



# Ex-News

## Standardization work on explosion protection

by Thorsten Arnhold (Editorial Board)



### IEC TC 31 Electrical apparatus for explosive atmospheres

TC 31 met in November 2007 in Kuala Lumpur (Malaysia). During this meeting, an important piece of personnel-related information was announced: the long-standing secretary of TC 31, G. F. Thompson, will retire in 2008. His successor in this function will be Mr. Danny Peacock who, like Mr. Thompson, is employed at the BSI.

A further important point of the meeting was the report from the working group involved in the standard-conformable representation of numerical values in the documents of the IEC 60079 series of standards and the subsequent discussion on appropriate measures. During this study it was found that some units of requirements used on design, type- and routine tests do not conform to standards and that there are also no tolerances. Along with a few very helpful corrections, it was also decided to undertake changes that make little practical sense and that, to some extent, are counter-productive. For instance, it was defined that the thermal endurance test to heat for plastic materials of enclosures is no longer to be performed for 4 weeks but for 672 + 30/ – 0 hours.

In addition, an Australian suggestion was discussed at the TC 31 meeting; the suggestion relates to the introduction of a type of protection ›special protection‹ that, comparable to the ›Essential health and safety requirements...‹ in Annex II of the ATEX directive 94/9/EC, is to form a framework for technical solutions outside the existing types of protection. The proposal is viewed

very critically by many experts, as such a special type of protection would need to be defined and documented at the IEC in a technical standard and not, like in the EU, via a legally-binding directive. A standard should contain clear design requirements. This would not be the case in this situation, as the nature of such a special type of protection is to verify new technical solutions at variance with the existing design requirements by testing on a case-by-case basis. There is particular concern that such a settlement will provide a way to legally bypass the severe, but justifiable requirements, in the standards on the existing types of protection. For instance, many increased severity test conditions that are intended to simulate ageing effects could be removed in this way.

The German proposal is therefore to delegate the topic to Working Group 22 of TC 31 for further work. Where it is appropriate, elements of the Australian standardization proposal should be applied to the related types of protection. The basic issue of rapid implementation of technical progress in the field of explosion protection can be addressed most effectively and safely if the standards are updated quickly to suit the publication cycles defined. This action requires the active participation of all specialists, as well as, the national committees.

### **New subcommittee SC 31M**

At the TC 31 meeting in Kuala Lumpur a new subcommittee, SC 31M, was announced and the way forward discussed. This committee is a joint project between ISO and IEC that is to address the subject of explosion protection of non-electrical equipment. The working title is: Non-electrical equipment and protective systems for explosive atmospheres. The area of work includes the preparation and further development of international standards for non-electrical equipment and protective systems for usage in areas with explosion hazards due to the possible presence of flammable gases, vapours, mists or combustible dusts. The chairman of this new organisation is Mr. Dr. Bothe from Germany. The standards prepared by this subcommittee will have the series number 80079 -X. The numbering of the individual standards (-X) will be matched to the 60079 series to facilitate subsequent integration of the two series of standards. The first standard projects are to be the standard for quality management systems 80079-34 (based on EN 13980 and IECEx OD005) and the standard for Mb-mining equipment (based on EN 1710). Project Team PT 80079-34 started work in April 2008.

### **IEC 60079-0: General Requirements**

The fifth edition of the basic standard 60079-0: General Requirements was published in October 2007.

Ex-Magazine reported in detail on the most important new aspects in the 2006 and 2007 editions. During the meeting of the Chairman's Advisory Group and some MTs of TC31 in April in Prague, Working Group 22 started with the preparation of the sixth issue of the standard during a three-day meeting.

An issue in urgent need of a pragmatic solution is the question of marking. Due to the combination of the various characteristics of explosion protection (zone 0–2; gas and dust explosion protection), as well as, the introduction of the equipment protection levels (EPLs) similar to the ATEX equipment categories, the amount of information contained in the marking has increased drastically; and some of this information is redundant. As a result clarity has suffered on the one hand, and on the other hand complete marking is often impossible due to lack of space. As the widespread usage of RFID type plates is not to be expected in the near future, a division into basic data that belong on every type plate for safe operation (EPL and category, explosion group, temperature class or surfaces temperature as well as identification number and manufacturer) and additional data that, for instance, must be included in the operating instructions (types of protection, information on intrinsic safety, among others) is a possible solution.

### **IEC 60079-1: Flameproof enclosures**

The 6th edition of the standard was published in the summer 2007. The 7th edition is currently in preparation. A CD can be expected at the end of 2008/ beginning of 2009.

### **IEC 60079-2: Pressurized enclosures**

The 5th edition of the standard has appeared. The Equipment Protection Levels (EPL) are now included. Otherwise there were no major changes.

A new project from MT 20 came out in the middle of 2007 with the CD for the first edition of IEC 60079-13: ›Protected by pressurized rooms«. The requirements on rooms with internal release sources go way beyond the previous stipulations. In practice, these types of rooms are generally analysis rooms. The subject of release sources for toxic gases requires particular care, e.g. by ensuring adequate exhaustion around the area of the release sources. The comments from the national committee are available and will be discussed by the maintenance team. →

### IEC 60079-5: Powder filling

The 3rd edition of the standard was published in 2007. The most important change from to the second edition is that it is now possible, in certain circumstances, to open the enclosure for repairs and then seal it again after refilling with filling material.

If it is possible to open the powder filling, corresponding information must be given on the enclosure and adequate information on correct re-filling and sealing of the enclosure must be included in the operating instructions.

This change could make powder filling an interesting alternative to type of protection encapsulation.

### IEC 60079-6: Oil immersion

Also published in 2007 was the 3rd edition of IEC 60079-6. However, this edition does not contain any significant changes from the previous edition. Work will be started on the fourth edition in 2008 with the objective of making this type of protection useful and attractive once again for special applications (e.g. for power electronics). (We reported on this aspect in the 2006 and 2007 editions of Ex-Magazine).

### IEC 60079-7: Increased safety

Since the publication of the 4th edition of the standard on increased safety in the middle of 2006, there has been no further activity. The preparation of the 5th edition is to be expected in the period from 2008 to 2011.

### IEC 60079-15: Apparatus for zone 2

The comments from the national committees on the CD published in the first half of 2007 were considered at the meeting of the maintenance team in Kuala Lumpur. Due to the integration of a large number of generally applicable issues in IEC 60079-0, it will be possible to make the new edition of part 15 more concise. The most important changes from IEC 60079-7 increased safety »e«, are, for instance, that the new requirements of the electrical connections have been adopted as appropriate. After all, the type of protection »nonsparking« is based on the same basic principles as increased safety.

The new requirements for »increased safety« luminaires for luminaries of type of protection »nA« were included with minor changes. Unlike Ex e, a warm start is possible and it is therefore possible to use T5 and T4 lamps. The important limits on the maximum power loss allowed for the »End of life« (EOL) protection have been defined at 2/3 of the values defined for normal industrial applications.

The results from a special ad hoc group on motors were checked and included in the related section of the draft standard without changes.

Significant changes are on the way relating to the section on the controversial type of protection »reduced breathing«. The fact that the requirements of part 15 of 60079 are in the meantime clearly contradictory to standard 60079-17: »Inspection and Maintenance« is seen by many specialists as inexcusable. In the latter, periodic inspections on reduced breathing equipment is required while in the current version of part 15, in defined exceptional cases, type examinations are allowed that make it unnecessary to perform periodic inspections. To solve this contradiction, an ad hoc working group has been given the task of proposing a solution. Its approach is to provide a test opening on reduced breathing apparatus that need to be opened in the field, and in future, no longer to allow any differentiation between sparking and non-sparking apparatus.

Further changes planned to this standard relate to additional measures for breathing apparatus, the easing of various routine tests at the manufacturer through the passing of increased severity type examinations (similar to the removal of routine tests on the burst strength on withstanding 4-times overpressure in the case of the flameproof enclosures).

The type of protection nL (energy limitation) will no longer be included in future (now defined via ic in IEC 60079-11).



### **IEC 60079-18: Encapsulation**

The CDV for the 3rd edition of the standard appeared in the first half of 2007. The comments on the CDV were discussed in Kuala Lumpur in November. As this paper is the first universal standard (gas, dust, zone 0–2, EPLs), there was a significant increase in public interest. This aspect can be seen in the fact that on the draft of a little more than thirty pages, more than 50 pages of comments were produced by the national committees.

### **IEC 60079-26:**

#### **Electrical apparatus for group II zone 0**

The 2nd edition of IEC 60079-26 appeared in 2007. In the related CENELEC standard, category 1 was defined by the foreword instead of the EPL Ga. Work is in progress on the third edition.

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

#### **Protection by enclosure**

The CDV for this standard was discussed in Kuala Lumpur. The Equipment Protection Levels are included in this edition of the standard. As a stop-gap for the contradiction of non-existent two-failure safety, a maximum power or rated voltage of 20 W / 50 V was initially proposed for EPL  $\geq$  as well as increased severity test conditions for the IP test. This proposal had to be withdrawn, as in many countries there are large motors for use in zone 20 that are only protected by a dust tight enclosure, often

fitted in the base of silos for pumping out grain silos. In these cases, significantly higher powers are required. The new proposal therefore also includes, along with protection by the enclosure, a limit on the inner surfaces. For usage in an environment with conductive dusts it will then be necessary to cover all bare internal current-carrying parts with encapsulation.

In addition, increased severity test requirements have been defined for the cable entries in enclosures with the protection level  $\geq$ . The general explosion protection requirements from IEC 60079-0 apply to cable entries in apparatus for the EPLs  $\geq$  and  $\geq$ . All changes prepared will be included in the FDIS and published most likely in August 2008.

### **IEC 62081 part 1 and part 2:**

#### **Resistance trace heating**

The majority of the national committees voted to retain an independent standard that will in future have the number IEC 60079-30 part 1 and part 2; the standard will be further developed under this number.

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### **IEC SC 31G: Intrinsic safety**

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A meeting of the subcommittee SC 31 G was held in Kuala Lumpur in November 2007. The situation in relation to the three individual standards is as follows:

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

The 5th edition of the standard on intrinsic safety was published in July 2006. An initial basis for the 6th edition in the form of a DC (Document for Comments) has been prepared and circulated to the national committees. The CD was published in December 2007. The following substantial changes can be expected:

- › the requirements for iD (dust explosion protection) will be included
- › the EPLs will be included in the standard
- › all requirements related to design and quality of equipment from part 27: intrinsically safe systems (see below) will be included in part 11
- › requirements for an intrinsically safe RS-485 fieldbus will be defined and
- › a new spark test apparatus for the test under specific load conditions will be described. →

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

The preparation of a second edition was started in Cape Town in 2006. As it was necessary to wait for the completion of IEC 60079-11, it was only possible to publish the CD in July 2007.

The comments on the CD were discussed at the meeting in Malaysia. These included the requirements on simple apparatus, the inclusion of requirements on dust explosion protection, and intrinsically safe systems in zone 2 (b/c).

As intrinsically safe systems can pass through different Ex zones, EPLs are not to be assigned to them.

The publication of the CDV can be expected in 2008.

### **IEC 60079-27: FISCO/FNICO**

As there were very few comments from the national committees to the CDV published in 2007, and there were no votes to the contrary, the FDIS stage was to be skipped and the 2nd edition was published directly as a standard in January 2008. In the future, 'ic' will also be included in this standard and there will then be no reason for retaining the term FNICO for zone 2 applications.

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### **TC 31 SC 31J Classification of hazardous areas and installation**

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

In December 2007 the 4th edition of these standards appeared. The Equipment Protection Levels (EPL) are now also included in this standard, on the one hand in chapter 'terms and definitions' (due to the scope of the standard only for gas explosion protection) and, on the other hand, under the heading 'Selection of the apparatus', where the types of protection are allocated to the EPLs.

For the first time a statement on the qualification of the personnel is made in this standard. This statement requires that, in future, selection and repair must be undertaken 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 August 2007, the 4th edition of this standard 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 the inspection and maintenance of electrical apparatus in areas with explosion hazard due to the presence of combustible dust.

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

The 2nd edition of this standard was published in October 2006. In the meantime, a new 'Technische Regel' (Technical Rule) has largely removed the discrepancy between the text in the standard and the national 'Betriebssicherheitsverordnung' (German Health and Safety regulations) in Germany.

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

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The CENELEC annual meeting was held in Prague in September 2007.

On the second day a joint meeting of CLC/TC31 (electrical equipment) and CEN/TC 305 (non electrical equipment) was held for the first time. In the future, the close interdependence between explosion protection of electrical and non electrical equipment will also be addressed in this way. This situation will also have a positive effect on the future work of the new IEC SC31M (see above).

The status of the Official Journal (OJ) of the European Union was also discussed. Unfortunately, the 'List of harmonized standards' was published in the journal in December 2006. As EN 60079-0:2004, which has replaced EN 50014, was not listed in the OJ,



the relationship between EN 50014 and EN 60079:2006 is so missing. An appropriate footnote 2.1 in the new list published in April 2008 clarifies how EN 50014, EN 60079:2004 and EN 60079:2006 belong together.

As was to be expected, at this year's CLC/TC31 and CEN/TC305 meeting the validity of the ATEX type examination certificate after changes of standards was an important topic.

After a long discussion, it was concluded that the technical committee CLC/TC31 has the appropriate authority and correct composition (manufacturers, end customers, member of public authorities) to evaluate the necessary consequences due to changes of standards. This evaluation is in future to be included in the related foreword for the European standard. A small working group has performed an example evaluation based on the new edition of EN 60079-11. You will find further information on this topic at <http://www.explosionsschutz.ptb.de>.

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### IECEx Scheme

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This year's meeting of the Management Committee (MC) and other IECEx forums took place in Denver, Colorado in September 2007. Along with other important topics, the following issues were discussed:

Along with the two IECEx schemes for product certification and for the certification of repair workshops, the certification of competent personnel was addressed as a future topic. General opinion was that experience should be obtained with the two established schemes and in the meantime to a business plan be developed for the new personnel certification scheme.

An IECEx logo will be introduced for IECEx-certified products in future. Usage is voluntary and involves the payment of a licence fee.

Poland joins the IECEx scheme in beginning of 2008, the inclusion of Malaysia and Brazil and is expected in 2008.

The technical guideline documents that are used as the basis for the accreditation of test laboratories (Ex-TL) have been thoroughly revised and brought up to the current state of the related standards of the types of protection.

A suggestion for dealing with product piracy was submitted by the German delegation. The enhancement of copies of products with IECEx certificates is to be prevented. This suggestion was accepted by a large majority and will be implemented. The topic will also be addressed as a standing point on the agenda of future IECEx meetings as a high priority. In the meantime, an IEC commission has also been formed to cover the issue of the prevention of product piracy for all certification schemes.

You will find more information on the status of IECEx at <http://www.iecex.com>.

### Abbreviations

EPL  
Equipment Protection Level

CD  
Committee Draft  
1st stage: publication of a draft standard  
call for comments

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