SLOVENSKI STANDARD
SIST-TP CEN/TR 15951:2009

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Pirotehniļ ni izdelki - Ognjemeti, kategorija 4 - Pregled harmoniziranih standardov, ki jih pripravlja CEN/TC 212/WG 2

Pyrotechnic articles - Fireworks, category 4 - Overview of harmonized standards that will be developed by CEN/TC 212/WG 2

Pyrotechnische Gegenstände - Feuerwerkskörper, Kategorie 4 - Überblick über harmonisierte Normen, die von CEN/TC 212/WG 2 erarbeitet werden

Articles pyrotechniques - Artifices de divertissement de catégorie 4 - Vue d'ensemble des normes harmonisées qui seront élaborées par le CEN/TC 212/WG 2

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This Technical Report was approved by CEN on 17 August 2009. It has been drawn up by the Technical Committee CEN/TC 212.

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Foreword

This document (CEN/TR 15951:2009) has been prepared by Technical Committee CEN/TC 212 “Pyrotechnic articles”, the secretariat of which is held by NEN.

This document (CEN/TR 15951:2009) has been prepared by Working Group Nr 2 “C4 Fireworks” of Technical Committee CEN/TC 212 “Pyrotechnic articles”, the convenor and secretary of which are respectively Italian and French. Experts from ten countries have participated to its elaboration: Belgium, Czech Republic, Denmark, France, Germany, Italy, Romania, Spain, The Netherlands and United Kingdom.

It has been approved by votes of all the members of CEN/TC 212 “Pyrotechnic articles” on August 2009.

Introduction

Directive 2007/23/EC of May 23rd 2007 on the placing on the market of pyrotechnic articles, has been published on June 14th 2007 in the Official Journal of the European Union. (Ref. Mandate M 416).

In its Annex 1, Directive 2007/23/EC gives the essential safety requirements (ESR) pyrotechnic articles shall comply with. In order to facilitate the process of demonstrating compliance with these ESR, harmonized standards for the design, manufacture and testing of pyrotechnic articles must be developed.

CEN has been mandated by the European Commission (EC) to develop these harmonized standards: Mandate M 416 describes the work that CEN shall perform.

CEN has entrusted coordination of this work to CEN/TC 212 ‘Pyrotechnic articles’ with the following scope:

“Standardization of fireworks, theatrical pyrotechnic articles, pyrotechnic articles for vehicles and other pyrotechnic articles, particularly from the point of view of their safe use”.

During its meeting in Delft on October 16th and 17th 2007, CEN/TC 212 has decided to share the corresponding work to be done between several Working Groups. Resolutions have been voted to establish five Working Groups, one of which is Working Group 2 (CEN/TC 212 / WG2) in charge of standardization of Category 4 Fireworks.

Because no European standards exist at present for Category 4 Fireworks, preliminary work needs to be performed before a list of standards to be developed by WG2 can be drawn up. It has been accepted by CEN/TC 212 and proposed to the European Community a one-year period will be allocated to WG2 to prepare a CEN Technical Report in which its future work program will be described and an overview of the harmonized standards it will develop will be given including the reasons why WG 2 propose to develop these standards.

Five work sessions have taken place, respectively in NEN – Delft – Netherlands on February 6th 2008, in BAM – Berlin – Germany on May 21st 2008, in NEN – Delft – Netherlands on September 10th 2008, in AFNOR – Paris – France on November 12th 2008 and in UNI – Milano – Italy on February 3rd 2009.

The present document is the final draft of the Technical Report for Category 4 Fireworks. It has been written in close coordination with the other working groups of CEN/TC 212 WG 1 “Fireworks, Categories 1, 2 and 3", WG 3 “Theatrical Pyrotechnic Articles”, WG 4 “Pyrotechnic articles for vehicles” and WG 5 “Other pyrotechnic articles”.

1 Scope

This Technical Report gives an overview of harmonized standards which will be proposed to be developed by CEN/TC 212 WG 2, Category 4 Fireworks. It also gives the interpretation WG 2 experts have made of some terms, definitions and requirements of Directive 2007/23/EC in order to assure future harmonized standards will encompass all varieties of fireworks, which are presently placed on the European market, in a consistent way and take the benefit of all the practical experience and usages of fireworks in the Member States.

2 Terminology

2.1 Definition of “C4 Fireworks”

Article 3 (a) of Directive 2007/23/EC gives the following definition of “C4 Fireworks”:

“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”

This definition raises the following comments:

— Exceptions can be found to this definition, because some “fireworks for professional use” – e.g. lances – cannot be considered as “presenting a high hazard” or generate a low noise level by themselves (e.g. less than C1 maximum noise level). But they have been designed for use in combination with other fireworks articles, mainly Category 4 Fireworks. Then they are only used by persons with specialist knowledge and never offered to the consumer market. Consequently WG 2 experts consider these articles belong to category 4.

— C1-C2-C3 fireworks articles will no longer be considered as belonging to categories 1, 2 or 3, if they do not comply with all the requirements of these categories. As soon as a potentially C1, C2 or C3 article definitively does not meet one of the requirements for C1-C2-C3 Fireworks, it will be categorized as a C4 article.

— Nothing in the definition of “pyrotechnic articles” in Directive 2007/23/EC means an article must be a complete product. Then the case of “incomplete” fireworks articles must also be considered. Such articles are commonly placed on the market. An example is a “roman candle without fuse”. This article needs adaptation of a fuse for its ignition and different types of fuse may be used. This operation can be made by firers at the firing place, but limited to persons with specialized knowledge.

  Another example is a “shell without lift charge”. This article can be used in two distinct ways. It can be placed in the mortar above a separate “bag charge” which will act as a lift charge and will have been placed first in the mortar – or – this “bag charge” can be fit to it first before placing the assembly in the mortar.

  Such products require “modification or preparation before use”, which appears to be a better wording than “incomplete”.

— Likewise, “components” of fireworks can be considered as “pyrotechnic articles” from the point of view of Directive 2007/23/EC, as far as they are placed on the market. Such pyrotechnic objects as rocket motors, drivers, delay fuses, shells to be included in more elaborated shells, etc. are used for the construction of fireworks. Some of them can have other applications than fireworks manufacturing and are “other pyrotechnic articles” as defined by Directive 2007/23/EC (See Clause 3 hereafter). The others – which are only used as components of fireworks – can be identified to “fireworks which are intended to be part of a more elaborate firework”, then as “C4 Fireworks” to be used by persons with specialist knowledge in pyrotechnical factories.

NOTE The specific case of “stars” is discussed in 4.1.

— In the English language, "professional use" mainly means "paid at work" and the sentence between brackets must be considered as informative but not prevailing. The important term is "person with specialist knowledge", which implies these persons are not necessarily paid to prepare and fire the fireworks.

To conclude and to assure their work will be fully exhaustive, WG 2 experts have adopted the following interpretation of the definition of C4 Fireworks of Directive 2007/23/EC:

"With respect to Article 3 (a) of Directive 2007/23/EC, Category 4 includes (1) fireworks which present a high hazard or (2) require modification / preparation before use or (3) are intended to be part of a more elaborate firework or (4) which do not meet all the requirements for C1-C2-C3 Fireworks, and 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."

Resolution TC 212 28/2008 has been approved by CEN/TC 212.

2.2 Other terms

The future C4 fireworks harmonized standard(s) will identify the design parameters and performance characteristics to be taken in consideration for the corresponding articles to meet the essential safety requirements of Directive 2007/23/EC. For each design parameter or performance characteristic it (they) will state requirements and criteria which shall be complied with.

According to the variety of articles usually observed during C4 fireworks shows, it is clearly noticeable these articles will not have all in common the same design parameters and performance characteristics. However, collections of articles sharing the same design parameters and performance characteristics exist. Then WG 2 experts have considered it was necessary to identify these collections of C4 fireworks articles and draw up their list.

The future harmonized standard(s) will state requirements and criteria for each identified homogeneous collection, which does not mean there may not exist requirements or criteria applicable to several collections as well as to all the C4 fireworks articles whatever their design or behaviour in normal use.

Word "type" has been proposed to name these collections of articles. But, this word is already used by Directive 2007/23/EC, in its Annex II, with another meaning. Then, because Directive 2007/23/EC cannot be modified, its definition of word "type" must be considered as imperative.

This does not exclude the possibility of using the word "type" in another meaning but – in that case – it has been suggested to add a qualifying term to it, as it is for the expressions "type of use" and "type of pyrotechnic article" in Directive 2007/23/EC itself. This proposal has been approved by CEN/TC 212 (See Resolution 43/2008).

Therefore, the following terms and definitions will be used hereafter and in the harmonized standard(s) to be developed by Working Group 2:

— **Type:** sample representative of the production envisaged.

NOTE 1 This definition corresponds to the use of the term 'type' in Annex II §2(c) of Directive 2007/23/EC for the purposes of type-examination.

— **Generic type:** set of articles with a common, very general, design feature and/or with a common characteristic effect.

— **Subtype:** set of articles within a **generic type** with specific design features.

— **Individual item:** article within a **generic type** or **subtype** for which every possible feature and characteristic has been fixed.

NOTE 2 Each feature and characteristic will be specified in the **technical name** or a technical data sheet, as appropriate.

— **Technical name:** general description of an individual item.

— **Trade name:** description of an individual item from a particular supplier.

— **Family:** set of individual items that will be considered together for the purposes of testing and approval.

NOTE 3 This last definition is fully compliant with Directive 2007/23/EC which states in "Whereas (18)": *"Groups of pyrotechnic articles that are similar in design, function or behaviour should be assessed by the notified bodies as product families"*.

The figure hereafter shows how WG 2 experts intend to organize Category 4 Firework articles in "individual items" (samples of which will be "types"), "families" and "generic types", starting from the precise design level to the general design level. Example is given for "shells".

At the bottom are located the individual items submitted to conformity assessment procedures by the means of "types". As shown they are attributed a relatively long name to give information to the users on the typical calibre and effects (e.g. green ring) of the shell.

In the middle are set up "families" of individual items which may be considered together for the purposes of testing and certification (samples of which will be groups of the corresponding "types").

These families exhibit a first level of generalization of the characteristics of individual items and the corresponding types. For example, their colour and their possible tracing effect are not concerned by the essential safety requirements of Directive 2007/23/EC. So they can be neglected as far as compliance with these requirements is concerned and type tests may only be performed on one type and extended by similarity to others which share the same generalized characteristics.

At the top, a higher level of generalization of the characteristics of types is again possible. For instance, WG2 experts think all types of shells can be put together in a unique collection of groups because they have already noted that the essential safety requirements of Directive 2007/23/EC will only imply design and performance requirements which will be common to every type of shells and none at a lower level (e.g. that of a family). WG2 harmonized standard will only deal with these "generic types".

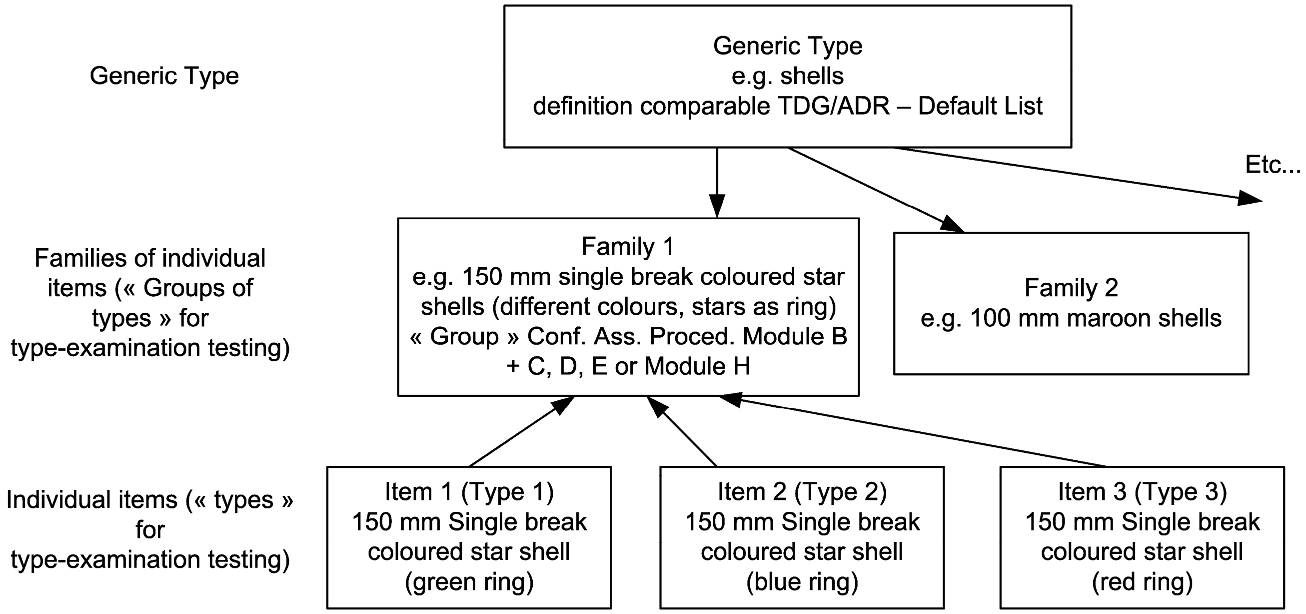

Figure 1 – Generic type, family and item

2.3 Technical terms

A list of technical terms which will possibly be used in setting design or performance requirements in the future harmonized standard(s) for C4 Fireworks has also been drawn up. Some of these terms which are presently used in standards developed by WG1 have strictly the same definition.

This list is given in Annex E.

It will be updated as far as it is necessary during the development phase of WG 2 harmonized standard(s).

3 Interfaces between CEN/TC 212 Working Groups

3.1 Interface between WG2 and WG1

Because drafts of WG 1 harmonized standards for “fireworks, categories 1, 2 and 3” already exist, they have been taken in account by WG 2 as far as it is necessary to prevent from conflicting situations (See Clause 4 hereafter) or useful when parts of these standards can be profitably applied to C4 fireworks (e.g. some test methods).

Indeed, WG 1 harmonized standards are not considered as prototypes of WG 2 harmonised standard(s). They will be distinct documents and requirements of WG 2 harmonised standard(s) will be limited to what is strictly necessary and sufficient from the point of view of their use by persons with specialist knowledge.

3.2. Interface between WG2 and WG3

WG 2 and WG 3 have exchanged their mutual opinions or solutions whenever they share the same questions or the same problems (e.g. use of high explosives or nitrocellulose with high nitrogen content in C4, T1 or T2 articles – See 5.1 hereafter)

3.3. Interface between WG2 and WG5

Components of firework articles are usually sold by manufacturers to other manufacturers in some European countries. WG 2 experts have considered “Category 4 firework articles” may include components of fireworks such as stars, crackers, volcanoes, tourbillions, quick match, black match, cord igniters, fuses or delays… from the point of view of Directive 2007/23/EC (See 2.1 here above).

WG 2 and WG 5 have met the following agreement:

— WG 5 will treat components of fireworks when they are used in other fields than fireworks (for example, electric igniters, quick match, black match, cord igniters, pressed fuses, stars).

— When these components are strictly relevant to the fireworks market, they will enter into the scope of work of WG2 (for example, crackers, volcanoes, tourbillions).

4 List of C4 Fireworks and definitions

4.1 Preliminary remarks

WG 1 dealing with “fireworks, categories 1, 2 and 3” has already elaborated drafts of harmonised standards dealing with “Terminology” and “Categorization”. These documents include definitions of some articles which will never have a C4 version and does not include definitions of articles which only exist as C4 fireworks (“shells” for instance). However, these documents have been taken in account by WG 2 to assure the same

definitions are used for the same types of articles by WG 1 and WG 2 as far as there are no justifiable technical reasons to create differences or additions.

WG 2 experts have met the necessity to create such differences and additions in a number of cases, because:

— Some WG1 definitions include requirements which are specific to C1-C2-C3 Fireworks and must not be imposed to C4 Fireworks as far as they are used by persons with specialized knowledge, e.g. cases of C1-C2-C3 Fountains must be non metallic and the corresponding WG1 definition states it, but metallic cases are already used for C4 Fountains and there is no major reason to forbid it.

— Requirements for C4 Fireworks do not need to be as precise, specific or numerous as for consumer fireworks for they will only be used by persons with specialized knowledge. Then several types of firework may be grouped under a more general type of firework or generic type, which simplifies the way design and performance requirements will be set in the future harmonized standard(s). WG 2 experts have decided to proceed to this grouping under some existing names of firework types and have consequently adapted corresponding definitions.

The final list and definitions of types of C4 Fireworks will be a separate document from WG 1 Consumer Fireworks Terminology and Categorization standards.

4.2 Criteria used to determine “generic types”

Criteria which have been used to determine “generic types” result directly from definition given here above to this term (See 2.2). A first list of possible C4 fireworks sharing similar, but general, design features and “space x time” performance characteristics has been drawn up. By “space x time”, WG 2 experts mean a pyrotechnic effect or a sequence of pyrotechnic effects spreading progressively in the air during a given time.

Considering this list was exhibiting too many entries (45 distinct C4 fireworks, 14 C1-C2-C3 fireworks and 12 components), WG 2 experts have decided to simplify their approach of “generic types” after having taken notice that:

— the essential safety requirements of Directive 2007/23/EC will only necessitate to determine requirements on a limited number of design and performance characteristics, as far as C4 fireworks are used by persons with specialist knowledge allowing them to assure safety of the public and protection of the environment by application of well mastered rules and instructions resulting from their experience and training;

— as a consequence of this limited number of design and performance characteristics, some possible generic types can be generalized to encompass other possible generic types which can then be considered as particular cases of these “generalised” generic types. For example, a “shot tube” is a “roman candle” the sequence of which is limited to a single shot.

Doing this, WG 2 experts have determined 12 “generalised” firework products which will become the “generic types” on which will be placed design and performance requirements in the future harmonized standard(s) for C4 fireworks.

The other 34 remaining firework products will only be particular variants of these “generic types”, consequently falling under the same design and performance requirements. To keep things clear, WG 2 experts have chosen to call them “sub types”.

The original list of firework products has then been split into three distinct lists: list of generic types (See 4.3), list if subtypes (See 4.4) and list of components (See 4.5)

4.3 Generic types: list and definitions

The following 12 generic types have been selected:

— *Aerial Wheel*

- *Aqua Firework (or: aquatic firework, nautical firework)*
- *Combination*
- *Components*
- *Fountain*
- *Guided Firework*
- *Mine*
- *Report*
- *Rocket*
- *Roman Candle*
- *Shell*
- *Smoke / Fog Generator*

For corresponding definitions, comments and description of principal effects, see Annex A.

4.4 Other types of firework: list, definitions and links to generic types

The following 33 firework products have been considered as subtypes of the previous generic types:

Aqua Shell (or Aquatic Shell, Nautical Shell), Bag Mine (or Mortar Mine), Battery, Bengal Flame, Cake, Daylight Shell, Flash Banger, Flight Rocket, Gerbs, Ground Maroon, Lance, Lancework, Maroon, Maroon Shell, Multibreak Shell, Parachute Rocket, Parachute Shell, Peanut Shell, Portfire, Preloaded mortar (or Shell in mortar), Repeater Shell, Saxon, Set Piece, Shell of shells, Shot tube, Signal Rocket, Strobe, Tourbillion, Underwater Firework (or Sub aquatic firework), Volcano, Waterfall, Wheel.

For corresponding definitions, links to generic types and description of principal effects, see Annex B.

4.5 Components: list and definitions

The following list is limited to pyrotechnic components which can be placed on the market and exchanged between industrialists throughout Europe. These components are not only intended for use by fireworks manufacturers, but can also be used – under given conditions – by persons with specialist knowledge which will be trained accordingly.

Bombette, Butterfly, Cracker, Fuse (including Delay Fuse), Motor, Serpent, Spinner, Star (including Comet, Crossette, Flash Pellet, Hummer and Whistle).

This list of components is not exhaustive.

For corresponding definitions, comments and description of principal effects, see Annex C.

For the specific case of “stars”, see Annex D.

4.6 Specific uses of articles

Special use of C1, C2 and C3 products:

C1, C2 and C3 articles may be used by persons with specialist knowledge in a different way that required and type-certified as “customer” fireworks. This possibility must be introduced as acceptable in a C4 standard, provided that the persons with specialist knowledge evaluate the new safety distances corresponding to their special use of the articles on the basis of performance characteristics to be supplied with the articles (label and/or “data sheet”).

Dual use:

Some products may have a dual use: outdoor fireworks and indoor / theatrical pyrotechnic articles, without any modifications or adaptations. In that case, it seems logical to WG 2 experts that they must be type-certified under the category corresponding to their most restricting use. For example, a T2 article may be generally used in a fireworks display as a C4 product without being C4 type-certified, but the contrary may not be possible.

4.7 Recommendations for integration of new items

Lists of generic types and subtypes given in Annexes A and B may not be fully exhaustive and correspond to the present knowledge of WG 2 experts. New items may be identified during the development phase or after the publication of C4 fireworks harmonized standard(s).

During the development phase:

Every new item will be compared by WG 2 experts to existing generic types and subtypes in the lists given in Annex A and Annex B. If it can be considered as a variant of an existing generic type or subtype, it will not be necessary to add it to these lists. In the opposite case and if it is not specific to one manufacturer or importer, the new item will lead either to the creation of a new subtype linked to an existing generic type or to the creation of a new generic type.

If the new item is specific to one manufacturer or importer, it will not be encompassed by the C4 fireworks harmonized standard(s) in development and its CE type-certification process will be determined by the Notified Body of one Member State.

After publication of harmonised standards:

If the new item is specific to one manufacturer or importer, its CE type-certification process will be determined by the Notified Body of one Member State.

Alternatively, the first Notified Body which will identify the new item will compare it to the lists of generic types and subtypes which will be part of C4 fireworks harmonized standard(s). If it can be considered as a variant of an existing generic type or subtype, no update of the harmonized standard(s) will be needed. If not, the Notified Body will propose to the Notified Bodies of the other Member States to ask CEN for a modification of the harmonized standards. Then the normal CEN process for updating standards will apply.

5 Parameters to be taken in consideration to meet the essential safety requirements

5.1 General aspects

Important parameters which rule the behaviour and performance of each type of firework in normal use must be identified and analyzed first. This approach does not need to be fully exhaustive, but limited to parameters which are influent from the strict point of view of compliance with the essential safety requirements of Directive 2007/23/EC. Therefore their precise liaison to each of these requirements must be determined.

Lastly these parameters will be split in two categories: "prescriptive" parameters – that is parameters submitted to requirements (limits, restrictions, tolerances...) and checked in the "type" examination or quality acceptance process – and "informational" parameters – that is parameters which will be given in parallel as information (e.g. to users). Examples of these "informational" parameters are calibres of mortars to be used, direction of ejection of projectiles, temperature limits, etc.

Following experience of WG 1 and what is more because C4 fireworks harmonized standard(s) deal with products to be used by "persons with specialist knowledge", WG 2 experts have concluded that:

— Requirements must be limited to those which are strictly necessary and sufficient to ensure compliance with the essential safety requirements of Directive 2007/23/EC.

— The set of construction and performance requirements to be considered as relevant to these essential safety requirements will be minimized, taking in account they must be considered from the point of view of a person with specialized knowledge. A first approach shows the number of generic types (See 4.3) and involved parameters (See 5.2) will be low.

— Consequently it is not necessary to create a standard for each type of C4 fireworks, and then these requirements can be included in a **sole common standard which will encompass all generic types of C4 fireworks.**

— Some of these requirements will be common to every C4 Fireworks type; then they will be gathered in a common clause of the future standard.

— Specific requirements for a given type of C4 Fireworks will be written on a type per type basis in a "Specific requirements" clause.

— No requirements coming from other Directives or regulations (REACH for instance) will be part of the future WG 2 standard.

— Lists of generic types, sub types, components and corresponding definitions (See § 4.3, 4.4 and 4.5) will be included in this future WG 2 standard.

— Definitions of technical terms (cf. 4.7) will be added to this "Terminology" clause. Entries will be limited to terms which are essential to the good understanding of the requirements.

5.2 Recommended construction and performance parameters

<u>List of forbidden substances:</u>

From the point of view of Directive 2007/23/EC, "forbidden substances" are the only ones which may be harmful for the health of fireworks firers and attendance or cause environmental damages. Substances which may be dangerous during the manufacturing process have not to be taken in account.

A list of forbidden substances will be determined for C4 fireworks and, because they are intended for use by "persons with specialist knowledge", it can be different from and less restrictive than the list which has been drawn up by WG1 for "consumer fireworks". This list must not include substances which have no concern with fireworks.

REACH Directive will apply to chemical substances used in fireworks, but it is not necessary to refer to it in a C4 fireworks standard.

Other restrictive regulations might apply.

Use of blasting agents and military explosives:

In its Annex I § (4) (a) and (b), Directive 2007/23/EC of 23 May 2007 “on the placing on the market of pyrotechnic articles” states pyrotechnic articles must contain neither commercial blasting agents, except for black powder or flash composition, nor military explosives.

As some T1 and T2, P1 and P2 articles, some C4 Fireworks already contain small amounts of explosives (e.g. nitrocellulose with high nitrogen content, single base or double base propellants one component of which is nitroglycerine) and must not be excluded from the European market as far as they comply with all the other essential safety requirements, except this § (4) (a) (b) of Directive 2007/23/EC / Annex I. Hence they must be included within the scope of preparing Standards for C4 Fireworks and to prepare suitable guidance.

CEN/TC 212 will prepare a specific resolution on that topic.

Limitations in mass and calibre:

These limitations exist in several European countries (e.g. Italy and France), but not in all of them (e.g. Germany, Spain and United Kingdom) and not always for safety in use.

If limitations have to be fixed in the harmonized standard, they cannot result from a compilation of all the national applicable laws, but only from the necessity of complying with the essential safety requirements.

Local limitations applying to the manufacturing process or to transportation of dangerous goods are not relevant to Directive 2007/23/EC and must be ignored in the harmonized standard(s).

Recommended construction and performance parameters:

The table in Annex F lists construction and performance parameters which will preferably be taken in account to determine compliance of C4 Fireworks with the essential safety requirements of Directive 2007/23/EC. This list aims at giving initial guidelines for the development of the future C4 Fireworks harmonised standard; it will be updated if necessary to meet the best compromise between the needs of all Member States within CEN/TC 212.

6 Identification of test methods

6.1 General aspects

Test methods are required to prove compliance with the Essential Safety Requirements of Directive 2007/23/EC. They are intended to check and/or measure construction and performance parameters which will be eventually selected as relevant to one or more of the Essential Safety Requirements and submitted to requirements in the future C4 Fireworks harmonized standard. These test methods are meant for persons and institutions performing the tests and for the Notified Bodies.

It must be reminded of the following aspects of type-examination and batch testing:

— Tests will not always be performed by Notified Bodies, but by Authorized / Certified Laboratories, some of them possibly part of a manufacturer’s organization (cf. Modules in Annex II of Directive 2007/23/EC).

— A construction or performance parameter can be measured in various ways. Alternative test methods – if approved – can be used. Then it is important is to determine the minimum required to compare results obtained from different test methods (e.g. accuracy, vibration and temperature levels).

— All laboratories involved to apply these test methods shall be agreed by a Notified Body, plus certified by an independent Certification Body, specialized in test protocols, calibration... and corresponding EN or ISO standards.