Business Plan

CENELEC/TC or SC	Secretariat	Date
TC 2	Germany	2013-05-21

TC 2: Rotating machinery

A Background

CLC/TC 2 standards portfolio is both large and mature, with currently 57 publications.

The present scope of CLC/TC 2 is the development and implementation of European electro technical standards in Europe as far as possible in full conformity with the relevant international standards and technical specifications for rotating electrical machines prepared by IEC (International Electrotechnical Commission) without limitations of voltage, output or dimensions.

Although, most IEC standards are implemented as European and national standards in Europe, CENELEC members may initiate specific proposals for the preparation of relevant European standards. This includes the aim to feed in the resulting drafts into the international work at IEC level. CENELEC may consider requests of the relevant user industry and authorities to start the creation of standards needed for the free movement.

Most of the maintenance and development is done by IEC/TC 2 as defined in Dresden Agreement, but the technical support to the European Commission as well as support to other CENELEC committees is provided by CLC/TC 2 itself.

B Business Environment

B.1 General

Rotating electrical machines are the subject of international and European trade, which relies on a comprehensive portfolio of International Standards.
In Europe harmonised EN standards are used to provide one means to comply with Essential Requirements of European Union Directives. The EN standards on rotating machines cover for example the Eco-design requirements by taking into account essential requirements implemented in Directive 2009/125/EC.

Main aspect in general business environment is energy efficiency. Energy efficiency is a major trend not affected by economical down or upturns. In that TC/SC's can influence only a little bit while CLC/TC 2 can influence quite a lot into motor efficiency classifications and their extension.

B.2 Market demand

As more than 99% of all electricity worldwide is generated in rotating electrical machines and as more than 45% of all electricity worldwide is converted back into mechanical energy by electrical motors, there is, seen in medium term, a continuously high market demand for both, motors and generators. Especially during the last years, the demand for rotating electrical machines has grown at approximately 10% per year except for a steep decrease in the last financial and economic crisis and a steep increase in the years 2010 and 2011 back and exceeding the values prior to the crisis. The increasing importance to use energy more efficiently leads to laws, regulations and a market demand for electrical motors with premium efficiency and to an increasing percentage of variable speed applications for electrical machines.

B.3 Trends in technology

The market for DC continues to shrink slightly because many of them were replaced by converter fed AC motors. The fast moving technology of converter drives has to be reflected in new European standards in preparation dealing with machines supplied from frequency converters. It can already be seen that the increasing share of converter fed applications will also increase the selection of used motor technologies, which shall also be considered.

The basic trend is to develop energy efficient motors and drive systems.

EN Standards have to take into consideration extension and increasing usage of:

- new three phases motor designs, like PM's motors or Reluctance motors (SRM);
- behaviour of using motors driven by converter.

B.4 Market trends

Markets may be classified:

- Market trend 1: energy efficiency;
- Market trend 2: increasing efficiency regulation as result of governmental energy strategies or other motor types and technologies motors;
- Market trend 3: system approach (motor + drive + pump/fan…);
- Market trend 4: market surveillance.

The most significant market trend is driven by the economical or legal need to save energy. Developed until 2009 in liaison with IEC TC 2, EN 60034-30 defines efficiency classes for three-phase induction motors, thus reprocessing the former voluntary efficiency labeling system of CEMEP. The efficiency classes of EN 60034-30 were implemented into European Motor Regulation EC/640/2009 thus achieving the binding legal status in Europe.

Edition 12 of EN 60034-1 (based on IEC 60034-1 Ed.12) reflects the increasing importance of energy efficiency as well as it requires including efficiency class and efficiency on the name plate in accordance with EC/640/2009 motors regulation.

Besides legal requirements, the market is significantly influenced by the extremely volatile price for rare earth permanent magnets (PM). On the one hand, PM machines have by principle better efficiency and torque density than electrically excited synchronous machines or induction motors. Furthermore high efficiency values can be achieved by electrically excited synchronous machines or induction machines as well in case more active material (i.e. copper and iron) is used. The consequence is that the market price for PM material has a high impact on the economically preferable motor technology and thus the size and weight of electrical machines. This has furthermore forced the markets to seek for more advanced motor technologies.

B.5 Ecological environment

Consider basic facts:

1. Environmental impact is practically caused by electricity used to run the motor.
2. About 45% of all electricity is used to power electrical motors.

About 17% of all primary energy is used to generate electricity for electrical motors causing remarkable part of all green house gases.

It is becoming important to consider the overall design of the machine, particularly with regard to increase efficiency, reduction of noise emission and reduction of the amount of materials used. Similarly, the effect on the environment of gases generated by impregnation and insulation materials during manufacturing and refurbishing has to be considered.

CLC/TC 2 contributed to the growing importance of high-efficiency motors through an official liaison with IEC/TC 2 in development to create extension of motor range in IEC 60034-30 to define efficiency class induction motors and IEC/TS giving guidance for the selection of energy efficient motors including variable speed application.

CLC/TC 2 has established a liaison with CLC/TC 22X to contribute on development of new European standards: Energy efficiency for power drive systems, motor starters, power electronics and their driven applications in response of European Commission Mandates M/476 and M/470.

B.6 Involvement of societal stakeholders

TC2 participates on the development of European energy efficiency regulation by providing technical assistance and support for example to European Commission, but it also receives wishes from other parties during the process. CLC/TC 2 strive to bring the expectations of European stakeholders into consideration of respective IEC committees as far as possible but on cases considered more local than international, it pursues to fulfil the regional needs.

B.7 Involvement of Small and Medium sizes Enterprises (SMEs)

CLC/TC 2 is open to representatives from all sizes of enterprises, respecting the input of all members. CLC/TC 2 tried to utilize novel working methods, like phone and email, to avoid extensive travelling and related costs, which in many case are considered as barriers for participation in SMEs. The aim is to continue and improve the usage of electronic collaboration tools provided by CENELEC.

C System approach aspects

Two mandates M/470 and M/476 have been issued by European Commission; the other one is concerning system approach. CLC/TC 2 has established liaison with the Technical Committee CLC/TC 22X, in charge of that mandate.

In detail, in CLC/TC 2's focus are mainly

Committees that use standards produced by CLC/TC 2	IEC/TC 22/SC 22G	Semiconductor power converters for adjustable speed electric drive systems
	CLC/TC 31	Equipment for explosive atmospheres
Committees that produce standards used by CLC/TC 2	CLC/TC 22X	Power electronics

Besides the exchange of documents, liaison officers have been appointed for these committees, who actively participate in their work and report to CLC/TC 2. The very close cooperation in the most important involvement of some motor experts' members of CLC/TC 2 and IEC/TC 2 with CLC/TC 22X.

On the field of energy efficiency, a joint project team has been founded with active participation of CLC/TC 2 expert's members of CLC/TC 22X/WG 6.

D Objectives and strategies (3 to 5 years)

The key targets for the next forthcoming years are:

Different working group inside CLC/TC 2 should be created to take into consideration the preparation of specifics EN standards in coordination with IEC/TC 2 in respect of new mandates issued by the European Commission

1. Efficiency classification for Low Voltage (LV) motors up to 1 000 kW;
2. Increasing efficiency regulation as result of governmental energy strategies for other motor types and technologies motors;
3. Efficiency classification for converter fed LV motors;
4. Improvement of the working principles and structure of the technical committee.

Item 1 is on-going with IEC/TC 2/WG 31.
Item 2 is on-going with IEC/TC 2/WG 31 in close cooperation with CLC/TC 2/WG 1.
Item 3 CLC/TC 2 will set-up a WG 1.

Item 4 is related to TC's ability to respond to European Commission mandates and preparatory studies. To prepare required EN standards sufficient working groups need to be appointed. The participation on the execution of the preparatory studies requires agile working principles, which have to be agreed.

The basic activity of CLC/TC 2 will be the maintenance of its publication portfolio taking into consideration new developments and market trends.

CLC/TC 2 shall also increase activities in the field of converter fed motors.

- Increased activities are to be expected in the field of converter supplied motors of all sizes. In particular, the interface problems between the converter and motor require further intensive research to improve understanding of the effect on the motors caused by the rapid progress of converter technology (as well as semiconductor components and control methods). This field covers problems of performance (pulsating torques, losses, etc.), environmental effects (noise emission) and operational reliability (bearing currents, winding stress, etc.).

- In addition, the increasing importance of energy efficiency will require activities in defining methods for determining the efficiency of variable speed drive systems and efficiency classes. Even if a complex subject like this cannot be handled by CLC/TC 2 only, TC2 will provide all necessary support for projects related to this.

Moreover, the demand to increase efficiency will affect other standards than those mentioned above as well. e.g. high efficiency induction motors will have to increase in size compared to today's motors, in some cases will thus have higher starting currents and noise emission, so it needs to be checked and discussed whether the limits given in the respective standards need to be adjusted.

Consequently the standard EN 50347 (General purpose three-phase induction motors having standard dimensions and outputs - Frame numbers 56 to 315 and flange numbers 65 to 740) may be modified due to that request.

E Action plan

Action plan is mainly oriented by taking the requirements of European Commission Mandates M/470 and M/476.

- Initialize necessary working groups inside CLC/TC 2 for taking into account requirements of EC Mandates M/470 and M/476. Working groups are needed at least for the following purposes: preparing European standards for motors as appropriate in the light of the foreseen implementing measures on other possible related products, such as compressors, fans and pumps, including motors driving these products;
- redefinition and reduction of test tolerances (in co-operation with IEC/TC 2/WG 12);
- redefinition of parameters for resource efficiency, re-use and recycling, as appropriate in view to define an EPD (Environmental Product Declaration);
- verification procedure for market surveillance purposes in Europe;
- define a template for a test report indicating the information to be declared by the manufacturers to fulfill at least the Eco-design requirements set out;
- initiate a new series of round robin tests for both application:
    - Direct On Line supply,
    - Motors driven by converter;
- initiate European standards or make proposal to IEC to develop a new part of IEC 60034-30-XX;
- goal of CLC/TC 2 is to describe the efficiency measures and efficiency levels for different motor types and technologies;
- to support as a main stakeholder the preparatory studies study of Lot 30.

The document IEC/TS CLC/TS 60034-31 has to be reviewed and re-updated, to take into consideration the new edition coming: IEC 60034-30-1.

The priorities shall be coordinated with IEC/TC 2, depending of the status work done by IEC/WG 28 and WG 31.

F Useful links to CENELEC web site

TC home page giving access to Membership, TC/SC Officers, Scope, Publications, Work programme [password-protected area].

http://www.cenelec.eu/dyn/www/f?p=104:7:3774837934323960::::FSP_ORG_ID,FSP_LANG_ID:60,25

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