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European Directive 2007/23/EC on the Placing on the Market of Pyrotechnical Articles: Are you concerned?

Lionel Aufauvre
Lionel.Aufauvre@ineris.fr
INERIS Certification Division
Parc Technologique Alata – BP 2
F-60550 Verneuil-en-Halate, France

ABSTRACT

On May 23, 2007 the European Parliament and the Council adopted the Directive 2007/23/EC [1] on the placing on the market of pyrotechnic articles. This newly published text is another piece of the European regulation concerning explosives and pyrotechnic articles. It completes the Directive 93/15/EEC of 5 April 1993 [2] on the harmonisation of the provision relating to the placing on the market and supervision of explosives for civil uses. These two Directives following the "new approach" aim at ensuring the free movement of products within the European Union (EU), improving safety of both consumers and professionals and implementing harmonised safety requirements for such products in all Members States.

Thus, the Directive 2007/23/EC applies specifically to pyrotechnic articles and their placing on the EU market, but what are they and how do you know if you are concerned? As Notified Body and Official Laboratory in France INERIS has gained a lot of experience in testing, certifying and approving explosives and pyrotechnic articles. In this paper we give an insight of the different parts of the Directive 2007/23/EC, we answer the title question and we present the possible frame of the CE marking and certification procedure for pyrotechnic articles.

Introduction

In the European Union (EU) pyrotechnic articles are now subjected to comply with the EU Directive 2007/23/EC [1] as far as it concerns their placing on the market. By introducing harmonized Essential Safety Requirements (ESR) this new Directive offers the possibilities to replace the National approval procedures concerned by a single legal framework throughout the European Union (EU).

Although this EU directive will reduce the administrative burden for everybody by introducing the CE marking and certification procedure, its substitution and application in replacement of the current National regulatory frameworks may create difficulties at the beginning. In this paper we present the different aspects of the Directive.

Scope of the Directive 2007/23/EC

Since 1993, pyrotechnic articles and ammunitions are explicitly excluded from the scope of the Directive 93/15/EEC that deals with explosives for civil uses. But one had to wait until 2004 and the adoption by the European Commission (EC) of the Directive 2004/57/EC of 23 April 2004 [3] (on the identification of pyrotechnic articles and certain ammunition) to specify what the term pyrotechnic articles actually covers in the context of the former Directive.

Thus, the Directive 2007/23/EC applies specifically to pyrotechnic articles defined as *"article containing explosive substances or an explosive mixture of substances designed to produce heat, light, sound, gas or smoke or a combination of such effects through self-sustained exothermic chemical reactions"*. This broad definition includes namely fireworks, theatrical pyrotechnic articles and pyrotechnic

articles for vehicles but also a large variety of other articles designed for more specific applications.

However, some articles are excluded from the scope of the Directive, they are:

- pyrotechnic articles intended for non-commercial use by the armed forces, the police or fire departments;
- pyrotechnic marine equipment falling within the scope of Directive 96/98/EC [4];
- pyrotechnic articles intended for use in the aerospace industry;
- percussion caps intended specifically for toys falling within the scope of Directive 88/378/EEC [5];
- and ammunition as projectiles or propelling charges or blank ammunition used in portable firearms, other guns and artillery.

Benefits of this new Directive

The implementation of the Directive 2007/23/EC by replacing some 27 parallel national approval procedures will guarantee the free movement of pyrotechnic articles while ensuring public security, safety of consumers and environmental protection at the EU level.

This is achieved by setting up essential safety requirements that pyrotechnic articles have to conform with. For the manufacturers, importers or distributors concerned that will result in a reduction of costs to obtain technical approvals for their products as the principle "tested once, accepted everywhere" will be followed as long as the essential safety requirements are fulfilled without lowering the level of safety for the end users.

But the benefit of that is still larger, for example in Europe, obviously, firework and automotive pyrotechnic markets are significantly different. Whereas on the one hand, the EU is a net importer of fireworks, on the other hand, it is a net exporter of automotive components containing pyrotechnic articles. The vast majority of fireworks on the EU market are imported from Asia (China, India...). As a result of that, most of the stakeholders in this field are involved in purchasing, storing, distributing and professional displaying of fireworks. These articles are often directly sold to a large public and subject to various regional traditions and habits pertaining to each country. Easy access to

consumer fireworks increases every year, and correlatively the number of accidents involving fireworks also increases, leading to a stringent reinforcement of the regulation in some countries. Then, the implementation of the new Directive is a real opportunity to achieve a higher safety level with fireworks articles through harmonized testing and quality assessment procedures.

By contrast, the EU appears as a major automotive pyrotechnics exporter, not only for manufactured components but also for parts of assembled vehicles. In this field, a large number of stakeholders are employed in designing, manufacturing and assembling. There is no direct consumer market for these products and only automotive factory workers or professional in repair shops buy, handle and use them. It seems that there are no records of accidents involving these products, most probably because of the lack of statistics in currently existing accidents/incidents database. Therefore, on this basis the application of an EU Directive can be seen less necessary. However, as the existing approval processes, regulations and laws were different from one Member State to another leading to the multiplication of delays and costs for approval, harmonization was also chosen through an EU Directive for the placing on the market of automotive pyrotechnic articles. This solution was also preferred by the automotive supplier industry to other types of solutions as the "new approach" legislation only lays down essential safety requirements and offers more flexibility to the manufacturer (together with more responsibility) to comply with regulation.

Application of the Directive 2007/23/EC

The Directive entered into force on July 4, 2007 and Member States shall adopt and publish, by January 4, 2010, the appropriate laws, regulations and administrative provisions necessary to comply with this Directive. They shall apply those provisions by July 4, 2013 for other pyrotechnic articles for vehicles.

However, by way of derogation, National authorizations for pyrotechnic articles for vehicles granted before that date should continue to be valid until their expiry.

Categorization

For the purpose of the Directive pyrotechnic articles shall be categorized by the manufacturer according to their type of use, or their purpose and level of hazard, including their noise level (see tables 1 to 3). The categorization has three consequences, firstly it matches age limits for the consumer (see table 4) below which pyrotechnic articles shall not be made available to them, secondly it limits the accessibility of fireworks category 4, theatrical pyrotechnic articles of category T2 and other pyrotechnic articles of category P2 to persons with specialist knowledge and thirdly it requires minimum specific labeling according to the category.

Table 1: Categorization for fireworks

Category 1	Fireworks which present a very low hazard and negligible noise level and which are intended for use in confined areas, including fireworks which are intended for use inside domestic buildings
Category 2	Fireworks which present a low hazard and low noise level and which are intended for outdoor use in confined areas
Category 3	Fireworks which present a medium hazard, which are intended for outdoor use in large open areas and whose noise level is not harmful to human health
Category 4	Fireworks which present a high hazard, which are intended for use only by persons with specialist knowledge (commonly known as fireworks for professional use) and whose noise level is not harmful to human health

Table 2: Categorization for theatrical pyrotechnic articles

Category T1	Pyrotechnic articles for stage use which present a low hazard
Category T2	Pyrotechnic articles for stage use which are intended for use only by persons with specialist knowledge

Table 3: Categorization for other pyrotechnic articles

Category P1	Pyrotechnic articles other than fireworks and theatrical pyrotechnic articles which present a low hazard
Category P2	Pyrotechnic articles other than fireworks and theatrical pyrotechnic articles which are intended for handling or use only by persons with specialist knowledge

Table 4: Age limits

Fireworks Category 1	12 years
Fireworks Category 2	16 years
Fireworks Category 3	18 years
Category T1 and P1	18 years
Fireworks Category 4	Only for persons with specialist knowledge
Category T2 and P2	

Conformity assessment procedures

For the assessment of conformity of pyrotechnic articles the manufacturer shall follow one of the following procedures:

1. the EC type-examination procedure (Module B), and, at its choice, either:
 - the conformity to type procedure (Module C), or
 - the production quality assurance procedure (Module D), or
 - the product quality assurance procedure (Module E);
2. the unit verification procedure (Module G);
3. the full product quality assurance procedure (Module H), insofar as it concerns fireworks of category 4.

A description of each module is given in different sections of the annex II of the Directive. Without going in too much details in the content of each module, it is worth to point out that a third body is requested for their application. Such a third body is called a Notified Body and stands as an organism appointed by Member States to carry out different tasks described in the modules. INERIS has officially applied to be notified for the Directive 2007/23/CE. It is likely that other organisms have or will also apply for this notification (lists of all Bodies notified for each

Directive can be found on the Internet [6]). The notifications will be registered shortly after the transposition of the Directive by the different Member States.

According to our experience as Notified Body for the Directive 93/15/EC, most of the manufacturers will probably choose the application of Module B + Module D for the certification of their products. Whereas the Module B consists in describing the type of article according to a technical documentation and test results and in assessing the conformity of representative samples with the Essential Safety Requirements given in the Annex I of the Directive, the Module D (or similarly Modules C or E) consists rather in assessing the capability of the manufacturer to ensure the later conformity of pyrotechnic articles actually produced with the type initially defined and thereby mainly by assessment of the quality system applied by the manufacturer. It also requires the marking of each article, the issuing of a written declaration of conformity and the archiving of specific documents by the manufacturer.

The main steps to get the CE mark approval

To briefly described the different things that an applicant shall do in order to receive the CE certification for its products:

- Contact the Notified Body (notified for the Directive 2007/23/EC) of your choice and lodge your application by submitting the necessary technical documentation to assess the Essential Safety Requirements.
- The Notified Body will carry out the relevant testing procedures on representative samples you will provide in the frame of the EC type-examination procedure (module B).
- The Notified Body issues an EC type-examination certificate to the applicant if the provisions of the Directive are satisfied.
- The Notified Body will either perform examination at random intervals on commercial articles (module C) or assess the quality system of the manufacturer (modules D or E). That is to confirm the later conformity of articles manufactured according to the type certified.
- The manufacturer can affix the CE conformity marking (see Figure 1) on its certified products

and issues the corresponding declaration of conformity to the Directive.

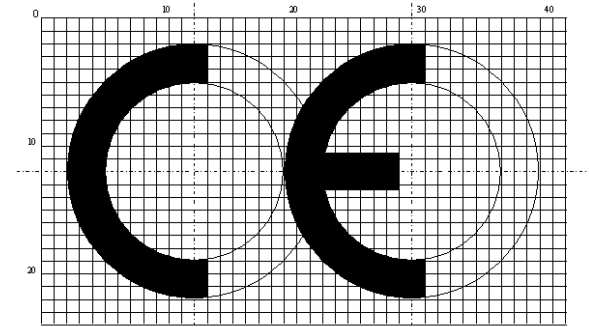


Figure 1: CE mark [7]

Essential Safety Requirements (ESR)

The Essential Safety Requirements given in the annex I of the Directive are the minimum requirements to be satisfied by the pyrotechnic articles in order to ensure a high level of protection of human health and safety and the protection of consumers and professional end users. Although the ESR do not really intend to guarantee any performance reliabilities in the final use of the articles, an adequate and complete operation of the articles according to what it is expected is in some way a basic condition for safety. Depending of the articles and their intended uses some of the requirements may not be relevant and the articles do not need to comply with.

Harmonized standards

In order to facilitate the process of demonstrating compliance with the essential safety requirements, harmonized standards for the design, manufacture and testing of pyrotechnic articles are being developed by the Technical Committee CEN/TC212 [8] of the European Committee for Standardization. In line with the “New Approach to technical harmonization and standardization”, pyrotechnic articles manufactured in compliance with harmonized standards should benefit from a presumption of conformity with the essential safety requirements provided for in the Directive.

However, these harmonized standards will not be available before a few years and the demonstration of the compliance with the ESR will have meantime to be made by the mean of

other relevant standards or existing testing procedures used in the frame of the national approvals of pyrotechnic articles. For example, as far as it concerns pyrotechnic articles for vehicles the relevant international ISO standards (for example the ISO 12097 Road vehicles – Airbag components) should be taken into account during the transition period.

Conclusion

In the recently implemented new process of the certification of pyrotechnic articles, to prove the compliance with essential safety requirements is one thing and to prove the ability to produce articles in conformity with the type certified is another thing. The manufacturer of pyrotechnic articles has to do both in the frame of the Directive 2007/23/EC. The application of the Directive requires the intervention of a Notified Body to carry out different tasks. In one hand, it proceeds to a type examination (product certification) in accordance with Essential Safety Requirements based on the manufacturer technical documentation and on test results. And on the other hand, it brings a complementary contribution in the control procedures in terms of periodic audits of the manufacturing and inspection conditions.

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