A Background
Technical Committee N° 33 was formed in 1946. The title and scope of TC 33 have been recently modified and the scope is defined as: “To prepare International Standards for power capacitors and their applications”. The responsibility of TC 33 is therefore to fulfil the requirements of the scope by issuing up to date standards. The co-operation between IEC and CENELEC has made this more important. In practice, all of IEC standards regarding power capacitors and their applications have been adopted by CENELEC without modifications. For the development of the technology, co-operation with CIGRE and IEEE is continuing.

Working groups
a) WG 3: Revision of IEC 60252 (AC motor capacitors);
b) WG 13: Series capacitors banks and protective equipment;
c) JWG 17A-(TC 33/SC 17A): Grading capacitors;
d) JWG 22F- (TC 33/SC 22F): Thyristor controlled series capacitors;

Maintenance teams
1. MT 18: Maintenance of IEC 61071 (Power electronic capacitors);
2. MT 19: Maintenance of IEC 60871 (Shunt capacitors for a.c. power systems having a rated voltage above 1000 V) and 61270 (Capacitors for microwave ovens)
3. MT 20: Maintenance of IEC 60358 (Coupling capacitors and capacitor dividers).
4. MT 21: Maintenance of IEC 60831 and 60931 (Shunt power capacitors having a rated voltage up to and including 1000 V) and 61921 (Low voltage power factor correction capacitor banks).
The total number of publications issued is 23 (they are listed in Section E).

TC 33 is currently developing 4 projects.

Liaisons

B Business Environment
B.1 General
The most important development on business environment during the last years has been the increasing participation of “new” countries to the works of TC33. China, India and Brazil are showing activity in comments to circulating documents and new works proposals.

B.2 Market demand
The most important application of power capacitors is for power factor correction. In this application, the capacitors are connected in parallel or series to low voltage or high voltage networks. The relevant IEC standards are IEC 60831, IEC 61921, IEC 60871 and 60143. Shunt power capacitors for network use can also meet the increased demand for the reduction of transient and, if in a filter circuit, of harmonics and, if switched in a controlled manner (e.g. electronically), they can stabilize and improve the use of the network. Series power capacitors stabilize the transmission voltage, increase the transmitted power of the lines and control the powerflow in parallel lines.
Other important applications for power capacitors are: capacitors for a.c. motors (IEC 60252),
capacitors for power electronics (IEC 61071), coupling capacitors and capacitors dividers for capacitor
voltage transformers (IEC 60358), capacitors for microwave ovens (IEC 61270) and capacitors for
induction heating and melting ovens (IEC 60110).
The customers of IEC standards regarding power capacitors connected to high voltage networks
are prevalently great companies which produce and/or distribute electrical energy. Some of these
larger companies are represented in the TC and/or in its JWG's; collaboration with users in development
of standards for motor capacitors has been achieved through exchange of comments with TC 51.
The customers of IEC standards regarding other applications are generally but not always (i.e. domestic
appliances manufacturers) small companies; their representation in the TC is quite problematic. Liaison
with users committees are useful and necessary.
The IEC standards are widely used at the regional and national level. In practice they do not have
important competing standards. The parallel voting system with CENELEC has had as a consequence
the identity of IEC and EN Standards in the field of activity of TC 33.
New standards will be issued in the near future: the standard for grading capacitors and the
standard for thyristor controlled series capacitors. Other proposals are in the table for Power filters and
in general for power factor correction.

B.3 Trends in technology
The development of the dielectric and other components and materials, the knowledge of how to
protect the capacitors and how to reduce the consequences in case of a failure have, during the
last decades, resulted in smaller, more economical and more reliable capacitors.
Safety and environmental aspects, reliability, accuracy, predicted life time and electromagnetic
compatibility of the capacitors have been addressed during recent years and will continue to be very
important in the future activity.
The latest developments in the technology of film metallization have given much work to the
Maintenance Teams of TC33 in the continuous effort to update standards.

B.4 Market trends
Power factor correction, especially high voltage, is an important and growing part of the market of power
capacitors, especially in rapidly developing countries. The market for power electronics capacitors is
also increasing due to the use more and more important of electric vehicles able to reduce pollution in
large cities. In contrary, the market of capacitors for fluorescent lamps is rapidly decreasing against the
use of electronic ballasts. The market of motor capacitors is nearly stable: in front of a decrease in
some applications, there is an increase in others.

B.5 Ecological environment
TC 33 standards, when opportune, prescribe precaution to be taken to avoid pollution of the
environment by products contained in capacitors. Particular prescriptions have been given for
polychlorinated biphenyls which were largely used in the past as impregnant.

C System approach aspects
Collaboration with users is an important matter of fact: TC 33 has currently established joint working
groups with SC 22F and SC 17A and there are some experts of TC33 collaborating with TC 9, SC34 C
and TC 61.

D Objectives and strategies (3 to 5 years)
Over a longer perspective, TC 33 foresee the following:
1. Greater demand for tests providing evidence of an undisturbed and defined lifetime of
capacitors.
2. As the application of power electronics becomes more widespread, the committee will ensure
that relevant standards are reviewed and updated as necessary to ensure that they meet the
needs of the changing market requirements.
3. The strong increase of power generation and distribution mainly in new developing countries is
requiring a large use of power factor correction capacitors and banks, both in high and in low voltage.
This will maybe demand a revision of the relevant standards.

E Action plan
The work in the near future consists of the development of the subjects contained in the
programme of work. Attention should be drawn to the increased number of Maintenance Teams: many
standards need to be updated due to the recent developments in the field of metallized film technology.
F  Useful links to IEC web site

TC 33 dashboard giving access to Membership, TC/SC Officers, Scope, Liaisons, WG/MT/PT structure, Publications issued and Work and Maintenance Programmes and similar information for SCs, if any.

Name or signature of the secretary

Giancarlo Testi