



IEC/TC OR SC: IEC/TC 51	SECRETARIAT: Japan	DATE: 2020-11-16
-----------------------------------	------------------------------	----------------------------

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 51
MAGNETIC COMPONENTS, FERRITE AND MAGNETIC POWDER MATERIALS

The scope of TC 51

To prepare standards relating to:

- parts and components displaying magnetic properties and intended for electronics in a wide range of application areas, including telecommunications, computers, automotive, audio, video, lighting, solar and wind power systems, welding, inductive heating, power conditioning (UPS), wireless charging and RFID;
- parts associated with such components;
- measuring methods, tests and specifications for transformers and inductors using such components;
- ferrite and magnetic powder materials.

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.

Working Groups

- WG 1 Ferrite and Powder Cores
- WG 9 Inductive components
- WG 10 Magnetic materials and components for EMC applications

Maintenance Teams

- MT 1 Magnetic oxide cores (E-cores) of rectangular cross-section and associated parts - Dimensions
- MT 7 Measuring methods for properties of gyromagnetic frequencies materials intended for applications at microwave frequencies

Internal IEC Liaisons

- TC 46/SC 46F R.F. and microwave passive components

TC 68	Magnetic alloys and steels
TC 91	Electronics assembly technology
TC 96	Transformers, reactors, power supply units and combinations thereof

Liaison A
IEEE-SA Power Electronics Standards Committee (PELS),
Electronics Transformers Technical Committee (ETTC)

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.

Magnetic components with ferrite and magnetic powder cores are key components in electric power systems and digital electronics. Since the latter half of 2016, electronics industry continues to grow. Further increased demand of electronic components is expected because of the higher functionality of smart phones and the growth of the ratio of electronic components not only in electric vehicles but also aircrafts. Also, the expansion of the robotics market is expected. The business of magnetic components will be expected to expand and grow further due to the development of next-generation high-speed telecommunication networks and the growing demand for integrated service digital broadcasting.

In addition, with the rapid spread of power semiconductors such as SiC and GaN, ferrite and magnetic powder cores are required to have lower losses at high frequencies and stable operation at higher temperature. It is expected that technological innovations to deal with these will be actively carried out.

On the other hand, while the spread of the new coronavirus Covid-19 infection, which became a global epidemic in the spring of 2020, major social behavior changes have been seen and a new lifestyle of "with Corona" and "new normal" have begun to take root. As a result, technological innovations are beginning to contribute to "distributed" and "independent" energy systems, and "remote" operation systems.

Consequently, innovations in electric energy systems and digital electronic devices will enter a new phase and it is expected that new technological innovations will be required to support magnetic cores and magnetic components, which are essential electronic components.

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.

Manufacturers of transformers, inductors and OEM manufacturers are the users of TC51 standards. TC51 recognizes the need for a stronger involvement of users of ferrite and inductive components. A proactive effort, which is standardization by foreseeing the future demand rather than documentation of the established industry standard (de facto standard), is desired.

The purpose of standards for magnetic components is to provide a general platform for agreement between suppliers and users. Special requirements are not unusual, and consequently direct agreements between supplier and user on critical points are common. Standards function to set the baseline expectations for typical components. IEC standards are widely used at the international level.

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/](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 type="checkbox"/> GOAL 3: Good Health and Well-being | <input 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 type="checkbox"/> GOAL 17: Partnerships to achieve the Goal |
| <input checked="" type="checkbox"/> GOAL 9: Industry, Innovation & Infrastructure | |

TC 51 prepares standards relating to parts and components displaying magnetic properties and intended for electronics in a wide range of application areas, including solar and wind power systems.

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.

“High frequency”, “small physical size and weight”, “low profile” and “low power loss” describe the key trends at present for magnetic components. Digital techniques are adopted in IT products such as mobile phones and personal computers, as well as in growth fields such as consumer electronics and automotive applications. Because the problem of high frequency noise occurs inevitably, the growth in demand for EMC components (and the related products of TC 51: ferrite cores of WG 1, inductors of WG 9 and noise suppression sheets of WG 10) is higher than the growth rate of electronic equipment generally.

The trend in power systems is to have distributed power architecture, usually one or more DC/DC converters on each board, often using a multiphase topology that requires multiple inductors. With this trend, the magnetic components need to have a “low profile”, a “low loss with high saturation magnetic flux density”, and wide temperature range performance at high frequencies. As the DC/DC converters are located physically closer to the load to reduce routing losses and routing inductance effects, larger values of current are required to drive devices at lower voltages coupled with multiple stages of voltage conversion allows for increased usage of magnetic powder cores.

The demand for active power factor correction (PFC) circuitry has become important, and exhibits strong growth. Demand for magnetic components for use in electrical vehicles (EV) and hybrid electrical vehicles (HEV) will be especially increased. Solar and wind power circuitry, inductive heating, welding and RFID also show strong growth. The technical requirements for magnetic components used in emerging technologies such as Smart grid, DC to the home and renewable energy should be monitored as these technologies near commercialization.

The environmental conditions in automotive applications require new materials and components to operate at temperatures in ranges from $-55\text{ }^{\circ}\text{C}$ to $+155\text{ }^{\circ}\text{C}$, and wider. High frequency and high voltage circuits utilizing magnetics are increasingly used in automotive applications.

Markets of magnetic components are various, including industrial, commercial, consumer products, aerospace, medical, and utilities. Customers for magnetic components have forced increased competition among the suppliers. Lower prices and shorter delivery times are demanded, without any reduction in quality. Production of magnetic components has been shifting to Asia, because that is where very substantial proportions of the markets for magnetic components have moved, and to meet lower price requirements. Currently about 70 % to 80 % of the production is in Asia. The demand of magnetic components has increased in quantity. In response to these demands of low cost and high power density, integrated magnetic components are being designed into more applications. Even though low cost is still the primary driver, there is renewed interest in the methodology used by manufacturers to characterize reliability. Also consistent with physical integration to reduce physical size there is a growing interest in the near magnetic field characteristics of magnetic components.

At the same time, many components that are not designed in accordance with any standards may appear on the market, it should become increasingly important to produce and supply products based upon IEC standards.

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.

- Component committees (TC 51 – role of a customer)

IEC/TC 40: Dimensional standardization of multilayer chip parts, packaging, safety requirement

IEC/TC 68: Classification, measuring methods and properties of magnetic materials

- System committees (TC 51 – role of a supplier)

IEC/TC 1: Terminology

IEC/SC 46F: RF and Microwave components

IEC/TC 96: Transformers, reactors, power supply units, and combinations thereof

- Other committees

IEC/TC 77: EMC

IEC/TC 91: Electronics assembly technologies, soldering

IEC/TC 104: Environmental conditions, test methods

IEC/TC 111: Environmental aspects

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.

None of the above

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
Align magnetic component performance with environmental improvement.	Develop new IS on near magnetic and electric fields characterization. (WG 9: Inductive components)	2024-12
Guideline on ferrites and magnetic powder cores used in manufacturers' catalogues and measuring method for each application.	Develop new IS series of magnetic powder cores. (WG 1: Ferrite and powder cores)	2025-12

Align magnetic component performance with environmental improvement.	Discuss NP for measuring method of permeability and permittivity of noise suppression sheets at higher frequencies than 6 GHz. (WG 10: Magnetic materials and components for EMC applications)	2025-12
Note: The progress on the actions should be reported in the RSMB.		