



IECEX Scheme –

Opportunity or threat to the industry in Europe?

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Figure 1: Management Committee IECEX MC in Colorado, USA

In his global bestseller, „The world is Flat: [1], the American journalist and triple Pulitzer Prize winner Thomas L. Friedman describes a triple convergence that started in the 1990's; the effects of this convergence are combined under the heading of globalization, and as the current major trend it will result in changes worldwide of as yet unimagined impact. The first convergence is in the development of the Internet into the modern, global information system par excellence. This change was made possible firstly by the development and proliferation of suitable hardware in the form of powerful PCs, storage media, transmission systems, etc., secondly by suitable software solutions, e.g. workflow programs, and thirdly by the emergence of an adequate number of experienced users. The second convergence is in the development and implementation of business models that are actually only possible in the first place due to the Internet. This development includes components such as the usage of horizontal, international value chains, the extensive standardization of information interfaces and logistics interfaces, and other aspects.

The third convergence comprises the freeing of around three billion people from their previously largely insular economies. The economic and political systems of the people of India, China, the former Soviet Union, Eastern Europe, Latin America and Central Asia opened up gradually in the nineties permitting their participation in the open market. The third convergence is this: the coming together of new freedom and the flat world platform now available with its new technologies and business practices. It ensures that these people will compete and co-operate with each other horizontally, and during this process utilize workflow instruments that are less expensive and more easily available than ever before.

The IEC Ex scheme as a response to the globalization in the process industry

Of course, these three convergences are also having an effect on the process industries where installations with explosion hazards are often found. Whether in the chemical, the petrochemical, the pharmaceutical or the food industry, to name only the most important industrial sectors in this respect, the concentration of plants or the outsourcing of activities that are not core competencies is common place. The big companies are trying to optimize their costs, among other aspects, by using international value chains.

Independent of the motives for these developments or the sector to which the company belongs, for the process of 'globalization of hazardous areas' the high standards for the protection of employees, other people, the environment, and the safety of the equipment and systems installed in the plants still apply. As the laws of physics and chemistry also define when explosions occur, irrespective of where they occur in the world, the technical and organizational procedures and measures that can be used to prevent explosions, despite slight local modifications, are based on similar principles. It is therefore obvious

that the approval conditions for mechanical and electrical equipment should be unified worldwide, and free global trade using certificates that are not country or region-specific is made possible.

This was the approach taken by the 'fathers of the IECEx scheme', when in June 1996 they met in London for the first time as the Management Committee (IECEx MC) to address worldwide standardization of the rules for approvals, encouraged by the initial successes of the European harmonization of the certification procedures of explosion protected equipment.

Since then more than ten years have passed and when the more than 100 delegates converged in September 2007 at the annual conference of the IECEx MC in Denver, Colorado, there were many positive developments to report (Figure 1). Up to now 28 countries have joined the scheme, with Brazil as a further candidate whose admission can be expected in the next year or two.

Worldwide there are currently 35 recognized IECEx Certification Bodies (ExCB) and 36 recognized IECEx-Test Laboratories (ExTL) accredited to common high standards and which are regularly monitored. The number of Certificates on Conformity (CoC) and Ex-Test Reports (ExTR) issued by these bodies increased significantly between 2003 and 2007, as can be seen in Table 1. Parallel to this, the number of Quality Assessment Reports (QAR) on the quality management systems at manufacturers also increased. For IECEx id applies: a certificate is only issued if both type tests on test samples have been passed, and the existence of an effective quality management system has been demonstrated by an audit.

Particular mention must also be made of the extensive documentation of the IECEx scheme that has been produced over the years in an exemplary manner through voluntary involvement in the various Working Groups (WG); this documentation adequately covers almost all aspects and requirements of working with the IECEx scheme. Currently around 60 technical documents are published each year. →

Year	CoCs	ExTRs	QARs	Total	Draft
2003	12	10	1	23	10
2004	104	54	33	191	115
2005	277	139	208	624	225
2006	619	1,001	250	1870	360
July 2007	524	574	183	1,281	420
Total	1,536	1,778	675	3,989	

Table 1: Development in the number of certificates, test reports and quality assessment reports on QM systems for IEC Ex from 2003 to mid 2007



Figure 2: IECEx-Logo

A detailed study of the most important documents of the scheme by members of the German working group in 2006 came to the result that, although in a few areas there is a lack of necessary definition and obligations in formulations compared to the IEC technical standards (this deficit has in the meantime been largely corrected), currently there is no further major need for regulation. It is considerably more important to also apply the documented rules consistently. The acceptance and effectiveness of the certification scheme is of course based on the strict application of the same rules for all accredited certification bodies and all certified companies. All the documents as well as the certificates issued can be viewed on the IECEx homepage (www.iecex.com) and can also be downloaded from there. In relation to its contents, updating, and ease of use, the homepage is a further example of the positive achievements made over the 10 years of the IECEx scheme.

Wherever there is light, there are also shadows. Currently still unsatisfactory is that Australia is the only country to recognize the CoCs without additional national verification or restrictions. As a result there are still regional and national approval processes all over the world, such as the

conformity assessment procedures according to ATEX- Directive in the European Union or the national approvals in the USA (UL, FM) and many other countries. The original objective of having one certificate for a product that permits unrestricted sale and usage worldwide has unfortunately still not been achieved. A minor detour into the history of the European legislation in the area of explosion protection of electrical equipment provides consolation. At the start of the eighties it was also inconceivable that the many national approvals in the European countries would no longer be necessary two decades later, and that the free trade and use of a product within the EU with a single certificate of conformity would be a matter of course.

An international manufacturer of explosion protected equipment is, as a result, currently 'forced' to apply for an ATEX certificate for the European market, an IECEx certificate for the Australian market, a UL certificate for use in the USA and so on. It is easy to imagine how much time and money can be spent on such a procedure. An additional gain in safety or other customer benefit is however questionable.

Of course, many certification processes at the large certification bodies such as PTB, DEKRA, Exam, UL or BASEEFA now run parallel such that, for example, ATEX and IECEx certificates can be applied for and processed at the same time. Due to the so-called 'fast track' procedure (the certification bodies use test reports issued by an IECEx test laboratory as the basis for

issuing national certificates without further tests), the situation is also easing noticeably. From the point of view of an established European manufacturer like R. STAHL, around 90 % of all test results from tests required by ATEX-Directive can be applied one to one for IECEx TRs.

However, in the end additional costs and delays for the manufacturers still remain due to the lack of full acceptance of the IECEx certificates.

The operating organizations would of course also profit from one certificate for explosion protected equipment with worldwide validity. Large international companies, in which value must be added all over the world, have a major interest in common global standards for production plants, particularly for reasons of safety and effectiveness of their processes. In the current situation, they must still use the related nationally valid certificates on their different sites and address the sometimes significantly different national requirements.



The Certified Service Facilities Program

Once the IECEx scheme for testing and certifying new products had been set up and, as seen above, the first success occurred, work got started three years ago on covering a further important area of explosion protection with a suitable certification scheme: The maintenance and repair of explosion-protected equipment. Like all technical entities, this equipment is of course subject to wear, even when used as prescribed, that is dependent on the operating conditions and ambient conditions, among other aspects. For products whose reliable function has a direct effect on the safety of the plant and, therefore, are only allowed to be placed in service after passing severe tests and the issuing of a certificate, it is obvious that their operation must not be left to fortuity, e.g., maintenance and any repairs necessary must meet the related and accepted quality and safety standards.

An example: It is not really sensible to purchase a high quality explosion protected motor from a respected manufacturer and after a couple of years operation to have the motor winding renewed by a repair shop without any specific competence in explosion protection. This is the approach taken by the new certification scheme under IECEx, the IECEx Certified Service Facilities Program. Depending on the maintenance and repair work that is to be undertaken by the organization assessed during an audit by experienced assessors, it is determined whether or not the necessary personnel competencies in relation to the function of the related product and the types of protection employed are available, as well as, whether the correct test equipment is available to a sufficient degree, and whether

identification and traceability measures are defined and used, how sub-contractors are trained and monitored, amongst other things. The basis for this assessment is formed by the standard IEC 60079 Explosive atmospheres – Part 19: Equipment repair, overhaul and reclamation, the Operational Document OD 013: IECEx Operations Manual – Assessment and Certification of Ex Repair and Overhaul Service Facilities as well as OD 014: IECEx Operational Document: Quality System Requirements for IECEx Service Facilities involved in repair, overhaul and modification of Ex Equipment.

Such a certificate is intended to give the operating companies and supervisory authorities worldwide the security that maintenance work and repairs on explosion protected equipment are performed correctly and under competent supervision. With this new part of the IECEx scheme a very positive contribution is being made to the globalization effects in the economies mentioned in the beginning of this article. As a result, for example, a German chemical company can assign locally certified service organizations with support for the equipment and systems installed on production sites all over the world and, in the process, can assume that the correct quality and safety standards will be

followed and implemented; standards that have been prepared with the active involvement of German experts. This process is also advantageous for the manufacturers, as it ensures, e.g., repairs will be undertaken correctly and therefore a high level of transparency on warranty and liability issues will be created.

In the meantime the following 6 test bodies have already been accredited for the IECEx Service Facilities Program: SIRA and Baseefa (UK), KEMA (Netherlands), NEMKO (Norway), TÜV Süd PSB (Singapore) and SIMTARS (Australia). The representative from KEMA, Mr. Theo Pijper, reported at the Ex MC Meeting on a very positive response to the Dutch test body's certification activities, an area where the test body has been active since mid 2007.

The status of the test centres, as well as the certificates issued to repair organizations can also, of course, be seen on the IECEx homepage.

The third component of the IECEx scheme is targeted in a similar direction; this component addresses the certification of the personal skills of experts who work in hazardous areas. Here (international) operating companies are also to be given the security that the personnel employed have the necessary qualifications and experience to be able to correctly perform the various, sometimes very complex tasks, in hazardous areas. It is not the objective of IECEx to offer professional training, however, it is intended to verify the quality of the now countless training courses by evaluating the knowledge of the employees trained and issuing corresponding certificates. At the moment, the business process is still being developed at the IECEx and initial practical experience is being collected. →

Even more type plate information? – The IECEX Logo

The delegates to the IECEX MC session in Denver were informed that the responsible Conformity Assessment Board (CAB) at the IEC had agreed to issue an IECEX Logo that in future will be used on the type plate on certified products in return for a licence fee (Figure 2).

Opinion is divided over the value of this logo. Some say that the flood of information triggered by various changes to the applicable IEC standards is scarcely manageable without an IECEX Logo. On the other hand, on smaller items of equipment there is often not enough space to add all the necessary information in legible form, quite apart from the degree to which much of the information can be understood. The other position is that with this new, voluntary symbol, easy recognition of products compliant with the standards can be obtained and therefore a visible differentiation to many, often unsafe, cheap products obtained. It will remain an interesting task for the future to develop a sustainable compromise here.

Defence against product piracy

The power of respected brands names just mentioned, however, also encourages product piracy, an illegal practice that has reached previously unknown levels due to the pronounced tendency towards globalization in recent years. At the external borders of the European Union, almost 100 million cases of product or brand piracy are detected each year. Based on EU estimates, 10% of world trade is lost due to product piracy, illegal over production, parallel imports and re-imports; this can be equated to international damages of more than 300 billion Euro.

The manufacturers of explosion protected equipment are also increasingly affected by this development. Here familiar, proven products are, as far as possible, exactly copied and sold under a different brand name. A certification scheme like IECEX primarily has the task of verifying the compliance of product characteristics with the requirements in standards (which in the case of a ›good‹ copy of a certified product should be the case). A certification body or a test laboratory cannot have the task of ensuring competition law is enforced. On the other hand, a product copy is quasi legitimized to the potential customer by an IECEX certificate, a fact that cannot be accepted by the manufacturer and the owner of the intellectual property related to the design of the product. The German delegation in Denver therefore submitted a suggestion on how product piracy can be tackled in the context of the IECEX scheme. The proposal met with the broad approval of the delegates, and it has been decided to prioritize the topic, adding it as a standing IECEX agenda item. As it is not only the IECEX scheme that is affected by the risk of product piracy, but all other IEC certification schemes are also confronted with this problem, it has, in the meantime, been decided to found a higher level IEC working group with the task of preparing an effective solution to this problem.



Conclusion

The question formulated in the title of this article can be answered more positively than negatively from the point of view of the European manufacturers and operating companies due to the development of the scheme.

From the point of view of the users, the advantages certainly seem clear. Using certification in accordance with the IECEx scheme of equipment, repair shops and personal competencies, they have the possibility of approaching a wider base of qualified equipment manufacturers and service providers on a global basis. With the implementation of a globally recognized product certificate for explosion protected equipment, it would be possible to use equipment anywhere irrespective of national borders. E.g., inventory and other aspects necessary for plant operation due to local differences could be further optimized with the goal of cost reduction. For established manufacturers the issue is not so clearly positive. Although at the start of the development of the IECEx scheme, commitment was unreversed due to the promise of easier access to immense new markets, with time it was discovered that the issue is not a one-way street, but that via IECEx certification new competitors from low-wage countries have appeared on the scene who are now

penetrating not just the new markets, but also the established markets. However, the rule that it is not possible to successfully obstruct general market trends over the long term also applies to the niche market for explosion protected equipment; protectionism is always the worst of all possible solutions.

If IECEx were to become fully established, and all countries in the world would be open to IECEx CoCs without reservation, there would be a significant time and cost advantage for all international players. Although manufacturers are confronted with many new competitors, this effect is clearly compensated for by the sales potential in the new markets. Finally, the rule of competition that the provider with the best price-performance ratio wins also applies to explosion protection.

The open, harmonized single European market has for years not known trade barriers for explosion protected equipment. The initial fears that manufacturers in countries with significantly lower wage levels could capture notable market share with cheaper products have been unfounded. Manufacturers from high-wage Germany have grown satisfactorily in the much enlarged market. A similar situation should also result worldwide under IECEx, provided the rules prepared are applied equally to all market participants!

Finally, the statement made by Professor Michael Hüther, the director of the Institut der Deutschen Wirtschaft also applies to industries with hazardous areas: »Die stark werdenden Märkte in der Welt geben uns derzeit noch die Kraft. Wir leben gut davon, wenn andere reich werden und nicht arm bleiben. So verstehe ich auch Fortschritt in einer freien Gesellschaft. Wettbewerb wird immer Wachstum erzeugen.« (The growing world markets still gives us strength. We live well when others become rich and do not remain poor. That is also how I understand progress in a free society. Competition will always generate growth.) [2].

References

- [1] Thomas L. Friedman: The world is Flat, Thornide Press 2005, ISBN 078627722X
- [2] Interview with Professor Michael Hüther in »Die Absatzwirtschaft« 1/2008, Seite 8