



# Ex-News

## Standardisation work on the topic of explosion of electrical apparatus

by Thorsten Arnhold (Editorial Board)



### IEC TC 31 Electrical apparatus for explosive atmospheres

#### IEC 60079-0: General requirements

At the meeting of Working Group 22 in Chicago in April 2006, the comprehensive revision of IEC 60079 part 0 was continued. The objective is the harmonisation of the complete series of standards managed by TC 31. This activity involves, among other aspects, the inclusion of dust explosion protection, the regulations for apparatus for zone 0 and 2 in a basic standard, as well as harmonising general definitions to a large extent.

The Ex-Magazine reported in detail on the most important additions to the standard in issue 32/2006. In the meantime, the draft standard was published in June 2006 as a CDV and passed on to the worldwide specialist community in the national committees for commenting. As expected, the response was overwhelming: By November 2006, 53 pages of comments had been received and had to be addressed in the meeting of WG 22 in Australia in March 2007 (results were not yet available at the time of going to press).

In the context of the harmonisation of the standards for explosion protection, at the TC 31 annual conference in Rio de Janeiro in October 2006 it was also decided to form a sub-committee, SC 31 M. This sub-committee will provide coordination between the explosion protection of electrical and mechanical apparatus. The secretariat for this sub-committee lies with the DIN (Deutsches Institut für Normung e.V.).

#### IEC 60079-1: Flameproof enclosure

Maintenance Team 25 in IEC TC 31 continued its work on the 6th edition at its meeting in Chicago in April 2006. A rough draft of the next edition of the standard was prepared. The inclusion in the standard of low temperatures for the specification of the test requirements and conditions was generally welcomed.

The CDV published in November 2005 was accepted by the national committees and the comments received were discussed and taken into account at the meeting of the MT. The 6th edition was published in April 2007.

#### IEC 60079-2: Pressurized enclosures

The 5th edition of the standard was published in February 2007. The Equipment Protection Levels (EPL) are now included. Otherwise there were no major changes.

#### IEC 60079-5: Powder filling

The 3rd edition of the standard is to be published in March 2007. The most important change compared to the 2nd edition is that it is now possible, in certain circumstances, to open the enclosure for repairs and then to seal them again after refilling with powder. This change could make powder filling an interesting alternative to moulding.

#### IEC 60079-6: Oil immersion

In the past oil immersion was more or less regarded as a type of protection for the museum: The members of WG 22 in TC 31 therefore asked themselves whether it was actually worth preparing a 3rd edition of the standard. To answer this question the secretariat of TC 31 sent a questionnaire to the national committees with the question as to whether the standard should be

withdrawn, or continue to be maintained. The international response to this question was positive and the type of protection ›oil immersion‹ will be retained. The 3rd edition was published in March 2007. Immediately after this publication, work is to start on the 4th edition to possibly define new requirements on the protective liquid and the devices covered by the liquid. The objective is to remove the quasi Zone 2 requirements on these devices by the selection of a suitable protective liquid and to develop a new method, for example for the protection of power electronics, with which effective cooling is produced as a side effect.

#### **IEC 60079-7: Increased safety**

The 4th edition of the standard on the type of protection ›increased safety‹ appeared in July 2006 and has since been adopted as an European standard using the ›parallel voting procedure‹.

The first important change is the updating of the requirements on the electrical connections to the current state-of-the-art and to address the tempestuous developments in electrical connector systems. The requirements on connections made during installation (field wiring) and those that are made during the manufacturer of the product (factory wiring), are now considered differently, like the requirements on permanent and detachable connections. Modern connection systems such as the cage clamp terminal or terminals with piercing technology are covered; plug-in connectors, e.g. tab connectors, are now possible under certain circumstances.

The second key area was the expansion and detailing of the assessment and test methods for machines with squirrel-cage rotors and high-voltage machines. An expert group was formed to address this aspect; in the future this group will address other issues and types of protection related to electrical machines for use in hazardous areas.

Finally, it was also possible to satisfactorily settle the ›end of life‹ issue for the operation of fluorescent lamps. The tests long in use in lighting engineering, the ›Asymmetric Pulse Test‹ and the ›Asymmetric Power Test‹, are now mandatory for electronic ballasts and are described in the normative Annex H.

#### **IEC 60079-11: Intrinsic safety**

The 5th edition of the standard for the type of protection ›intrinsic safety‹ was published in July 2006.

In October 2006 a meeting of sub-committee SC 31G and the new MT 60079-11 was held (for improved clarity the maintenance teams now have the same numbering as the related standards). At this meeting the preparation of the 6th edition of the standard was started. The requirements on dust explosion protection from the old IEC 61241-11, the equipment protection levels, and the apparatus requirements from IEC 60079-27 (FISCO and FNICO) will be adopted in this edition.

Further important aspects such as the requirements on battery chargers, as well as the harmful formation of dendrite on the use of lead-free solder were discussed.

#### **IEC 60079-15: Type of protection ›n‹**

The first meeting of MT 60079-15 for the preparation of the 4th edition of the standard for apparatus for use in Zone 2 was held in along side of the TC 31 annual conference in Rio de Janeiro in October 2006. Due to the integration of a large number of generally applicable issues in IEC 60079-1, it will be possible to make the new edition more concise. The most important changes from IEC 60079-7, for instance the re-definition of the electrical connections, have been adopted as appropriate. After all, the type of protection ›non sparking‹ is based on the same basic principles as ›increased safety‹. The section on luminaires has been completely re-structured. The issue of electronic ballasts for Zone 2 lighting fittings with fluorescent lamps is currently under discussion. The question here is whether an electronic ballast must have clearances and creepage distances compared to the industrial version or whether it must be moulded. The usage of additional fuses ahead of industrial electronic ballasts to make the devices suitable for use in Zone 2 were also discussed.

As expected, there was again a long and controversial discussion at the meeting on the issue of reduced breathing, particularly as a type of protection for luminaires. The German proposal to make the number and magnitude of temperature changes the decision criteria for routine tests rather than the presence of sparking parts is currently under discussion.

The CD for the 4th edition will appear in the first half of 2007. →

#### **IEC 60079-25: Intrinsically safe systems**

The preparation of a second edition was started in Cape Town. As it was necessary to wait for the completion of IEC 60079-11, CD was published in March 2007.

The text for the CD was discussed in Rio in October 2006. Among other issues, the topics of »requirements on simple apparatus« and »adoption of the requirements on dust explosion protection« were covered. As intrinsically safe systems can pass through different Ex zones, equipment protection levels are not to be assigned to them.

#### **IEC 60079-27: FISCO/FNICO intrinsically safe fieldbus**

The 1st edition of the standard appeared in 2005 and included the Zone 2 concept (FNICO). It is planned to adopt the apparatus requirements in IEC 60079-11 and the system requirements in 60079-25. The CDV of the 2nd edition was published in February 2007.

#### **IEC 60079-16: Encapsulation**

The CDV for the third edition was published in April 2007.

#### **IEC 60079-26: Electrical apparatus with EPL Ga**

The 2nd edition of IEC 60079-26 appeared in August 2006.

#### **IEC 60079-31 (formerly 61241-1): Protection by enclosure**

The CDV for the standard now included in the 60079 series has been available since February 2007. This edition of the standard includes the equipment protection levels. For EPL a, a maximum power and rated voltage of 20 W/50 V as well as increased test conditions for the IP degree of protection test have been defined.

The requirements from American and European practice are also combined in this edition.

#### **IEC 60079-30 Part 1 and Part 2: Resistance trace heating (formerly 62086)**

The 1st edition of these standards under the new numbering was published in February 2007. Currently the future independence of both standards is in question. The alternative of integrating both parts of the standard into the apparatus or installation standards is being checked.

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#### **TC 31 SC 31 J: Classifications of hazardous areas and installation requirements**

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#### **IEC 60079-14: Electrical installations in hazardous areas**

In July 2006 the CDV for the 4th edition appeared. The Equipment Protection Levels (EPL) are now also listed in this standard, on the one hand in the definition (however due to the scope of the standard only for gas explosion protection) and, on the other hand, under the heading »Selection of electrical apparatus« where the types of protection are allocated to the EPLs.

For this first time a statement on the

qualification of the personnel is made in this standard. Based on this information, in future selection and repair must be made by skilled persons who, due to their training, are familiar with the types of protection and installation methods, as well as with the applicable rules and regulations including the essential aspects of zone classification.

#### **IEC 60079-17: Inspection and maintenance:**

In September 2006 the CDV for the 4th edition was published. The text is now very closely related to part 14. For instance, the EPLs have been adopted and the qualification requirements for the personnel matched. In addition, the issue of inspection and maintenance of electrical apparatus in areas hazardous due to dust has been included.

#### **IEC 60079-19: Repair and overhaul**

The 2nd edition of this standard appeared in October 2006. Already to the FDIS of this standard the German committee voted negative, as the stipulations are incompatible with German practice. An attempt is currently underway in Germany to make the new standard compatible with national practice by modifying the German »Technical Rules« within the scope of the German Safety and Health Regulations.



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### CENELEC TC 31: Electrical apparatus for explosive atmospheres

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The CENELEC TC 31 annual meeting was held in Zagreb in September 2006. The validity of ATEX type examination certificates following changes of the standards was discussed yet again.

A further key point was the run through prEN 50495, which details the requirements on protective systems under the ATEX Directive 94/9/EC.

Dr. Ullrich v. Pidoll was nominated the new chairman of SC 31-8 'Electrostatic painting and finishing equipment'.

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### IEC - Ex scheme

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This year's meeting of the Management Committee (MC) and other IEC Ex forums took place in Shanghai in September 2006. For this meeting a German position paper was prepared; this paper was read at the MC's meeting. In this paper the German national committee expressed the concern that the acceptance of the IEC-Ex scheme could melt away if it is not possible to convince other member states along with Australia to accept the scheme fully without reservations, and if the high quality, written, documented reference work is not fully complied with in practice. The German position was supported by similar concerns from countries such as France.

As a consequence, it was decided to form a working group and to check all documents for unclear, incorrect or missing requirements.

#### Abbreviations

EPL	Equipment Protection Level
CD	Committee Draft 1st stage: publication of a draft standard
CDV	Committee Draft for Voting 2nd stage: first vote on the draft standard
FDIS	Final Draft International Standard 3rd stage: final vote on the draft standard