STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
85	**China**	**2016-12-23**

A. TITLE AND SCOPE OF TC

A.1 Title

The title of TC85 is **Measuring Equipment for Electrical and Electromagnetic Quantities**

A.2 Scope

To prepare international standards for equipment, systems, and methods used in the fields of measurement, test, recurrent test, monitoring, evaluation, generation and analysis of steady state and dynamic (including temporary and transients) electrical and electromagnetic quantities, as well as their calibrators. Such equipment includes:

- devices for testing the effectiveness of protective measures and safety of power distribution systems and connected equipment;

- devices for Condition Monitoring of transmission, transformation and distribution equipment or system for reliable energy supply;

- monitoring and measuring systems used for more efficient use of available energy sources (for Energy Efficiency purposes, network monitoring, grid power quality monitoring, demand side power quality monitoring, ...);

- electrical measuring transducers, signal generators, recorders together with their accessories.

NOTE: Product safety aspects are covered by TC 66, where applicable.

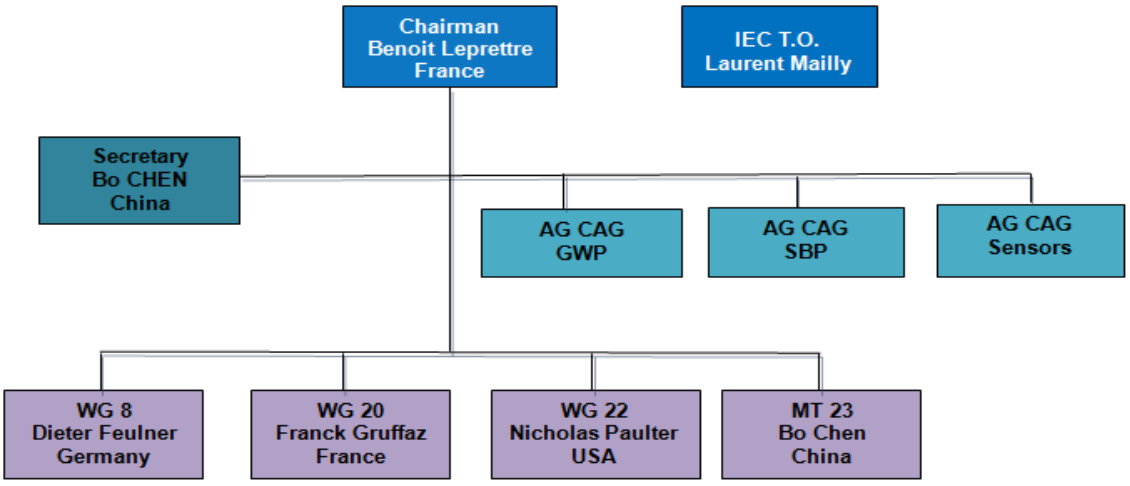
A.3 Background

TC 85 was transferred from SC 13B (Electrical Measuring Instruments) and established in 1983. In 1992, the original TC 66 was absorbed by TC 85; while a new subcommittee, SC 66E, was established that later become TC 66 that had the responsibility for the measuring, control and laboratory equipment.

B. MANAGEMENT STRUCTURE OF THE TC

TC85 works are carried out by three working groups, one maintenance team and three CAGs:

- WG 8: *Measuring and monitoring equipment for testing protective devices in energy distribution systems;*
- WG 20: *Equipment for measuring and monitoring of steady state and dynamic quantities in Power Distribution Systems;*
- WG 22: *Waveform Parameter Measurement;*
- MT 23: *Revision of IEC 60051 series: Direct acting indicating analogue electrical measuring instruments and their accessories (Parts 1-9);*
- AG CAG GWP: *Chairman's Advisory Group Practices;*
- AG CAG SBP: *Chairman's Advisory Group on Strategic Business Plan;*
- AG CAG Sensors: *Chairman's Advisory Group on sensors.*



C. BUSINESS ENVIRONMENT

The business environment has gone through fundamental changes in recent years.

Most of the measuring instruments or their functions that are used for the measurement of electrical and electromagnetic parameters are more integrated into automatic measurement-control or continuous monitoring-control systems as parts/modules of the system than has been done previously.

The scope of TC 85 addresses not only single functional instruments but also multi-functional instruments or systems (for instance, the measuring system and the measuring-control system).

The business on which TC 85 focuses its attention has already **extended from** the generation, measurement and calibration of basic electromagnetic quantities (which were used mainly in the laboratory) **to** the measuring and monitoring of electrical, electromagnetic and condition quantities of transmission, transformation and distribution equipment or system, which are relevant for electrical safety, for protective measures and/or for electrical performance.

Communication interfaces for remote data acquisition and exchanging information have become increasingly important.

Worldwide markets:

- For measuring instruments covered by IEC 60051: The estimated worldwide market is higher than 80 M€. It is used by over 50 companies mainly in Asia/Pacific (China and Japan). Geographic segmentation of the instruments: 60% Asia/Pacific, 40% Europe and America.
- Equipment covered by IEC 61557 is used by over 40 companies mainly in the Asia/Pacific region, the Americas and in Europe.
- The worldwide market for products covered by IEC 61557-12 is at least 150 M€. Geographic segmentation of the products: 33% Asia/Pacific, 33% Europe, 33% America.
- The worldwide market for other IEC 61557 standards should be at least 200 M €.
- The estimated worldwide market for Power Quality Instruments (PQI) covered by IEC 62586 is at least 40 M€. It is used by over 20 companies mainly in Asia/Pacific, America and Europe. Geographic segmentation of the instruments: 20% Asia/Pacific, 30% Europe and 50% America. The market growth and the regional demand for PQI are coming from "power quality assessment" applications.
- The worldwide market for products covered by IEC 62974-1 is a part of the gateway market which should be at least 500 M€.
- Waveform recorders, covered by IEC 60469 and IEC 62754 (in-progress), in 2012 had an estimated world market of 890 M€ with an expected growth up to 1.5 B€ by 2019. The America, Asia-Pacific, and European markets are nominally equal, with about 10 % of the market being attributed to other regions.
- IEC 62792 describes methods for measuring the output of electroshock weapons, the market of which exceeds 80 M€ annually, includes the American, European, and Asia-Pacific markets.

NOTE: It is not the intention of this report to judge these forecasts or to quantify the growth.

D. MARKET DEMAND

Definition and evaluation for the performance of the equipment supported by the TC85 should be standardized to facilitate not only their global trading, the choice of end-users in terms of performances, safety, interpretation of the indications, but also the advancement of technology.

Standards developed and maintained by TC 85 are globally recognized and used:

- by industry for the basic maintenance of industrial equipment to ensure safe operation;
- in power transmission, transformation and distribution systems for testing and monitoring of safe/ reliable operation or protective measures, and for predictive diagnoses;
- by electrical utilities to ensure supply of quality power and to reduce power pollution;
- by industrial, commercial and similar use for more efficient use of available energy sources and reducing greenhouse gas emissions;
- by laboratories, testing and calibration laboratories;
- for legal metrology purposes;
- for educational purposes;
- by governments to improve the "health and safety at work".

Through the agreement with CENELEC, the TC-85-developed standards are generally adopted as European Standards (EN).

Some of the TC85 standards are listed in compliance with the European Standardization Requests (Mandates), like the Low-Voltage Directive (LVD) and the Electromagnetic Compatibility Directive (EMC).

IEC 61557 series are used for IECEE-CB scheme. Some of the current publications, such as IEC 60051, IEC 60359, IEC 61187 and IEC 61557, are being cited by TC/SCs (e.g. mainly TC 13, TC 64, TC 65, etc.) in their publications as normative references.

Power Quality and Power Monitoring Systems operate very similarly to Quality Management Systems in companies. They are independent from Operation-, Control- and Management Systems and are supervising all activities and electrical assets/ equipment in a corresponding grid. Therefore, such systems can be used as “early warning systems” and are a must to analyze faults and to identify the corresponding reasons.

New IEC 62586 is widely used for devices that are used to ascertain Power Quality parameters in power supply systems and cited in many TC/SCs concerned. The devices may be installed:

- inside a substation;

- at the interface point between the installation and the network, in order to check the compliance to the connection agreement with a network operator;

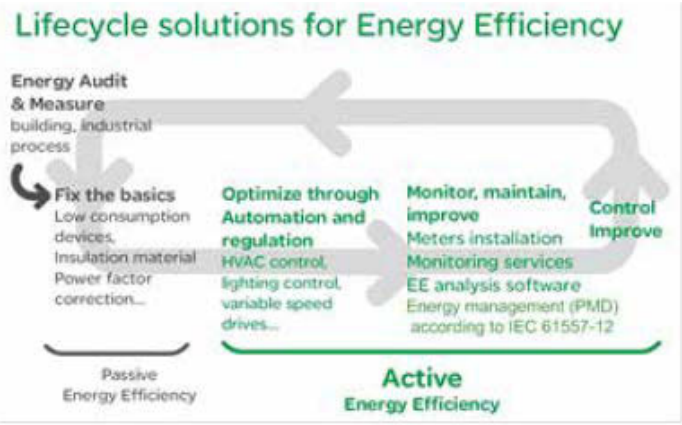
- at the point of common coupling to assess the level of Power Quality;

- inside the installation to make Power Quality surveys.

Following the up-to-date technology/demands, a revised version of IEC 60688 specifies further requirements relating to transducers whose main application is in electrical power engineering and telemetry systems.

Improving electrical energy efficiency (E3) means first to measure or monitor electrical quantities: you can’t change what you don’t know; you can’t know what you don’t measure.

Energy Efficiency projects are based on permanent and continuous measurement and monitoring.



TC 85 plans to remain active in this field.

Participation in TC 85 work:

Participation is mainly by members coming from manufacturers, testing and calibration institutes for measuring, analysis, monitoring and testing, instruments.

TC 85 is lacking direct participation from representatives of the end users, the utility companies and the legal metrology bodies, although they have made contributions through the National Committees. For an efficient development, TC 85 needs necessary resources and support from National Bodies.

A larger representation from manufacturers and users being engaged in Condition Monitoring and Predictive Diagnoses for transmission, transformation and distribution networks would be desirable.

E. TRENDS IN TECHNOLOGY AND IN THE MARKET

E.1 Trend in Technology

The advanced functionality measuring, monitoring, and testing equipment and instrumentation becomes possible by using the latest achievements in electronic information and communication technologies. These new technologies may affect the way requirements and testing methods are specified. The most important trends are the following:

- extended use of electronic technologies, like digital signal processing, mixed signal circuits and firmware, which may have to be updated during the life of the equipment;

- changes in network conditions and EMC environments due to the growing use of non-linear loads, power lines and radio communications. On the one hand, these changes require advanced measurement instruments, methods, and analyses to measure power and power quality parameters including dynamic quantities. On the other hand, better protection is needed against undue influences.

- an increased use of interoperable communication and IT technologies, including an increased interaction and integration of systems that were formerly discrete and separated, will be common to most of the Smart Measuring technologies.

The major drivers for the waveform recorder market are increasing analog bandwidth, modularity, improvements in the user interface, interoperability, and system intelligence.

The needs for on-line Condition Monitoring are bringing TC85 into Substation Automation System based on IEC61850.

The transducers covered by new IEC 60688 have been improved by new concepts and designs that use digital data acquisition and relevant software.

In low-voltage distribution IT systems, it is important to locate the first insulation fault as soon as possible.

Also, to monitor the required performance or fault diagnosis and prediction of power transmission, transformation and distribution systems, it becomes more important to measure different electrical or non-electrical parameters due to:

- installation standards evolutions, for instance, over-current detection is now a new requirement for the neutral conductor due to harmonic content;

- technological evolutions (electronic loads, electronic measuring methods, etc.);

- end-users' needs (cost saving, compliance with aspects of building regulations, etc.);

- safety and reliability of operation of power systems and connected appliances;

- in the field of energy metering, sustainable development requirements where energy measurement, for instance, is recognized as an essential element of energy management, part of the overall drive to reduce carbon emissions and to improve the commercial efficiency of manufacturing, commercial organizations and public services;

- more complex leakage current that are expected in distribution systems and in appliances and devices that will have influence on the protective measures.

The standards produced by TC 85 must be sufficiently flexible to adapt to improvements in manufacturing processes, architectures, materials, and innovations, in order to comply with the user requirements.

E.2 Trend in market

In addition to trends in technology, there are factors relevant to market trends:

- Increasing demand on safety or reliability;

- Changes in the lifecycle of measuring equipment;

- Changes in the EMC environment;

- New communication technology;

- Advancement of electronic and manufacturing techniques. This may affect the way requirements are specified and tests are performed;

- The assurance of a quality supply of power or to reduce power pollution;

- The assurance that repaired electrical equipment operate properly afterwards safely and can be used by workers or users without impairment to their safety or health at all times;

- The Increase in the use of software inside measuring instruments;

- More functions in measuring equipment are beyond the current scope of TC 85.

TC85 should consider further expanding its attention to supporting the development of measuring systems for on-line Condition Monitoring and Predictive Diagnoses of smart transmission and transformation equipment,

Although the standards developed by TC85 are not the core standards for Smart Grid or Electric Vehicle charging system, some of the TC85 standards have been playing an important supporting role for Condition Monitoring and Predictive Diagnoses, for example, the on-line measuring and monitoring of electrical safety or of the protective measures in power distribution systems.

It is not the intent of TC 85 to directly develop standards on the condition monitoring of the aforementioned products and systems not in its scope. This is clearly left to the different relevant TCs. However, TC 85 can actively cooperate in developing such condition monitoring standards at the request of other TCs, by e.g. providing support on measurement techniques for certain electrical and electromagnetic quantities.

It is also worth noting that, TC 85 is responsible several standard documents in which the notion of measurement uncertainty is central. Yet, the definition and determination procedure for the measurement uncertainty parameter are not completely defined, be it in TC 85 documents, documents from other TCs, the IEV, ISO/IEC Guide 99 or the Guide to the expression of Uncertainty in Measurement (GUM). A certain level of ambiguity remains, leaving the door open for interpretation and thereby preventing totally fair comparison.

Since the market trend is clearly oriented towards producing more measurements and using them to make relevant decisions, it is important that the performance of measurement devices be expressed without ambiguity and in a comparable manner, whenever this matters.

E.3 Ecological environment

Electronic measuring equipment may have shorter life cycles due to functional obsolescence. Some types of equipment may contain batteries and other hazardous materials. Therefore, use of hazardous materials and safe disposal will become an issue to be addressed.

Improvements are always made on parameters that are measured and monitored. By providing accurate

measurement on the use of electric energy, measuring equipment contributes to improve energy efficiency and power quality (for reducing power pollution) and sparing use of natural resources– consequently – will contribute to the reduction of pollution.

As some of measuring devices are continuously powered, low power consumption is also important.

The liaison with IEC/TC 111 in the elaboration of environmental requirements is considered important.

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

TC 85 actively promotes a communication, reciprocity and cooperation with other committees concerned.

Therefore, liaisons are confirmed with:

- TC1: to co-ordinate the terms and definitions of TC85 standards for inclusion in the IEV database;
- TC13: to co-ordinate specifications for power quality functions of meters and metering functions for network analysers;
- SC23E: TC85/WG8 involves the residual current devices (RCD), and residual current monitoring devices (RCM). Hence, it is necessary to set up a liaisonship between our two TCs to make sure there is no conflict in the standards;
- TC38: to address the impact of new instrument transformers with low-voltage analogue and digital interfaces;
- TC44: to co-ordinate project IEC61557-14;
- TC64: to co-ordinate the development of IEC61557 series;
- SC65A: to address EMC requirements on respective TC85 standards;
- TC66: to address safety issues on standards for test and measurement equipment;
- SC77A: to address EMC testing methods on power quality Standards and ensure consistency and quality of measurement techniques;
- TC82: to address PV monitoring;
- TC42: to address high-voltage issues in TC85 standards;
- TC111,: to address environmental issues in TC85 standards;
- SC121A: to exchange on measurement techniques used in switchgear and controlgear and make sure there is no conflict

Externally, TC85 will maintain the type D liaisons with IEEE/TC10 and OIML.

G. CONFORMITY ASSESSMENT

All publications issued by IEC TC85 are made in accordance with the requirements related to the conformity assessment aspects as specified within clause 6.7 of part 2 of ISO/IEC directives.

Moreover, the publications aren't dependant or intended to be used for IEC Conformity Assessment Systems likely IECEE, IECEx, IECQ and IECRE.

TC85 standards specify requirements as well as test methods that allow repeatable and reproducible test results.

IEC 61557 series are used by IECEE-CB scheme.

H. 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
Efforts should be made to determine the role that the TC85 should play on supporting	- Establishing a new WG, - Limitation of the scope of the	Before 2017-06

Condition Monitoring of smart transmission, transformation or distribution equipment and on Electric Vehicle charging systems.	WG; - To list the standard projects to be developed; - And submit the NWIPs.	
To construct and perfect the standard series for monitoring and measuring systems used for Energy Efficiency purposes.	- IEC 62974-1 to be published; - development of following parts	- Before 2017-03 - Before 2020-12
To clarify the different definitions around measurement uncertainty and to better specify the uncertainty determination processes, in order to avoid misinterpreting accuracy requirements and allow fair comparison between products.	- Exchange with other TCs (e.g. using the liaisons) to agree on a common terminology and procedure, identify discrepancies. - If necessary create a JWG on the subject of uncertainty determination. - Add reference terms in IEV - Publish usable information as annex to IEC 61557-12 or as a separate standard or TR.	- Before 2020-12
To give guidelines to TC 85 officers, and to TC85 members, to promote a common approach to the drafting of standards, and to promote unified working practices, between Chair, Secretary, Convenors and members to make the TC85 work more efficient; To improve the communication between TC85 its members and new members.	o develop a practical 'Guide on Good Working Practices' within TC85 that is approved by TC85 officers and all TC85 members. Publication and distribution of the Guide to all TC85 members and to new members. To develop a review and update procedure of the Guide in regular intervals in order to keep it a 'living' guide close to the needs of the practical work of the committee workers . To nominate a TC85 member who serves as the contact person for collating changes and updates to the guide suggested by any TC85 member. To publish an INF document related to a guideline complementary to ISO/IEC rules	Implementation by the start of 2017
To construct and perfect standard series for Grid Power Quality and Demand side Power Quality	- to publish IEC 62586-1 and IEC 62586-2 - to start a maintenance cycle on IEC 62586-2 in order to improve test procedures and address unresolved comments received on CDV. - to initiate a work on the demand side power quality	- Before 2017-03 - Before 2017-03 - Before 2017-12
To construct and perfect standard series for Power Metering and Monitoring	- to publish IEC 61557-12 Edition 2	- Before 2017-12

To address the e-commerce topic (based on IEC/SC 3D works on Product data and properties for information exchange) for Power Metering and Monitoring Devices as well as for Power Quality Instruments.	- to initiate a work on e-commerce for measuring devices (PMD and PQI)	- Before 2020-12
To set up a procedure within TC85 whereby issues coming from the European Standardization Requests are considered in standard work	To address the requirement of an CENELEC Annex ZZ in the standards that are under parallel voting.	Asap - Implementation by January 2017
To maintain series of IEC 61557	To publish documents for the related parts -1 to -7 and -11)	2019
To construct a new part of IEC 61557 for testing Arc Fault Detection Devices.	To initiate a work on the testing of AFDDs. If necessary create a JWG with TC 64 and SC23E.	2020
Note: The progress on the actions should be reported in the RSMB.		