IEC/TC OR SC:	SECRETARIAT:	DATE:
TC20	**Germany**	**2020-11-19**

Strategic objectives of TC20 are given in item H of the SBP (see Annex). Nothing specific can be reported on these objectives as work is generally progressing as foreseen

A. STATE TITLE AND SCOPE OF TC

Technical Committee 20 - Electric Cables - covers a very broad product range from low voltage domestic installation wiring and appliance wires up to extra high voltage transmission cables for 500 kV.

The current scope of TC20 is:

"To prepare international standards for the design, testing and end-use recommendations (including current ratings) for insulated electrical power and control cables, their accessories and cable systems, for use in wiring and in power generation, distribution and transmission.

The applications cover an unlimited range of voltage and current, and includes applications such as cables for photovoltaic installations, charging cables for electric vehicles, HVDC cables (land and sub-sea), High Temperature Superconducting (HTS) cables and heating cables where the current is used to create heat.

Cables specifically designed for marine applications covered by SC 18A are excluded. All cables for communication, data transmission and other non-power applications are covered elsewhere (TCs 46 and 86A).

TC20 holds a group Safety Function for Fire Hazard testing on cables comprising:

- flame propagation tests;
- fire resistance tests;
- smoke optical density tests;
- corrosivity tests."

Users of cables generally demand safe and reliable products with a long life expectancy. The pressures on such mature products are economic rather than technical. New and emerging technologies are not expected to affect greatly and quickly the scope and work of the TC.

Consequently, the scope of TC20 does not need modification at present.

B. Management Structure of the TC

IEC Advisory Committee No 20 “Electric cables” first met in Prague in October 1934. Preliminary work had been done at the High Tension Conference in June 1933. The early work was aimed at HV cables (then restricted to a maximum voltage of 66 kV). Later developments saw a split into two sub-committees, SC 20A for higher voltages and SC 20B for lower voltages. In 1990 a 3rd SC was added, SC 20C, for fire performance aspects of cables. In 1998 the work was re-consolidated into a single TC20, supported by permanent WGs. These are:

WG16 High voltage cables (1 kV and above), their accessories and cable systems

WG17 Low voltage cables (below 1 kV)

WG18 Burning characteristics of cables

WG19 Current ratings and short circuit limits

There are at present no other proposals to change the structure of TC20.

C. Business Environment

The total worldwide market size for electric cables is ca. 150 billion USD (2016); of which ca. Americas 20%, Europe 20%, China 30%, Japan 7 % and others 23%.

Company mergers (amongst manufacturers, contractors, users and certifiers), have accelerated globalisation as well as the product and material rationalisation; new markets and manufacturing capabilities have emerged in developing countries. These trends will reinforce and enhance the importance of IEC standards in the sector.

Greater globalisation and the market growth in new areas will ensure that test houses and approval organisations remain strong users of TC20’s product and test standards.

At least 80 countries have some manufacturing capabilities. This number is growing especially for lower voltage cables used in basic infrastructure and domestic applications.

Excluding China, where statistics are hard to find and small enterprises may be numbered in hundreds, there are at least 600 individual manufacturers worldwide, of whom only a few a) manufacture for voltages above 150 kV, and b) have a global presence. Especially North American and European manufacturers have invested in the Middle and Far East and in South America.

Day-to-day cable business is affected by the economics of oil and metal prices. Global economic indicators such as for the developments of GDP and the building industry are indicative for cable market volumes.

Climate concerns have pushed sustainable development to the top of the international political and business agenda, leading to substantial investments in smarter distribution and transmission grids. Amongst others there is a considerable business increase for cables for subsea large distance connections and for connecting offshore windfarms.

The strong usage of TC20 standards in the marketplace is manifest in different ways due to regional differences, and to differences in the type of standard (e.g. product standard or test method). Many major developed economies use the product standards as a baseline for their own national standards, but frequently impose additional requirements due to different network systems, local regulations and/or customer demands. In some industrially well-developed countries and regions, competing standards exist by virtue of historical infrastructure and regulatory influences. In other regions, and in the absence of such local factors, the unchanged product standard serves well as the national standard and offers sufficient proof for regulatory compliance.

D. Market Demand

The customers of TC20 standards are usually economic actors involved in development, materials supply, manufacturing, sales, trading, installation, testing, certification and usage of electric cables. The products range from LV domestic installation wiring and appliance wires through to EHV transmission cables up to 500 kV.

Especially for mechanical, electrical and fire test methods and current rating standards there is very wide usage, virtually regardless of region. This has the potential to be enhanced even further via the IEC global relevance programme.

Analysis shows that cable manufacturers, test houses and users are represented on Working Groups and at TC level, but for the users this is mainly restricted to the transmission and distribution sector. Although there is some participation from the developing industrialized countries, this may require further encouragement.

The majority of the work covers the maintenance of existing standards, as these can accommodate most of the technological developments for the majority of cable types. A limited number of really new standards covering major extensions of new technology, or to satisfy new applications relating to renewable energy sources, will be required.

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

Specific standard are supporting goals 7, 9 and 11.

F. Trends in Technology and in the Market

There is a continued worldwide need for reliable, affordable and publicly acceptable electricity grids. In many countries the traditional grids with large central power stations and a one-way flow of power from the network to the consumer are or will be adapted. As climate change is today one of the major concerns the challenge for the electrical power system is how to integrate the increasing number of non-carbon electricity sources. Electricity needs to be carried ashore from offshore wind farms or from remote onshore windmills and photovoltaic installations to the consumers. Smarter distribution lines are needed to serve private homes and industry installations more adequately; networks will be enriched with information technology such as sensors, digital meters and communication capabilities. More countries will move towards undergrounding to achieve more resilient distribution networks and less blackouts. HVDC cables will increasingly be the backbone of future systems of electricity highways securing power supply over long distances and enabling electricity trading across country borders.

Wire and cables are designed to function safely for a long period of time, sub-standard cables are dangerous and may cause malfunctioning of the equipment connected. For established cable standards from LV up to at least 400 kV, changes in technology derive mainly from production processes, materials and components, and must be seen as relatively small step-by-step improvements in a substantially mature situation. These developments, which improve the efficiency and durability of the cable, are incorporated into the standards via the maintenance procedure.

The newer infrastructure demands, such as from large developing countries, taken in conjunction with interconnection projects and use of renewable energy sources, means that the Technical Committee has recently produced publications on:

HVDC polymeric cables (IEC 62895)
High temperature superconducting cables for rated voltages from 6 kV to 500 kV; (IEC 63075 in cooperation with TC90)
Submarine MV power cables up to 60 kV for offshore connections (IEC 63026)

The TC is also looking in particular to the effects for cable standards of the technical developments in:

UHV (in CIGRE)
LVDC (in SEG 4 and TC 64)
Charging of Electric Vehicles (IEC 62893 series)
Photovoltaic energy systems (IEC 62930)

Much technical development work of the last 20 years has been in the area of fire performance cables, for this subject TC20 (through its WG18) has a group safety function. In certain regions and countries there is already some maturity in the general domestic and industrial building sector for low fire hazard cables, which is often supported by national or regional regulations or installation standards. This is gradually influencing MV and HV applications. The demand of low fire hazard cable is supported via test method standards covering all important aspects of fire behaviour. These standards are actively refined further and, under the global relevance programme, assessed as tests where harmonisation across regions could be beneficial.

The TC is considering for many years the environmental aspects of its products and components both in relation to their end of life disposal, recycling and their in-service performance. TC20 published information several years ago on suitable cable design parameters to achieve lower transmission losses and reduced heating effects, and hence reduced carbon footprint. This specific TC20 guidance document has been revised and upgraded from a TR to an IS (IEC 62125) covering environmental issues. Guidance on environmental conductor size optimization is provided in the new publication. TC 111 is seen as a source of information and inspiration for this activity and its work was part of the review process.

There is a strong awareness of the potential impact of requirements and regulations relating e.g. heavy metal - or halogen free. Initiatives in particular in TC111 to set new test methods and requirements are carefully monitored to assess relevance to power cables and avoid conflicts with well-established cable material test methods. TC20 has taken active participation in ACEA which also covers many environmental, horizontal issues.

G. Systems approach aspects (See Directives Part 1 Annex SP)

TC20 products, by their very nature, are generally not suitable for coverage by a horizontal system approach to standardisation. This is principally due to factors such as:

- the use of cables as products with a long life expectancy (many decades) and their installation in inaccessible places (e.g. buried);
- the wide variety of end-uses to which a single cable type can be put;
- the role of cables as connecting devices (often over long distances) between items of equipment.

However, TC20 is monitoring the work of the IEC System Evaluation Groups (SEGs), System committees (SyCs) and the System Resource Group (SRG). At present only the work in SyC LVDC is expected to have a direct effect on some LV standards of TC20.

In 2018, it was agreed that TC20 would participate in ACTAD, the advisory committee on transmission and distribution. Since 2017 TC20 is officially represented in ACEA, the advisory committee on Environmental aspects, specifically in the discussion about the definition of “halogen-free”.

There is obviously interdependence between the TC20 work and the activities of other TC/SCs in several areas. Therefore, TC20 has liaisons and interfaces with many TCs and SCs as illustrated below:

TC20 as a customer for standards of other TCs	TC 15	Solid electrical insulation materials
	TC 42	High voltage and high current testing techniques
	TC 89	Fire hazard testing
	TC 90	Superconductivity
	TC 99	System engineering and erection of electrical power installations in systems with nominal voltages above 1 kV a.c. and 1,5 kV d.c., particularly concerning safety aspects (replacing TC28 on insulation co-ordination)

TC20 as a supplier of standards to other TCs	TC 14	Power Transformers
	SC 17C	HV Switchgear
	SC 18A	Electric cables for ships and mobile and fixed offshore units
	TC 23	Electrical accessories
	TC 27	Industrial electroheating and electromagnetic processing
	TC 34	Lamps and related equipment
	TC 36	Insulators
	TC 46	Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories (including SC 46A and SC 46C)
	TC 61	Safety of household and similar electrical appliances
	TC 69	Electric road vehicles and electric industrial trucks
	TC 82	Solar photovoltaic energy systems
	SC 86A	Fibre optics. Fibres and Cables
	TC 97	Electrical installations for lighting and beaconing of aerodromes
	TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology
	TC 1	Terminology

Other horizontal committees that produce standards used by TC20	TC 64	Electric installations and protection against electric shock
	TC 111	Environmental standardization for electrical and electronic products and systems
	TC 112	Evaluation and qualification of electrical insulating materials and systems
	TC 115	HVDC transmission for voltages above 100 kV

TC20 has liaison officers and experts participating in committees: SC 18A, TC 64, TC 69, TC 82, TC 89, ISO/TC 178, IEEE-PES-ICC and CIGRE SC B1.

Experts reporting to TC20 but working in other TC/SCs are in: SC 17C, SC 23A, TC 27, SC 34D, SC 86A.

H. Conformity Assessment

TC20 test method and product standards are well recognized in the market place. They are in daily use for conformity assessment and certification of cables and cable materials. IEC conformity assessment schemes for cables do not exist and/or are not used. Typically, IEC test methods are directly used or are the basis to qualify local or regional products and often IEC product requirements are called up for national or regional approvals and market access.

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
Maintain the time for development of TC20 work within requested timescales.	Encourage Convenors and Project Leaders to plan work, meetings and schedules up to three years ahead.	2021-09
Ensure that those standards that have had no review since the introduction of the formal maintenance process are addressed.	Ensure that Convenors, project leaders and experts are aware of Best Working Practices and have access to all tools to work efficiently.	2021-09
Regularly review TC20 product standards to reflect changing technologies and user requirements, including in the area of fire performance, but ensure maximum stability for associated test methods.	Monitor, with assistance of TC20's Strategic Planning Group, emerging market and technological trends.	2021-09
Ensure that work is prioritized in relation to the available resources.	Engage with IEC Central Office at the earliest stage of any procedural or structural	2021-09

	problems likely to cause delay.	
Continue to respect targets for global relevance of standards without creating non-homogeneous deliverables.	Maximise consensus for both new work and amendments/revisions before formal entry into the procedures:	2021-09
Promote the existing high awareness of TC20's work and standards, especially towards newer members and associate members of IEC.	Regularly review target dates for all work.	2021-09
Note: The progress on the actions should be reported in the RSMB.		