) of HTS cable, dark count rate of superconducting photon detector, and so on, will be important for technical, industrial, and economic aspects in the field of future superconductivity.

In addition, large-scale international and MRI business projects already need to purchase superconductors from a different of countries (ex ITER). The consistency of the “measurement standards” and the “terminology related to superconductors” are important to facilitate the international trade.

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.

The customers of the standards:

- Superconducting wire/device manufacturers/developers

- Magnet manufacturers/developers

- Electric cable manufacturers/developers

- Superconducting sensor/devise manufacturers/developers

- Cryogenic system manufacturers/developers

- High energy/fusion

- Health science

- IEC/TC20 (Electric cables)

E. SUSTAINABLE 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.

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

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.

Studies on equipment such as power cables, ship propulsion motors, generators, transformers, fault current limiters and many kinds of magnets are ongoing in very active ways.

Superconductor electronic devices and/or sensors used for industrial or medical inspection instruments, quantum information processing, and so on are also expected to become a huge market.

2 special technical topics have to be considered

Electrical insulation techniques and properties measurements (electrical strength, permeability, AC losses) for superconducting wires, devices and their applications are also the important technique related to IEC/TC90.

Evaluation of Ic uniformity is a prerequisite for most of the superconducting devices built with HTS materials. This technique will be carried out within IEC/TC90.

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.

There are some system approach aspects in TC90 activity.

A liaison relationship with VAMAS has been already established for long time. A liaison relationship with CIGRE SC D.1 has been also established. The collaboration with TC20 has been implemented for the standardization of testing of HTS cables.

For applications of superconductivity which have conventional counterparts already subject of an existing technical committee within IEC, TC90 will work with a liaison with the relevant committee to establish standards. TC90 also plans to make use of existing pre-standardization organizations and build upon their work wherever possible. This is

the case of "testing superconducting AC cables" which is carried out with the TC 20 power cable committee.

For technologies that have no existing technical committee and for which TC90 members typically have advanced expertise (cryogenic etc.) will be studies in TC90.

As an example, "Cryogenics" closely related to superconducting technology should be considered within TC90. Different terms to describe "Cryogenics" will be at least defined in TC90/WG1(Terms and definitions).

Standardization of superconducting sensors/devices is the objective of a joint working group between IEEE and TC90/WG14.

H. Conformity Assessment

With reference to Clause 33 of Part 2 of the ISO/IEC directives, are all your 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.

Many of TC90 standards include test specifications, reproducible test requirements, and test methods.

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
Twist pitch measurement method	NP submission from CNC	2021
Ic measurement of superconducting cables	will be discussed in TC90/WG3	2022
MgB2 Ic measurement	Discussion about another International Round Robbin Test	2022
Low temperature tensile test method of REBCO and BSCCO wires	will be discussed in TC90/WG5	2022
Ic Measurements on REBCO and BSSCO wires under Tensile Load at liquid nitrogen temperature	will be discussed in TC90/WG5	2022
Cooling technology	will be discussed in TC90/WG12	2022

Note: The progress on the actions should be reported in the RSMB.