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Title of TC  
Power Capacitors

**A. Background**

Technical Committee N° 33 was formed in 1946.

No subcommittee exist.

The scope of TC 33 is by IEC defined as:

“To prepare International Standards for power capacitors”.

The responsibility of TC 33 is therefore to fulfill 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 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 (TC 33/JWG TC 33-SC 17A): Grading capacitors;
- d) JWG (TC 33/JWG 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**

- 1. Cooperation with SC 17A: JWG (TC 33/JWG TC 33-SC 17A): Grading capacitors.
- 2. Cooperation with SC 22F: JWG (TC 33/JWG TC 33-SC 22/F): Thyristor controlled series capacitors.

***P-members of TC 33 (24)***

Austria, Belgium, Brazil, Canada, China, Czeck Republic, Egypt, Finland, France, Germany, India, Italy, Japan, Korea (Republic of), Romania, Russian Federation, Serbia, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, U.S.A.

**B. Environment****B.1 Business environment**

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 recently 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 60931, 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; however, TC 33 needs wider participation from utilities and also from customers concerned with other applications such as motors and induction heating.

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 TC33.

Two new standards will be prepared 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 and trade**

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 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. Work programme****C.1 Current work**

TC 33 meets every two years. Each plenary meeting lasts two days. All the working groups or maintenance teams, which have to discuss some documents, meet also in conjunction with the TC general meeting.

Generally, working groups and maintenance teams meet one or more times between two TC meetings, at invitation of the convenor. The meetings of working groups and maintenance teams last normally one day. Today much work can be done and time spared by the use of the internet and new tools prepared by IEC (collaboration tool).

**C.2 Resources/infrastructure needed**

Invitation for the TC33 plenary meeting that should be held in Autumn 2010.

**C.3 Safety aspects (only for committees which do not have a reference to safety in their scope)**

**D. Future work**

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.

Over a longer perspective, TC 33 foresees 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.

<b>E. Maintenance cycle</b>				
<b>Publication no.</b>	<b>Date of publication</b>	<b>Review date</b>	<b>Maintenance result date</b>	<b>Responsibility (Maintenance Team)</b>
60110-1 Ed.1.0	1998-06	2010	2013	*
60110-2 TS Ed.1.0	2000-02	2010	2013	*
60143-1 Ed.4.0	2004-01	2009	2011	WG13
60143-2 Ed.1.0	1994-08	2007	2010	WG13
60143-3 Ed. 1.0	1998-01	2007	2010	WG13
60143-4		2008	2010	JWG TC33/SC22F
60252-1 Ed. 1.0	2001-02	2005	2009	WG3
60252-2 Ed. 1.0	2003-05	2005	2009	WG3
60358 Ed.2.0	1990-05	2005	2008	MT 20
60358-1		2008	2009	MT 20
60358-2		2008	2010	MT 20
60358-3		2009	2012	MT 20
60358-4		2009	2012	MT 20
60831-1 Ed. 2.1	2002-11	2008	2011	MT 21
60831-2 Ed. 1.0	1995-12	2008	2011	MT 21
60871-1 Ed. 3.0	2005-07	2007	2012	MT19
60871-2 TS Ed. 2.0	1996-06	2007	2012	MT19
60871-3 TS Ed.1.0	1996-03	2007	2010	MT19
60871-4 Ed.1.0	1996-08	2007	2010	MT19
60931-1 Ed.2.0	1996-11		No planned revision	MT 21
60931-2 Ed.2.0	1995-12		"	
60931-3 Ed.1.0	1996-08		"	
60996 TR Ed.1.0	1989-11	2009	2012	MT19
61071-1 Ed.1.0	2007-06	2012	2015	MT18
61270-1 Ed.1.0	1996-08		No planned revision	MT18
61642 Ed.1.0	1997-09		No planned revision	MT19
61921 Ed.1.0	2003-04	2010	2013	MT21
62146 -1 Ed. 1.0		2008	2011	JWG TC33/SC17A

**Notes:**

- IEC 60110-1 and -2: no change is required.
- IEC 60358 has been divided in four parts: each will be therefore a New Project; the first one is 60358-1: Common clauses. See 33/441/CD

Name or signature of the secretary

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