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| IEC/TC OR SC: TC 27 | SECRETARIAT: Poland | DATE: 2018-10-26 |
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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: Industrial electroheating and electromagnetic processing

Scope: Standardization in the field of industrial equipment and installations intended for electroheating, electromagnetic processing of materials and electroheating based treatment technologies

Note: The scope of interest covers industrial installations with the use of the following equipment:

- equipment for direct and indirect resistance heating;
- equipment for electric resistance trace heating;
- equipment for induction heating;
- equipment using the effect of EM forces on materials;
- equipment for arc heating, including submerged arc heating;
- equipment for electroslag remelting;
- equipment for plasma heating;
- equipment for microwave heating;
- equipment for dielectric heating;
- equipment for electron beam heating;
- equipment for laser heating;
- equipment for infrared radiation heating.

The list presents typical examples of equipment and its applications and is not exhaustive.

The scope of TC 27 now covers all industrial electroheating (EH), including electroheat-based surface treatment technologies, and their combinations as well as electromagnetic processing of materials (EPM). Specific aspects of electromagnetic compatibility (EMC) and electromagnetic fields (EMF) are addressed, too. Excluded from the scope are domestic uses, medical uses, and welding applications.

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.

Secretariat: Poland **Chair:** Germany

Advisory Groups

[AG 1](#) Chairman's Advisory Group (CAG)

Project Teams

[PT 63078](#) Installations for electroheating and electromagnetic processing - Test methods for induction through-heating installations

Maintenance Teams

[MT 17](#) Maintenance of IEC 60519-10, IEC 62395-1 and IEC 62395-2

[MT 18](#) Maintenance of IEC 60519-1 and IEC 60398

[MT 21](#) Maintenance of IEC 60519-4, IEC 60676 and IEC 60683

[MT 23](#) Maintenance of IEC 60519-6, IEC 60519-9 and IEC 61307, IEC 61308

[MT 24](#) Maintenance of IEC 60519-3, IEC 60519-11, IEC 61922 and IEC 62076

[MT 26](#) Maintenance of IEC 60519-7 and IEC 60703

[MT 28](#) Maintenance of IEC 60519-8 and IEC 60779

[MT 31](#) Maintenance of IEC 60519-12, IEC 62693 and IEC 62798

MT 32 Maintenance of IEC 60050-841

MT 33 Maintenance of IEC/TS 62996 and IEC/TS 62997

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.

TC 27 was established in 1937 to prepare international standards for characteristics, safety requirements and test methods for industrial electroheating installations. One of TC 27's main objectives is to provide the market with relevant safety requirements, along with test and measurement methods, which also take into account the impact of industrial equipment and installations for EH and EPM on the environment, people and the electric supply network.

In general, EH is used in the following generic industrial operations: fluid and solids heating, drying, sterilization, annealing, metal and non-metal melting, smelting/agglomeration, curing and forming, to name the most important. EPM processes can be thermal or non-thermal, they rely on magnetic or electric forces and may further employ very high pressures including compression waves, as well as vacuum. Examples are induced change of crystal orientation, separation processes including pulverization, stirring of liquids and high pressure sterilization. Such technologies are used for producing or processing many different materials, that range from metals to glass, natural fibres to polymers but also paper and foodstuffs.

The techniques under the scope of TC 27 use a substantial part of electricity generated on earth. They are widespread and found in most industrial processes or somewhere used for the manufacturing of most stuff – especially manufacturing of electronic devices and technologically advanced products.

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.

Standardization in industrial EH and EPM is of great importance for manufacturers of equipment and installations. Manufacturers cover the complete range from specialized small or medium-sized enterprises to global corporations. Their products are usually individually designed and custom engineered according to specific needs of the end users. Establishing common international standards with safety requirements and other characteristics that may vary is rather difficult, but supports global harmonization and reduction of trade barriers. Harmonization of safety aspects is of particular importance; it especially enables small and medium enterprises (SMEs) to make safe equipment for the international market.

End-users of TC 27 publications are customers coming from various industrial sectors

- basic material industry like iron, steel or non-ferrous metal, cement, glass, ceramics and chemical;
- industry manufacturing industrial machinery and equipment, photovoltaic cells, batteries;
- industry manufacturing products for the end user, like automotive, food, paper and print, items made from plastic including fiber reinforced plastics.

EH technologies cover a large percentage of industrial electricity consumption. In the European Union it is estimated to range from 20 % to 40 %. This industry faces increasing concerns and requirements on energy efficiency and energy management from society and customers.

There is an increasing need for international standards dealing with safety requirements, test and measurement methods of relevant equipment as industrial enterprises providing EH and EPM equipment with their various techniques act more global.

A growing number of heating installations use electric heating rather than fossil fuel. The market recognizes that industrial EH equipment offers a significant opportunity to enhance industrial productivity, increase energy efficiency, decrease emissions from industrial sites and enhance global competitiveness. Some of the technical, economic and environmental advantages of EH in comparison with heating processes powered by fossil fuels are

- fast heating, superior temperature accuracy and instant on-off operation;
- high quality of final products,

- high production capacity at comparably low production cost and cost of ownership;
- high safety, efficiency and reliability provided through simple process control and monitoring;
- possible full automatization of electroheating processes in small-scale production;
- low to no critical emissions of pollutants at the production plant;
- good working conditions and safety for personnel;
- safety advantages over fuel combustion energy use, due to the hottest object typically being the workload itself;
- fully operational with non-fossil and renewable energy sources.

E. 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.

Due to the increasing demand for energy savings, product quality and environmental protection EH and EPM methods are becoming increasingly challenging but essential for industry.

Industry demands increasingly compact equipment, higher throughput, higher flexibility in materials processing and advanced control over product characteristics.

Development of new materials for construction and advances in computer aided engineering (CAE) enable new generations of EH or EPM equipment to be manufactured. Industrial EH and EPM are also considered as fields with tremendous potential for the application of power electronics (converters and digital control systems), which could help to achieve significant energy savings, enhanced productivity and improved quality.

Advanced technologies offer considerable industry-wide cost savings and high performance efficiencies – energy consumption can be reduced by 5-25 % over the next 10 years. It is envisioned that advancements in EH and EPM will make significant contributions to achieving set targets regarding safety, energy efficiency and environmental performance.

Reducing the carbon footprint of industry will have a major impact on development and application of industrial EH and EPM. New applications substituting conventional heating techniques will be instrumental for creating global sustainable energy usage.

Industry and NCs tend to take standardisation in the area of TC 27 for granted or stick to long outdated versions of standards. This could be caused by

- the fragmentation of the market into many small segments;
- this fragmentation necessitates a specialization thus, testing bodies might be less interested in participating in the safety work;
- regulators tend to produce requirements which are not always applicable to specific types of equipment, creating a situation not encouraging standardisation work;
- companies unwilling to share expertise or knowledge;
- other issues in standardisation being of more immediate concern to industrial players (e.g. digitalisation);
- EH being an old technology, assuming there are no changes in technology and a disregard for changes in regulation;
- SMEs often do not have sufficient in-house resources for active participation in standardization work, as the expert is needed for day-to-day activities.

These effects seem to result in the observed decreasing support from industry or NCs to TC 27. Today's situation is marked in that the loss of three core experts from the TC would make it basically inoperable – this demise is expected soon due to age or lack of funding

F. SYSTEMS APPROACH ASPECTS (REFERENCE - AC/33/2013)

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 Systems 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.

If there is no need for a systems approach as outlined in AC/33/2013, is it intended a TC would not be requested to report on general systems approach considerations such as customer/supplier relationships, liaisons, joint WGs, etc. as referenced in the system approach matrix illustrated in slide 14 of the presentation attached to AC/37/2006?

| | | Subject area |
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| System committees (TC 27 – supplier) | TC 18 | Trace and surface heating on offshore units |
| | TC 31 | Trace and surface heating in potentially explosive atmospheres |
| Component committees (TC 27 – customer) | TC 20 | Cables |
| | TC 33 | Power capacitors |
| Other committees | TC 1 | Terminology |
| | SC 3C | Graphical symbols for use on equipment |
| | TC 16 | Identification of conductors Coding principles for indicators and actuators |
| | TC 26 | Electric welding |
| | TC 44 | Safety of machinery – general requirements |
| | TC 61, SC 61B | Safety of household equipment Microwave appliances for household and commercial use |
| | TC 64 | Protection against electric shock, thermal effects and overcurrent |
| | TC 66 | Safety of measuring, control and laboratory equipment |
| | TC 70 | IP Code |
| | TC 76 | Optical radiation safety and laser equipment |
| | TC 77 | Electromagnetic compatibility |
| | CISPR | Radio interference / Protection of radio services |
| | TC 99 | Power installations exceeding 1 kV a.c. |
| | TC 104 | Environmental testing |
| | TC 106 | EMF |
| | TC 108 | Methods of measuring touch current and protective conductor current |
| TC 112 | EIS | |
| ISO/TC 244 | Industrial furnaces and associated processing equipment | |

TC 27 cooperates with its liaison partner ISO/TC 244 (Industrial furnaces and associated processing equipment) aiming at:

- aligning the safety standards of the committees, avoiding documents with overlapping scope or double work;
- increasing mutual understanding of respective roles and responsibilities as well as needs of the

- market;
- enabling joint projects.

G. 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.

With reference to clause 33 of Part 2 of the ISO/IEC Directives all publications are in line with the requirements related to conformity assessment aspects. IEC 62395-1 is used by the IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE). TC 27 publications include test specifications, reproducible test requirements, and test methods. There are no special conformity assessment requirements generated by any standards projects.

H. HORIZONTAL ISSUES

Indicate here how the TC/SC deals with horizontal issues such as energy efficiency, environmental aspects, safety, security...

Provide information on the interaction with SMB Advisory Committees, if applicable.

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>I - Developing a consistent series of standards IEC 60519 for industrial equipment and installations for EH and EPM covering all safety aspects – electrical and non-electrical hazards</p> | <p>Revision of the IEC 60519 series of standards, and development of the European Annexes ZZ in cooperation with CENELEC.</p> <p>All parts to be revised, including the main Part 1 with general requirements.</p> <p>Get experts and convenors for this work – see (III)</p> | <p>New editions to be published according to availability of convenors and experts, and in cooperation with CENELEC</p> |
| <p>To provide incentive for this work in industry and NCs: withdraw any safety standard that refers to ed. 4 of IEC 60519-1 in due time</p> | <p>Decision at plenary</p> | <p>According to extended, new SDs</p> |
| <p>III - Re-establish a minimum number of industry support, working experts and P members, to actually enable any substantial work in TC 27 and maintenance of existing standards</p> | <p>The TC is unable to muster resources for the activation of new experts on a global base or on a national level.</p> <p>It is left for IEC and the NCs, to take the urgently needed action, as IEC and the NCs have the</p> | <p>Urgent</p> |

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| | <p>necessary experience and resources.</p> <p>The TC will request permission from the technical management board to decrease the minimum requirement of nominated experts to 3 in cases concerning EH installations .</p> | |
| IV - Addressing EMC and EMF issues relevant for EH and EPM equipment | <p>Transforming two newly developed IEC/TS 62996 and IEC/TS 62997 (on touch currents 1 kHz to 6 MHz, and on magnetic nearfields 1 Hz to 6 MHz, respectively) into ISs after revision – preferable with help of experts from TC 106.</p> <p>MT 33 work items - liaison with IEC/TC 106, and with IEC/TC 26</p> | Maintenance of IEC/TS 62996 and IEC/TS 62997 (on touch currents 1 kHz to 6 MHz, and on magnetic nearfields 1kHz to 6 MHz, respectively). |
| V - Developing consistent terminology to be used in TC 27 publications | Continuing maintenance work on IEC 60050-841: International Electrotechnical Vocabulary - Part 841: Industrial electroheating – MT 32 in co-operation with the IEC Terminology Coordinator | Ongoing |
| VI - Undertaking new projects aiming at development of safety and test methods standards concerning: <ul style="list-style-type: none"> – plasma arc furnace installations; – new casting systems; – electromagnetic processing of materials; | <p>Establishing working contacts with international and regional partners from industry and academia</p> <p>collaboration with technical committees of ISO and CEN dealing with thermoprocessing equipment could support such activities</p> | No action being considered due to a lack of experts |
| VII - Technologies allowing small, compact, and efficient frequency converters are evolving and the boundaries between commercial and industrial uses are becoming increasingly difficult to define. | TC 27 will consider to bring this up, with e.g. TC 61. | Ongoing |
| VIII - The EH and EPM installations using protective and reactive gases as well as vacuum atmosphere have been widely used for long, relevant safety aspects shall be considered. | <p>The safety issues relating to electrical aspect are being considered in the revision of IEC 60519-1:2015.</p> <p>A new IEC/TS on “Best practice and test methods for vacuum EH and EPM installations” is intending to be prepared.</p> | |
| Note: The progress on the actions should be reported in the RSMB. | | |