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Canada

Guidelines for Authorization of Consumer and Display Fireworks

Classification and Authorization
Requirements for Types F.1, F.2 and F.4

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Guidelines for Authorization of Consumer and Display Fireworks

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1. Introduction

These guidelines have been prepared as a guide to industry and the public. They describe the safety requirements for the design and performance of fireworks. They are published in accordance with Part 3 of the Explosives Regulations, 2013 (ER, 2013) published under the Explosives Act (R.S., c. E-15, s. 1). These guidelines are written in conjunction with the Explosives Regulatory Division (ERD) document titled *General Standard for the Authorization and Classification of Explosives* and specify the documentation and testing needed for the authorization¹ of cartridges.

Some companies experience difficulties in having their products added to the list of authorized explosives. Often this occurs because the process or the intent of the legislation is not fully understood. These guidelines explain the process of authorization and provide the information needed to complete and file a submission. All the documents referred to in these guidelines are available on ERD's website (www.erd.nrcan.gc.ca).

1.1 Scope

These guidelines apply to fireworks used in commercial (i.e., non-military) applications. It sets out the general and detailed requirements for consumer fireworks (Type F.1), display fireworks (Type F.2) and some fireworks accessories (Type F.4). Special effect pyrotechnic (Type F.3) are not covered by these guidelines.

1.1.1 Consumer Fireworks (Type F.1)

Type F.1 fireworks comprise low-hazard fireworks (consumer fireworks) generally used for recreation, such as fountains, wheels, Roman candles, sparklers, volcanoes, mines, snakes and toy pistol caps.

These fireworks are for use outdoors. They carry minimum risk outside a 5-meter radius when used according to the instructions. However, they are not toys and must only be used by adults. Regardless of all warnings, children do sometimes gain access to and misuse fireworks. Consequently, these criteria are provided to define fireworks that minimize risk, even when misused. The quantity of composition is limited and certain types of fireworks are denied authorization.

1.1.2 Display Fireworks (Type F.2)

Type F.2 fireworks comprise high-hazard display fireworks used for recreation, such as display shells, barrages, batteries, fountains, exhibition candles, flares, set-pieces, maroons, wheels, bouquets and firecrackers. These may only be purchased by persons with a valid fireworks operator certificate.

1.1.3 Fireworks Accessories (Type F.4)

Type F.4 fireworks comprise fireworks accessories, such as electric matches or portfires. Such articles may only be purchased by persons with a valid fireworks operator certificate.

¹ Authorization is the process by which an explosive, as defined in the Explosives Act and Regulations, is declared authorized by the Chief Inspector of Explosives, at which time it becomes legal to manufacture, sell, possess or use that explosive in Canada or import it into Canada; only after approval is the item added to the list of authorized explosives. As part of this process, the explosive is classified in accordance with the ER, 2013. Only explosives under the care and control of the Department of National Defence are exempt from authorization.

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1.2 Regulation for the Use of Fireworks

Natural Resources Canada (NRCan) does not regulate the use of explosives in general, but does regulate the use of display fireworks (Type F.2). The regulation that applies to their use is summarized in the NRCan document titled *Display Fireworks Manual*. As part of the approval and testing process, NRCan does request information to ensure that the item can be safely used as recommended by the manufacturer, e.g., company product information and technical data.

1.3 Repeated Requests for Authorization

It is not in the interest of the Canadian public to review, test and retest submissions for category of fireworks (e.g. Mines, Roman Candles) from companies whose products continue to fail or whose submissions demonstrate consistently poor quality. The purpose of the authorization process is to assure public safety. Poor quality products and documents show that the manufacturer has not been able to meet this objective. Therefore, the following will apply:

- i) An applicant which fails a third request for a category of fireworks (e.g., Roman candles) will not be permitted to submit that category of fireworks for authorization for five years.
- ii) Holders of authorization with explosives already on the list of authorized explosives will be allowed a total of three attempts per category of fireworks. After the third failure of a given category of fireworks, such category will not be considered for authorization again unless the product is redesigned and evidence to this effect is presented.

1.4 Continuing Authorization

There are two different processes used to confirm the continuing acceptability of an authorized explosive, i.e. auditing and testing.

1.4.1 Continuing Authorization Auditing

Manufacturers located in Canada will be audited to determine what manufacturing controls are used in order to ensure that an explosive consistently meets the drawings, specifications and requirements. Foreign manufacturers will either be audited or subject to continuing authorization testing.

1.4.2 Continuing Authorization Testing

Samples may be picked from the field or requested from the holder of authorization at any time and subjected to testing. The cost of such testing is borne by the Government of Canada.

All samples must be faithful to the technical declaration provided in support of an authorization. Failure to meet the technical declaration may result in the cancellation of the authorization.

1.4.3 Results of Continuing Authorization Auditing or Testing

If an article is recommended for continuing authorization based on the results of an audit or testing, it will remain authorized in Canada and continue to be published on the list of authorized explosives. A laboratory report from NRCan will be provided to the holder of authorization outlining the results of the audit or the tests that were performed.

If an article is not recommended for continuing authorization based on the results of an audit or testing, its authorization may be cancelled.

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The Chief Inspector of Explosives must cancel the authorization of an explosive if periodic testing or new information reveals that the explosive can no longer be safely manufactured, handled, stored, transported, used or destroyed (s. 39, ER, 2013). If the inconsistencies noted during the testing are considered critical (for example, the article toppled over during functioning, forbidden chemicals such as arsenic or lead were detected, the labels are misleading and could lead to injuries, etc.), the authorization of the article will be cancelled. The article will therefore be removed from the list of authorized explosives (s. 42, ER, 2013) and a product recall will be done in accordance with section 40 of the ER, 2013.

1.5 Authorization by Analogy

New articles similar to existing articles from established and known companies may be authorized by analogy to existing products upon review of the application and provided that sufficient information was provided by the applicant.

When applying for an authorization by analogy, an applicant must make reference to previous testing including:

- a list of the laboratory reports from NRCan (CIE #) with the date on which they were issued;
- the type of testing that was conducted on each of the composition/components/articles (e.g. chemical analysis, function test, etc.);
- a reference to the category of fireworks, i.e. Roman candles, cakes, etc.;
- the complete set of technical declaration (application form, engineering drawing, chemical composition, gross weight, NEQ, labels, packaging); and,
- a reference to a specific authorized explosive to which this new article compares to.

1.6 Firework Articles Forbidden in Canada

Certain firework articles considered to be unsafe will not be authorized in Canada, i.e.:

- i) intended for indoor use;
- ii) designed to be hand-held, except sparklers and hand-held fountains;
- iii) self-propelled from the ground and rising in the air with unpredictable flight paths or moving erratically;
- iv) judged excessively violent;
- v) not properly labelled;
- vi) having a history of injuries; and,
- vii) trick and joke devices.

The following are examples of fireworks which will not be authorized:

- i) *Ammunition for Tie-Clips, Cufflinks, Key Chain Pistols, etc.:* This ammunition is a violent type of blank ammunition for use in novelty items. It is often designed to resemble toy pistol caps in metal cups.
- ii) *Auto-Foolers:* Articles designed as a burglar alarm. When wired to the ignition system of a car, they operate with a loud screeching whistle followed by copious amounts of thick smoke, with or without an explosion. These articles can cause fires within the engine compartment.
- iii) *Blaster Balls:* They are solid substrate balls coated with a pyrotechnic composition such that when two balls are struck together there is an ignition at the point of contact resulting in a low level noise.
- iv) *Cherry Bombs, M-80 and Silver Salutes, Flash Crackers:* These are very violent firecrackers that often contain excessive charge weights and/or unacceptable fireworks compositions.
- v) *Cigarette Loads:* Small charges designed for insertion into the end of a cigarette or a cigar.

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- When the heat from the embers reaches the charge, it explodes, ejects sparks, gives off obnoxious fumes, or creates Asnow.®
- vi) *Dancing Crackers*: These are small charges designed to snap and crackle when stepped on. They are usually dropped on a dance floor.
 - vii) *Exploding or Smoking Golf Balls*: These are designed to look like golf balls. When impacted they either explode or emit copious amounts of coloured smoke generated by a pyrotechnic reaction.
 - viii) *Helicopters (or similar items such as Aplanes,® Awhiz-bangs® or Amissiles®)*: These articles are designed to rise in the air while spinning, often in an erratic way. Some helicopters function as soon as the article is ignited while others are first projected.
 - ix) *Parachute Shells*: Night-time parachute shells are not allowed due to their unpredictable paths. Daytime parachute shells displaying logos, banners and the like may be considered.
 - x) *Party Poppers*: Small articles designed to eject streamers and/or small party favours. They are triggered by pulling a tape or string. Some are shaped and coloured to resemble champagne bottles and are called champagne poppers.
 - xi) *Rockets* : These have unpredictable paths and, in the case of rockets with a stick, they have been the cause of injuries when the guiding stick fell back to earth.
 - xii) *Stink or Smoke Bombs*: These articles are designed to resemble other fireworks, most often cherry bombs or salutes. They release a stench or coloured smoke, or both.
 - xiii) *Table Bombs*: Articles that are designed to sit on a flat surface and, upon ignition, eject streamers and/or party favours.
 - xiv) *Table or Bottle Rockets*: Small tubes or Arockets® with propelling charges that are secured to a stick. When lit they rise out of the neck of a bottle, or from a pipe or a table top.
 - xv) *Tear Gas Pens and Launchers*: These can resemble a pen and may contain a mechanism activated by an explosive. They are supposedly for protection against muggers, but may be used as an offensive weapon or as a practical joke.
 - xvi) *Throw Downs (also called Snap Caps)*: Small objects designed to explode when thrown against a hard surface or stepped on.
 - xvii) *Trick Matches*: These resemble ordinary book matches or boxed matches, but are designed to produce various effects when lit, including explosion, sparking, foul odour, Asnow,® etc.

2. Application for Authorization

This section highlights some of the technical information required to support a new submission for authorization. You may refer to the *General Guidelines for the Authorization and Classification of Explosives* for the full details and the complete list of documents that must be provided in support of an authorization submission. The application for authorization is a legal declaration to the Government of Canada. It is the first indication of the care a company exercises in achieving a product of acceptable quality. Poor submissions do affect perception.

Every request for authorization must be accompanied by the form Application for Authorization of Explosives F03-01, properly completed. The review process does not start until all information has been provided.

2.1 List of Articles

A list of all the articles in the submission is required. The list must include a product name (trade name) and/or an identifying part number. The product name should include the effect, the calibre and the colour. If more than one colour is associated with a given name or part number, the applicant must list all the colours that are being submitted for each name or part number (different colours, being different chemicals, are considered to be separate articles).

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For submissions containing over ten (10) articles, an **electronic copy** of the list of articles must be supplied in Microsoft Excel to ERDmms@NRCan.gc.ca. As shown in the example below, part numbers and product names must be listed in two separate columns. Borders or special characters must not be used.

Part No.	Product Name
M123	Blue Mine
S879	Red Sparkler
BP-2	2-inch Blue Peony

2.2 Engineering Drawing

An engineering drawing of each article is required. If the same construction is used for different sizes or colours, then one drawing may be used to represent the different articles. Engineering drawings must be legible or they will not be considered.

The drawings must include: dimensions, charge weights of all explosive components, gross weight of the article, construction materials, and tolerances for charge weights, gross weight and dimensions. For multi-tube articles, the fusing pattern and the charge weight of each individual explosive component in each individual tube must be clearly indicated on the drawing.

Each submission must contain all the pertinent information; references to previous submissions will not be accepted.

2.2.1 Tolerances on Dimensions

The tolerances on dimensions must be declared by the manufacturer. They must be set so as not to interfere with proper function and must not be greater than $\pm 25\%$ of the nominal dimensions. *Where a maximum or a minimum size is specified in these guidelines, it represents the limit of the tolerance range.*

For example, if the maximum diameter of a Roman candle (consumer firework) is specified as 22 mm, that number must be considered when stating tolerances. A diameter described as 22 mm $\pm 10\%$ is not acceptable, since it means that diameters larger than 22 mm may be found.

2.2.2 Tolerances on Charge Weights

If maximum charge weights are specified in these guidelines, they must represent the maximum of the tolerance range. Otherwise, the following applies to charge weights:

Charge Weight	Tolerance
< 10 g	$\pm 25\%$
≥ 10 g	$\pm 10\%$

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2.3 Chemical Composition

The chemical composition of all explosive components must be given. This can be provided on the drawing or a reference may be made on the drawing to a table of compositions.

Compositions must list all ingredients used and must give the percentages and the tolerances for each. The ingredients must be listed by their chemical names wherever possible. Generic names may be used only when the ingredient is best known by the generic name. *All ingredients declared must be present. Ingredients not declared must not be present.*

If an effect is composed of more than one composition, the manufacturer needs to provide the ingredients information for each composition used in the construction of the effect, e.g., ignition composition and colour composition for a primed star.

Stability is a chief consideration for authorization. The chemicals listed in section 2.3.2 are known as components of stable fireworks. It is recognized that not all articles submitted for authorization can be sampled to prove their stability. Samples will be required for any chemicals other than those listed in section 2.3.2 or if unusual combinations of any chemicals are presented.

2.3.1 Tolerances on Chemicals

Tolerances for chemicals must be less than $\pm 20\%$ of the quantity for any component that represents less than 25% of the composition, and $\pm 10\%$ of the quantity for any component that represents 25% or more of the composition.

For example, if the quantity is 30%, and 10% of 30% is 3%, then the quantity and tolerance are specified as $30\% \pm 3\%$; if the quantity is 15%, and 20% of 15% is 3%, then the quantity and tolerance are specified as $15 \pm 3\%$. Companies may use more stringent tolerances.

2.3.2 List of Standard Chemicals in Fireworks

- aluminum;
- ammonium perchlorate;
- antimony;
- antimony sulphide;
- barium carbonate;
- barium nitrate;
- barium sulphate;
- bismuth oxide;
- boric acid;
- calcium carbonate;
- calcium sulphate;
- carbon or charcoal;
- copper metal;
- copper oxide;
- dextrine;
- hexamethylenetetramine;
- iron and iron alloys (ferro-titanium);
- iron oxide;
- magnalium;

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- magnesium;
- magnesium carbonate;
- magnesium sulphate;
- nitrocellulose-based lacquers;
- red phosphorus (toy pistol caps only);
- potassium or sodium benzoate;
- potassium hydrogen phthalate;
- potassium nitrate;
- potassium perchlorate;
- potassium sulphate;
- potassium terephthalate;
- sodium bicarbonate;
- sodium nitrate;
- sodium salicylate;
- sodium sulphate;
- strontium carbonate;
- strontium nitrate;
- strontium sulphate;
- sulphur; and,
- titanium (mesh greater than 100).

Organic compounds (lactose, shellac, red gum, chlorinated paraffin and PVC B consisting of some combination of carbon with hydrogen, oxygen and/or chlorine and nitrogen) may be present if they account for less than 10% mass/mass of the compound.

2.3.3 List of Chemicals Normally Precluding Authorization

The following chemicals are normally not allowed in fireworks:

- arsenic compounds - poisons;
- boron - readily oxidizable;
- chlorates with sulphur, sulphides, ammonium salts, elemental metals (such as magnesium or aluminum) or copper or soluble copper salts - such mixtures are friction-sensitive and liable to spontaneous combustion;
- chromium and chromium compounds;
- gallates or gallic acid - incompatible with many chemicals;
- lead and lead compounds or salts - poisons;
- mercury compounds - poisons;
- phosphorus, except for red phosphorus in toy pistol caps;
- picric acid and picrates - incompatible with many chemicals;
- thiocyanates, except for snakes - explosively oxidizable;
- zirconium - explosively oxidizable;
- hexachlorobenzene (C₆Cl₆) (Chemical Abstracts Service (CAS) No. 118-74-1); and,
- any carcinogenic chemicals.

2.4 Marking and Labelling

The labelling and markings on packages and explosives must conform to the ER, 2013. Consumer

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fireworks (Type F.1) must also conform to the *Consumer Packaging and Labelling Regulations*.

As prescribed by Parts 3, 4 and 5 of the ER, 2013, it is the name and address of the holder of the authorization that must appear on the list of authorized explosives, on the packaging and on the article. It is no longer acceptable to have the explosives listed under the manufacturer but labelled with the name and address of its authorized distributor or vice versa.

Examples of labelling and instructions for safety and for use must be presented in both English and French. More details on the labels and markings are available in the appendices of these guidelines.

Where fireworks that are too small to carry all markings are to be sold to the end user without the factory packaging, they must carry the most important safety messages appropriate to their mode of functioning and satisfactory to the Chief Inspector of Explosives.

Every firework component ejected from a tube (e.g., small effects, whistles, etc.) must carry the following police label: "Explosive - Danger – Explosif".

2.5 Type and Category of Fireworks

2.5.1 Type

The applicant must specify the type of fireworks submitted, i.e. Consumer fireworks (Type F.1), Display fireworks (Type F.2) or Fireworks Accessories (Type F.4).

2.5.2 Category

The applicant must specify the category of the fireworks submitted, i.e. fountain, Roman candle, sound shell, nautical shell, etc. The terminology used in the appendices must be referred to and used.

2.6 Transport Classification

Classification for transport is assigned through one or a combination of the following methods:

- i) testing,
- ii) analogy to existing products,
- iii) on the basis of the UN default fireworks classification table,
- iv) in the case of imported articles, by acceptance of a letter from a competent authority in the country of origin.

When possible, the applicant should provide a certificate of transport classification from a competent authority. If the firework is not classified as per the UN default classification table, the certificate/letter of classification must be supported by test results. If a certificate/letter of classification is not available, the default classification applies. The CERL may conduct classification testing at the request of the applicant or as required.

Transport classification based on testing is the preferred approach. However, it is recognized that not all fireworks may be tested. In July 2004, a working group within the UN Committee on the Transport of Dangerous Goods approved a default classification for the transport of fireworks that have not been tested. This default classification was implemented by the ERD on September 1, 2005. When a company prefers a more favourable classification, it has the option of testing. Similarly, if the ERD

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believes that the default classification is inappropriate, it will require testing before a transport classification is granted (e.g., aerial colour shells over 155 mm but under 180 mm (with no more than 25% flash composition² as loose powder and/or report effects). In any case, display fireworks (F.2) will be given a 1.3G or more stringent classification, while consumer fireworks (F.1) will be granted either a 1.4G or 1.4S classification. Note that mixed loads within one package are to be classified as per the *Canadian Transportation of Dangerous Goods Act and Regulations*.

In accordance with the latest revised edition of the United Nations *Recommendations on the Transport of Dangerous Goods – Model Regulations*, fireworks may be classified as follows:

Shipping Name	UN Number	Classification
Fireworks	0333	1.1G
Fireworks	0334	1.2G
Fireworks	0335	1.3G
Fireworks	0336	1.4G
Fireworks	0337	1.4S

3. Sampling of a Submission and Acceptance Criteria

Not all articles are tested. Large submissions are sampled, and acceptance of a submission depends on the behaviour of the sample. New articles similar to existing articles from established and known companies may be authorized by analogy to existing products.

Sampling will be at the discretion of the inspector and depends on previous experience, the history of complaints, the availability of articles from the same company to use as analogies, or the time elapsed since articles from the company were last tested.

The sampling procedures described below assume minimum sampling. An inspector may decide to use more samples if they believe the result would be a better evaluation of a submission.

The appendices describe in detail the general and specific requirements that must be met by each category of fireworks. The requirements that are critical are identified with the letter AC.[®] More stringent acceptance criteria are used for the critical characteristics.

3.1 Consumer Fireworks

3.1.1 Sampling of a Submission with One Consumer Fireworks Article

If an individual article is submitted for authorization, the article will be evaluated on its merits. Acceptance or rejection of an article is based on the criteria outlined in section 3.1.3.

3.1.2 Sampling of a Submission with Multiple Articles or Categories of Consumer Fireworks

When multiple articles are submitted, the fireworks may be divided into categories (as defined in Appendix B) based on their construction and their effect. Each such category may be represented by a

² Flash composition refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used to produce an aural effect or used as a bursting charge, or propellant charge unless the time taken for the pressure rise is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance in the HSL Flash Composition Test (Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, 19th revised edition).

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sample.

3.1.3 Acceptance Criteria for Consumer Fireworks

All the critical requirements – marked (C) – must be met. All the non-critical requirements should also be met. Failure to meet the requirements outlined in these guidelines constitutes failure of the article. However, failure to meet only one non-critical requirement will not preclude authorization.

3.1.3.1 For Each Article (other than toy pistol caps and sparklers)

Generally, for each article selected for testing, 24 units are required to evaluate its acceptability, as follows:

- i) 12 units are fired:
12/12 must pass on the characteristics marked **(C)** and 10/12 must pass all other characteristics.
- ii) 6 units are subjected to abuse testing (1-metre drop):
3/6 must pass characteristics marked **(C)** and 3/6 must pass all other characteristics.
- iii) 2 units are disassembled and measured and the chemicals are analyzed; 2 other units are subjected to the stability tests. The physical measurements, chemicals and stability must conform to the manufacturer-s declaration and ERD requirements.
- iv) 2 units are used as spares.

3.1.3.2 Toy Pistol Caps and Sparklers

The testing of toy pistol caps will require at least 400 caps, while the testing of sparklers will require about 50 units. The number of units requested for testing is subject to change.

3.1.3.3 Authorization of a Submission

In the case of a submission for which an applicant has elected to have one or more articles authorized on an individual basis, the authorization procedure for each article will be as described in the previous sections (3.1.3.1 and 3.1.3.2).

In the case of a submission that includes one or more categories of articles, authorization of the categories of articles will be based on the following:

- i) Each category of articles will be treated individually, e.g., if one category from a submission successfully passes testing at the CERL, and another category from the same submission fails testing, only the category that has failed will be denied authorization.
- ii) For a category of articles to be authorized, all articles selected for testing from that category must pass the tests as per the requirements of section 3.1.3.1 and 3.1.3.2.

It is important for the applicant to distinguish between the various categories of articles submitted within an application.

3.2 Display Fireworks

3.2.1 Definition of a Separate Article

A separate article is defined as one of a different effect, construction or colour. Different calibres using the same construction do not constitute separate articles. The total number of separate articles in a submission will determine the number of samples to be selected for testing. For each article selected,

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generally 12 units are to be supplied.

3.2.2 Sampling of a Submission of Display Fireworks

The number of separate articles in a submission is used to determine the number of articles chosen to represent a submission. Companies with no past difficulties warrant reduced inspection; known companies with some past difficulties warrant normal inspection; unknown companies warrant enhanced inspection.

The following applies (MIL-STD-105):

Number of articles submitted for authorization	Number of articles to be sampled			Acceptance
	Companies with no past difficulties	Known companies with some past difficulties	Unknown companies	Maximum number of failures
2 to 8	2	2	3	0
9 to 15	2	3	5	0
16 to 25	3	5	8	0
26 to 50	5	8	13	0
51 to 90	5	13	20	0
91 to 150	8	20	32	1
151 to 280	13	32	50	1
281 to 500	20	50	80	2
501 to 1200*	32	80	125	3

* See MIL-STD-105 for larger numbers

3.2.3 Acceptance Criteria for Display Fireworks

3.2.3.1 For Each Article

Generally, for each article selected for testing:

- i) 12 units are examined for labelling and condition as received;
- ii) 6 units are fired: 6/6 must pass characteristics marked **(C)** and 5/6 must pass other characteristics;
- iii) 2 units are subjected to thermal stability testing and must pass;
- iv) 2 units are dismantled for construction, physical measurements and chemical analyses:
 - \$ Construction: 2/2 must meet characteristics marked **(C)** and 1/2 must meet other characteristics.
 - \$ Chemical and physical measurement: these must conform to the declaration.

Failure to meet these requirements constitutes failure of the article. The performance of the selected articles will determine whether the submission is authorized or denied.

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3.2.3.2 Authorization of a Submission

The performance of all the articles selected as the sample will be used to assess the submission. Each article can either pass or fail; the number of articles that may fail without causing rejection of the submission is set out in the table in section 3.2.2.

3.3 Packaging of Samples for Shipping to NRCan

The samples selected for testing must be shipped to NRCan in a packaging in compliance with the National Standard of Canada CAN/CGSB 43.151-2012 (*Packaging of Explosives (Class 1) for Transportation*) and carry the required labelling and markings (s.47 and s.74 of ER, 2013).

Guidelines for Authorization of Consumer and Display Fireworks

Appendix A B General Requirements for Consumer Fireworks

Guidelines for Authorization of Consumer and Display Fireworks

All consumer fireworks must meet the general requirements listed in this appendix. Specific requirements for each category of article (Roman candles, mines, cakes, etc.) are described later in these guidelines.

ITEM	CHARACTERISTIC	GENERAL REQUIREMENTS FOR CONSUMER FIREWORKS
1	Shipping Packaging	Packaging must comply with the <i>Transportation of Dangerous Goods Act and Regulations</i> and the standards referred to therein.
1.1	<i>Marking</i>	Markings on the case used for transport <u>must</u> include (C) : \$ UN classification \$ Proper UN shipping name \$ UN number \$ Dangerous goods safety marks \$ Type of explosives as per s.36 of ER, 2013 (i.e. F.1) \$ Names of the authorized explosives as per the list of authorized explosives (in either English or French) \$ Part number, if any \$ Name and address of the holder of the authorization \$ Packaging registration number
1.2	<i>Condition of Packaging</i>	Loose composition is <u>not</u> allowed in packaging (C) .

Guidelines for Authorization of Consumer and Display Fireworks

ITEM	CHARACTERISTIC	GENERAL REQUIREMENTS FOR CONSUMER FIREWORKS
2	Labelling of Articles	Labels affixed to fireworks <u>must</u> include the following information ³ (C): <ul style="list-style-type: none"> \$ Canadian type, i.e., F.1 \$ Name and part number (if any) of the authorized explosive as per the list of authorized explosives \$ Name and address of the holder of the authorization \$ Instructions for use and safety warnings in both English and French (refer to Appendix B for examples) \$ Maximum height of the effect \$ Safe separation distance for spectators (<i>The separation distance must be at least twice the height of the effects for straight articles and two and a half times the height of the effects for angled articles.</i>) \$ For angled articles, an arrow indicating the direction of the effect/fire/flame \$ Date of manufacture and, if the manufacturing operations are in shifts, the shift of manufacture
2.1	<i>Labels on Ejected Components</i>	Ejected components <u>must</u> carry the label <i>Explosives - Danger - Explosif®</i> . This label <u>must</u> remain attached to the tube or shell after firing (C).

³ If marking the firework is not practical, the markings must appear in every inner package. In the absence of an inner package, the markings must appear on the shipping packaging. When the fireworks are too small to carry all the markings and are to be sold without the shipping packaging, they must carry the most important safety messages appropriate to their mode of functioning, and the markings must be approved by the ERD.

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3	Physical Integrity	
3.1	<i>Construction of Articles</i>	<p>Articles must <u>not</u>:</p> <ul style="list-style-type: none"> \$ Contain metal, such as staples or wire, or hard plastic, which could be a possible missile hazard when fired or if a malfunction happens (C) \$ Have pyrotechnic falling out of the tube (C) \$ Contain loose pyrotechnic powder in an unintended part of the article (C) \$ Show signs of breaking or cracking in the casing or composition \$ Be constructed so that the rolled paper tube allows the composition to migrate under the inner layer of paper \$ Have secondary components that are easily removable from the tube
3.1.2	<i>Bases and Spikes</i>	<p>When present, bases and spikes must <u>not</u>:</p> <ul style="list-style-type: none"> \$ Become detached or unsecured during handling <p>When present, the base must <u>not</u>:</p> <ul style="list-style-type: none"> \$ Cause the article to topple over when tilted to 12° (C)
3.1.3	<i>Main Fuse</i>	<p>Main fuse <u>must</u> be:</p> <ul style="list-style-type: none"> \$ Present on all categories of consumer fireworks with the exception of Hand Held Fountains, Snakes, Sparklers and Toy Pistol Caps (C) \$ Visible (C) \$ Permanently and securely attached (C) \$ Covered with a fuse cover to protect the fuse from ignition <p>Main fuse <u>must not</u> be:</p> <ul style="list-style-type: none"> \$ Any type other than an igniter cord, safety fuse or fuse encased in plastic tubing (C) \$ Primed with an electric match (C)
3.1.4	<i>Interconnecting Fuse</i>	<p>Interconnecting fuse <u>must</u>:</p> <ul style="list-style-type: none"> \$ Be covered in a manner that prevents accidental or unintentional ignition (C) \$ Be securely attached \$ Provide proper firing sequence

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4	Performance	
4.1	<i>Fusing</i>	<p>Fusing must:</p> <ul style="list-style-type: none"> \$ Provide a reliable ignition (C) \$ The fuse burning time from the ignition of the tip of the fuse to ignition of the device must be at least 3 seconds but not more than 9 seconds (C)
4.2	<i>Function</i>	<p>Articles <u>must</u>:</p> <ul style="list-style-type: none"> \$ Function as described on the label \$ Function in a safe, reliable, reproducible and predictable manner (C) <p>Articles <u>must not</u>:</p> <ul style="list-style-type: none"> \$ Eject effects with unpredictable trajectories landing more than 5 m away (C) \$ Topple over before the last effect has functioned (C) \$ Have a delay between visible or audible effects of more than 5 s (C) \$ Bulge, shatter, rupture or burn through the case and/or closures unless designed to do so (C) \$ Have a base or spike that comes loose during functioning (C) \$ Burn after function is complete (C) \$ Have unconsumed pyrotechnic composition after functioning \$ Have loose plugs after functioning (for tubes having plugs at the base) \$ Explode (unless designed to do so) (C) \$ Have a noise level higher than 140 dB (AI) within a 5-m radius (C) \$ Burning debris and effects must not land on the ground more than 5 m from the article (C) \$ Project unlit composition
4.3	<i>Height</i>	<p>Minimum heights:</p> <ul style="list-style-type: none"> \$ Articles with reports containing more than 130 mg of flash composition or more than 500 mg of black powder must function at a minimum height of 10 m. \$ Shells or colour effects must function at a minimum height of 10 m.

5	Physical Measurements	The test results <u>must</u> show that the measured gross weights and explosive charge weights are as per the
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Guidelines for Authorization of Consumer and Display Fireworks

		manufacturer-s declaration.
6	Stability	All units subject to stability testing (75°C for 48 h) <u>must</u> pass.
7	Pyrotechnic Composition	The applicant should provide a copy of the Safety Data Sheet for any ingredients that are not listed in section 2.3.2 of these guidelines.
7.1	<i>Chemical Analysis</i>	Chemical analysis must <u>not</u> show the following discrepancies (C) : \$ Detection of more than 0.5% of a component not present in the declaration \$ Non-detection of a component present in the declaration \$ Detection of over 200% for components specified as under 25% in the declaration \$ Detection of over 150% for other components specified as 25% or over in the declaration \$ Detection of under 50% for components specified as over 10% in the declaration \$ Detection of chlorate with sulphur
7.2	<i>Flash Composition</i>	Flash composition refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used to produce an aural effect or used as a bursting charge, or propellant charge unless the time taken for the pressure rise is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance in the HSL Flash Composition Test (Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, 19th revised edition).

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Appendix B B Specific Requirements for Consumer Fireworks

Guidelines for Authorization of Consumer and Display Fireworks

In addition to the general requirements listed in Appendix A, each category of consumer fireworks must meet the specific requirements described in this section. Some of the fireworks categories referred to in this appendix can also be known under different names, i.e.:

Terminology used in these guidelines	Synonyms
<i>Report</i>	Banger
<i>Cake</i>	Battery
<i>Flare</i>	Bengal Fire, Coloured Fire, Illuminating Fire, Lawn Light, Torch
<i>Battery/Combination</i>	Bombardo, Hybrid
<i>Wheel</i>	Driver, Pinwheel, Saxon
<i>Fountain</i>	Rains, Showers, Volcano
<i>Ground Spinner</i>	Spinner
<i>Shot Tube</i>	Pre-loaded mortar

Note that articles such as replicas or other articles not listed in these guidelines which are prepared with fireworks described in these guidelines will be allowed provided that their outer package or assembly does not hinder their proper functioning and safety.

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PART I: FIREWORKS ARTICLES

1.0 Battery/Combination

Synonyms: barrage, bombard, hybrid, multiple tubes, etc.

Description: Battery/Combination consists of a rapidly fired sequence of aerial or low-level fireworks with one or two points of ignition. It is an assembly including several elements either containing the same category or several categories each corresponding to one of the following: Roman candles, mines, fountains, flares or ground whistles. Shells are not allowed in such articles. Note that this category of firework is also commonly called Acake.[®] However, in these guidelines, articles with more than seven tubes are described separately and must meet different requirements.

Requirements

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR BATTERY/COMBINATION
1.1	Construction of the Article	\$ no more than 7 tubes per article (C) \$ Wires tying tubes together or to a support are not permitted (C) \$ Maximum 15° angle from the vertical (C)
1.2	Construction of the Tubes	Tubes in the article must be constructed as per the requirements for Roman candles, fountains, flares, mines or ground whistles.
1.3	Charge Weight	<u>Article:</u> \$ Total pyrotechnic composition: no more than 300 g (C) \$ Total flash composition permitted per article: no more than 1 g and no more than 5% (C) <u>Aerial whistle:</u> \$ no more than 3 g/whistle \$ Articles with more than one (1) aerial whistle may be subjected to a crush/violence test. <u>Aerial whistle with report at the end of the whistle:</u> \$ no more than 1 aerial whistle with report per tube (C) \$ no more than 800 mg of flash composition/report or no more than 2 g black powder/report (C)

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR BATTERY/COMBINATION
		<p>Report:</p> <ul style="list-style-type: none"> \$ no more than 1 report/tube (no more than 800 mg flash composition/report or no more than 2 g black powder/report) allowed (C) \$ if more than 1 report/article: no more than 130 mg flash composition/report or no more than 500 mg black powder/report (C) \$ Total report composition for articles with multiple report tubes: no more than 1 g and no more than 5% flash composition or no more than 4 g black powder (C)
1.4	<i>Performance</i>	<p>Articles must <u>not</u>:</p> <ul style="list-style-type: none"> \$ Enhance any hazard expected from individual components (C) \$ Move as a result of function
1.5	<i>Labels</i>	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <ul style="list-style-type: none"> \$ All general labelling requirements outlined in section 2.0 of Appendix A \$ Labels must be as per the category of articles used, i.e., Roman candles, mines, fountains, flares and ground whistles. Refer to these sections for an example of the labelling. \$ For angled articles, an arrow indicating the direction of the effect/fire/flame <p>Ejected components <u>must</u> carry the label <i>Explosives - Danger - Explosif®</i>. This label <u>must</u> remain attached to the tube or shell after firing (C).</p>

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2.0 Cakes

Description: Cakes are fireworks devices consisting of 8 to 100 small-diameter cylindrical tubes that are chain-fused to fire in sequence after a single ignition. These items discharge projectiles such as stars, comets, aerial whistles or small effects into the air. Roman candles, ground whistles and shells are not allowed.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR CAKES
2.1	Construction of the Article	\$ Between 8 and 100 tubes/article (C) \$ Wires tying tubes together or to a support are not permitted (C) \$ Maximum 15° angle from the vertical (C)
2.2	Construction of the Tubes	\$ Tube diameter: no more than 22 mm
2.3	Charge Weight	Article: \$ Total pyrotechnic composition: no more than 300 g (C) \$ Total flash composition permitted per article: no more than 1 g and no more than 5% (C) Aerial whistle: \$ no more than 1 aerial whistle/tube (C) \$ no more than 3 g/whistle \$ Articles with more than one (1) aerial whistle may be subjected to a crush/violence test. Aerial whistle with report at the end of the whistle: \$ no more than 1 aerial whistle with report per tube (C) \$ no more than 800 mg of flash composition/report or no more than 2 g black powder/report (C) Report: \$ no more than 1 report/tube (no more than 800 mg flash composition/report or no more than 2 g black powder/report) (C) \$ If more than 1 report/article: no more than 130 mg flash composition/report or no more than 500 mg black powder/report (C) \$ Total report composition for articles with multiple report tubes: no more than 1 g and no more than 5% flash composition or no more than 4 g black powder (C) Small effect: \$ no more than 8 g total pyrotechnic composition/small effect (C) \$ For more details on small effects, refer to Part II - Fireworks Components, Section 4.0.
		Articles must <u>not</u> :

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR CAKES
2.4	<i>Performance</i>	\$ Enhance any hazard expected from individual components (C) \$ Tip over as a result of function (C)
2.5	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix A \$ The warning on the cake must indicate which types of effects are projected from the article; e.g., if the cake projects whistles and comets, the warning should say AShoots Flaming Balls and Whistles / Émet des boules enflammées et des sifflets.@ \$ For angled articles, an arrow indicating the direction of the effect/fire/flame Ejected components <u>must</u> carry the label AExplosives - Danger - Explosif@. This label <u>must</u> remain attached to the tube or shell after firing (C) .

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3.0 Flares

Synonyms: Bengal fire, coloured fire, illuminating fire, lawn light, torch

Description: Ground-level firework that consists of a thin-walled cylindrical tube into which a pyrotechnic composition is pressed or cast. While burning, the pyrotechnic composition produces a hot bright-coloured flame. The tube may burn away with the composition.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR FLARES
3.1	Charge Weight	Total pyrotechnic composition: no more than 150 g (C)
3.2	Labels	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <p>\$ All general labelling requirements outlined in section 2.0 of Appendix A</p> <p>The flares <u>must</u> also carry the following English <u>and</u> French labels (C):</p> <p>\$ AWARNING: EMITS FLAMES. For use by adults. For outdoor use only. Do not hold in hand. Place upright on level ground (for flares with base) or stick firmly upright in ground (for flares without bases). Light fuse and stand clear.@</p> <p>\$ AMISE EN GARDE: ÉMET UNE FLAMME. Utilisation par des adultes. N'utiliser qu'à l-extérieur. Ne pas tenir dans la main. Placer verticalement sur le sol à un endroit bien à plat (fusées comportant une base) ou Bien enfoncer en position verticale dans le sol (fusées sans base). Allumer la mèche et se tenir à l-écart.@</p>

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4.0 Fountains

Synonyms: rains, showers, volcanoes

Description: Ground piece fireworks that are filled with pyrotechnic composition and usually having a choke or restricted orifice. When ignited, it projects a jet or broad spray of fire and sparks. Fountains may contain microstars.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR FOUNTAINS
4.1	Charge Weight	\$ Cone shape: no more than 50 g (C) \$ Cylindrical shape: no more than 75 g (C)
4.2	Performance	Article with a base and cone fountains must <u>not</u> : \$ Topple over when tilted to 12° (C)
4.3	Labels	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in Section 2.0 of Appendix A The fountains <u>must</u> also carry the following English <u>and</u> French labels (C) : \$ AWARNING: EMITS SHOWER OF SPARKS. Height of effects is: X m. Spectators must be at a distance of 2X m. Choose a wide, clear site away from all obstacles. For use by adults. For outdoor use only. Do not hold in hand. Place on level surface or partially bury (no spikes) or stick firmly upright in ground (with spikes). Light fuse and stand clear.@ \$ AMISE EN GARDE: ÉMET UNE PLUIE D'ÉTINCELLES. Hauteur des effets: X m. Les spectateurs doivent être à une distance de 2X m. Choisir un emplacement bien dégagé, loin de tout obstacle. Utilisation par des adultes. N'utiliser qu'à l'extérieur. Ne pas tenir dans la main. Placer sur le sol à un endroit bien à plat ou enterrer partiellement (sans pieu) ou Bien enfoncer en position verticale dans le sol (avec pieu). Allumer la mèche et se tenir à l'écart.@

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5.0 Ground Spinners

Description: Non-metallic tube containing gas and sparks-producing pyrotechnic composition, with or without noise-producing pyrotechnic composition. Rotation on the ground and emission of sparks and/or flames with or without aural effect.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR GROUND SPINNERS
5.1	<i>Construction</i>	The fuse shall be firmly affixed to the support and shall be well insulated to prevent cross-ignition.
5.2	<i>Charge Weight</i>	\$ Total pyrotechnic composition: no more than 8 g (C) \$ Total whistle composition permitted in an article: no more than 3 g (C)
5.3	<i>Performance</i>	Articles may eject sparks, microstars or flames but must <u>not</u> : \$ Shoot stars (as in Roman candles) Articles <u>must</u> : \$ Revolve smoothly \$ Have a stoppage time no more than 5 s \$ Have a final position no more than 5 m from the ignition point \$ Have a distance of projection no more than 1 m
5.4	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix A The ground spinners <u>must</u> also carry the following English <u>and</u> French labels (C) : \$ “WARNING: EMITS SHOWER OF SPARKS. Use on a flat surface. For use by adults. For outdoor use only. Do not hold in hand. Light fuse and stand clear.” \$ “MISE EN GARDE: ÉMET UNE PLUIE D-ÉTINCELLES. Utiliser sur une surface plane. Utilisation par des adultes. N-utiliser qu-à l-extérieur. Ne pas tenir dans la main. Allumer la mèche et se tenir à l-écart.”

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6.0 Ground Whistles

Synonyms: sound tubes

Description: A ground-level device that produces a whistling sound other than a salute or report by the burning of a pyrotechnic composition. The composition is pressed into a tube and is recessed from the end. Similar items projected into the air (aerial whistles) are described in Part II - Fireworks Components, section 1.0.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR GROUND WHISTLES
6.1	Charge Weight	Total pyrotechnic composition: no more than 15 g (C)
6.2	Performance	<p>\$ The case must stop burning no more than 30 s after functioning has ceased.</p> <p>\$ Whistles must <u>not</u> convert into report after transporting, crushing or rolling 25 kg static pressure.</p>
6.3	Labels	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <p>\$ All general labelling requirements outlined in section 2.0 of Appendix A</p> <p>The ground whistles <u>must</u> also carry the following English <u>and</u> French labels (C):</p> <p>\$ <i>AWARNING: EMITS A LOUD WHISTLING NOISE. For use by adults. For outdoor use only. Do not hold in hand. Place upright on level ground and assure a vertical position. Light fuse and stand clear.®</i></p> <p>\$ <i>AMISE EN GARDE: ÉMET UN SON STRIDENT. Utilisation par des adultes. N'utiliser qu'à l-extérieur. Ne pas tenir dans la main. Placer verticalement sur le sol à un endroit bien à plat et s-assurer qu'il reste à la verticale. Allumer la mèche et se tenir à l-écart.®</i></p>

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7.0 Hand-held Fountains

Description: Very low-hazard firework device that burns at low temperature and not violently. Its composition will not include poisonous ingredients. The combustion products are gaseous and will generate low odour and low smoke. They are designed to be used in close proximity.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR HAND-HELD FOUNTAINS
7.1	Construction	\$ Inside diameter: no more than 8 mm \$ Length of composition: no more than 150 mm \$ <u>Not</u> contain sulphur (C)
7.2	Charge Weight	\$ Total pyrotechnic composition: no more than 15 g (C)
7.3	Performance	Articles <u>must</u> : \$ Burn smoothly \$ Have an ignition time no more than 10 s (when ignited with a match flame) \$ Have a total burning time no more than 5 min \$ <u>Not</u> produce large pieces of composition falling from the article when functioning; only sparks are allowed (C) Articles <u>must</u> meet the 'pinhole test' requirements (C) , i.e.: \$ No ignition or burning (scorching and some pinholes are allowed) through a single page of newspaper when the article is in a horizontal position 450 mm above the paper \$ Diameter of pinholes: no more than 2 mm \$ Number of pinholes allowed for 20-article sample: no more than 20 \$ Number of pinholes allowed per article: no more than 5
7.4	Labels	Labels affixed on the primary container, which is the smallest container sold to the public, <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix A The primary container <u>must</u> also carry the following English and French labels (C) : \$ "WARNING: EMITS FLAMES OR SHOWERS OF STARS. For use by adults. Not recommended for indoor use. Do not touch glowing article. Light only one article at a time. Keep away from the body. Keep burning

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR HAND-HELD FOUNTAINS
		<p><i>end and sparks away from clothing or other flammable materials.”</i></p> <p>§ <i>“MISE EN GARDE: ÉMET UNE FLAMME OU UNE PLUIE D-ÉTINCELLES. Utilisation par des adultes. Non recommandé pour utilisation à l’intérieur. Ne pas toucher l’article en incandescence. N’allumer qu’un article à la fois. Garder aussi loin du corps que possible. Garder aussi loin que possible des vêtements ou de toute autre matière inflammable.”</i></p>

8.0 Mines

Description: Mines are devices designed to project many ignited stars and/or effects into the air (upwards). All effects must be ignited at the same time by the lift charge. Mines produce low-level visual effects, such as, but not exclusively, those from stars, tourbillons, firecrackers or whistles, and one or more reports. The effects may be preceded by a fountain and/or flare and/or burning stars.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR MINES
8.1	Charge Weight	<p><u>Article:</u></p> <p>§ Lift charge: no more than 10 g</p> <p>§ Effect composition: no more than 40 g</p> <p>§ Total pyrotechnic composition⁴: no more than 40 g effect composition + no more than 10 g lift charge (C)</p> <p>§ Total flash composition permitted per article: no more than 1 g and no more than 5% (C)</p> <p><u>Aerial whistle:</u></p> <p>§ no more than 3 g/whistle, no more than 10 g total whistle composition per article</p> <p><u>Black powder firecrackers:</u></p> <p>§ no more than 5 g/firecracker, no more than 10 g total firecracker composition per article</p> <p><u>Report:</u></p>

⁴ If there is more than 1 (one) effect in the mine, the pyrotechnic composition of individual effects + total lift charge must not exceed 25 g.

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR MINES
		<p>\$ If no more than 1 report/article: no more than 800 mg flash composition/report or no more than 2 g black powder/report</p> <p>\$ If more than 1 report/article: no more than 130 mg flash composition/report or no more than 500 mg black powder/report</p> <p>\$ Total report composition in an article with multiple reports: no more than 1 g and no more than 5% flash composition/article or no more than 4 g black powder/article</p>
8.2	<i>Labels</i>	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <p>\$ All general labelling requirements outlined in section 2.0 of Appendix A</p> <p>The mines <u>must</u> also carry the following English <u>and</u> French labels (C):</p> <p>\$ <i>“WARNING: ERUPTS THROWING STARS OR FLAMING BALLS. Height of effects is: X m. Spectators must be at a distance of 2X m. Choose a wide, clear site away from all obstacles. For use by adults. For outdoor use only. Do not hold in hand. Place upright on level ground (with base) or bury one third of its length in sand (without bases). Light fuse and stand clear.”</i></p> <p>\$ <i>“MISE EN GARDE: ÉMET UNE PLUIE D-ÉTINCELLES. Hauteur des effets: X m. Les spectateurs doivent être à une distance de 2X m. Choisir un emplacement bien dégagé, loin de tout obstacle. Utilisation par des adultes. N-utiliser qu-à l-extérieur. Ne pas tenir dans la main. Placer verticalement sur le sol à un endroit bien à plat (avec base) ou Enterrer au tiers dans du sable (sans base). Allumer la mèche et se tenir à l-écart.”</i></p>

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9.0 Roman Candles

Synonyms: exhibition candle, candle, bombettes

Description: Roman candles are cylindrical tubes containing a series of pyrotechnic units (stars (including microstars), small effects) consisting of alternating pyrotechnic composition, propellant charge and transmitting fuse.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR ROMAN CANDLES
9.1	Construction	\$ Inside diameter: no more than 22 mm (C) \$ Number of shots: not less than 5 \$ Roman candles must <u>not</u> have a spike.
9.2	Charge Weight	<u>Article:</u> \$ Total pyrotechnic composition: no more than 40 g (C) \$ Total flash composition permitted per article: no more than 1 g and no more than 5% (C) <u>Aerial whistle:</u> \$ no more than 3 g/whistle, no more than 10 g total whistle composition per article \$ Roman candles with more than one (1) aerial whistle may be subjected to a crush/violence test. <u>Report:</u> \$ no more than 1 report or tourbillon/article: no more than 800 mg flash composition/report or no more than 2 g black powder/report \$ Roman candles may <u>not</u> have more than one report.
9.3	Performance	Articles <u>must</u> : \$ Have a regular time interval between the shots
9.4	Labels	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix A The Roman candles <u>must</u> also carry the following English <u>and</u> French labels (C) : \$ "WARNING: SHOOTS FLAMING BALLS. Height of effects is: X m. Spectators must be at a distance of 2X m.

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR ROMAN CANDLES
		<p>Choose a wide, clear site away from all obstacles. For use by adults. For outdoor use only. Do not hold in hand. Bury one half of its length in sand. Light fuse and stand clear.”</p> <p>\$ “MISE EN GARDE: ÉMET UNE PLUIE D-ÉTINCELLES. Hauteur des effets: X m. Les spectateurs doivent être à une distance de 2X m. Choisir un emplacement bien dégagé, loin de tout obstacle. Utilisation par des adultes. N-utiliser qu-à l-extérieur. Ne pas tenir dans la main. Enterrer à la moitié dans du sable. Allumer la mèche et se tenir à l'écart.”</p>

10.0 Shot Tubes

Synonyms: single shot Roman candle, small pre-loaded mortar

Description: Shot tubes eject a small shell, a small effect, a comet, an aerial whistle or a report.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SHOT TUBES
10.1	Construction	\$ Inside diameter: no more than 50 mm (C)
10.2	Charge Weight	<p><u>Article:</u></p> <p>\$ Lift charge: no more than 10 g (C)</p> <p>\$ Total pyrotechnic composition (effects + lift charge): no more than 25 g (C)</p> <p>\$ Total flash composition permitted per article: no more than 1 g and no more than 5% (C)</p> <p><u>Aerial whistle:</u></p> <p>\$ For more details on aerial whistles, refer to section 17 of this Appendix.</p> <p><u>Comet:</u></p> <p>\$ For more details on comets, refer to section 18 of this Appendix.</p> <p><u>Report:</u></p> <p>\$ For more details on reports, refer to section 19 of this Appendix.</p> <p><u>Small effect:</u></p>

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SHOT TUBES
		<p>\$ For more details on small effects, refer to section 21 of this Appendix.</p> <p><u>Small shell:</u></p> <p>\$ For more details on small shells, refer to section 20 of this Appendix.</p>
10.3	Labels	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <p>\$ All general labelling requirements outlined in section 2.0 of Appendix A</p> <p>The shot tubes <u>must</u> also carry the following English <u>and</u> French labels (C):</p> <p>\$ <i>“WARNING: SHOOTS A SHELL OR A WHISTLE. Height of effects is: X m. Spectators must be at a distance of 2X m. Choose a wide, clear site away from all obstacles. For use by adults. For outdoor use only. Do not hold in hand. Place upright on firm, level ground or bury one half of its length in sand. Light fuse and stand clear.”</i></p> <p>\$ <i>“MISE EN GARDE: LANCE UNE BOMBE OU UN SIFFLET. Hauteur des effets: X m. Les spectateurs doivent être à une distance de 2X m. Choisir un emplacement bien dégagé, loin de tout obstacle. Utilisation par des adultes. N'utiliser qu'à l'extérieur. Ne pas tenir dans la main. Placer verticalement sur le sol à un endroit solide et bien à plat ou enterrer à la moitié dans du sable. Allumer la mèche et se tenir à l'écart.”</i></p>

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11.0 Smoke Articles

Description: Smoke articles are devices designed to emit smoke.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SMOKE ARTICLES
11.1	Construction	\$ Must not have plastic components in contact with the pyrotechnic composition
11.2	Charge Weight	\$ Total pyrotechnic composition: no more than 100 g (C)
11.3	Performance	Articles <u>must</u> : \$ Burn smoothly and produce a uniformly fine effect with no slag or other molten particles that are large enough to have the potential to cause burn (C) \$ Be constructed so that they will neither burst nor produce external flame upon ignition (C)
11.4	Labels	Labels affixed on the primary container, which is the smallest container sold to the public, must include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix A The primary container must also carry the following English and French labels (C) : \$ "WARNING: EMITS SMOKE. For use by adults. For outdoor use only. Recommended for daytime use. Do not hold in hand. Avoid breathing smoke. Place on ground. Light fuse and stand clear. The duration of the effect is : X. Spectators must be at a distance of at least 5 m" \$ "MISE EN GARDE: ÉMET DE LA FUMÉE. Utilisation par des adultes. N'utiliser qu'à l'extérieur. Recommandé pour utilisation durant le jour. Ne pas tenir dans la main. Placer sur le sol. Allumer la mèche et se tenir à l'écart. La durée de l'effet est de : X. Les spectateurs doivent être à une distance d'au moins 5 m"

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12.0 Snakes

Synonyms: glow worms, serpents

Description: Snakes are ground piece fireworks that consist of a solid pellet. When the pellet is ignited, it swells forming what resembles a snake.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SNAKES
12.1	Construction	Cracked pellets or loose composition are not allowed.
12.2	Charge Weight	\$ Total pyrotechnic composition: no more than 5 g (C) \$ Flash composition is not allowed (C)
12.3	Performance	Articles must have an ignition time no more than 10 s (when ignited with a match flame).
12.4	Labels	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix A The snakes <u>must</u> also carry the following English <u>and</u> French labels (C) : \$ “ <i>WARNING: PRODUCES A SNAKE. For use by adults. For outdoor use only. Do not hold in hand. Do not put in mouth. Place on level ground.</i> ” \$ “ <i>MISE EN GARDE: FORME UN SERPENT. Utilisation par des adultes. N-utiliser qu-à l-extérieur. Ne pas tenir dans la main. Ne pas mettre dans la bouche. Placer sur le sol à un endroit bien à plat.</i> ”

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13.0 Sparklers

Synonyms: *hand-held sparklers, non-handheld sparklers, wire sparklers*

Description: *Rigid metal wire partially coated (along one end) with slow burning pyrotechnic composition with or without an ignition tip. Sparklers are designed to be hand-held.*

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SPARKLERS
13.1	<i>Construction</i>	\$ Total length of the sparkler: 100 mm to no more than 950 mm \$ Length of the rod to serve as a handle: not less than 1/3 of the total length of the sparkler \$ Sparklers must <u>not</u> have cracked composition. \$ Sparklers must <u>not</u> have composition falling off.
13.2	<i>Charge Weight</i>	<u>Nitrate base:</u> \$ Total pyrotechnic composition: no more than 30 g (C) <u>Perchlorate base:</u> \$ Total pyrotechnic composition: no more than 5 g (C)
13.3	<i>Performance</i>	Articles <u>must</u> : \$ Burn smoothly \$ Have an average ignition time for 20-article sample no more than 10 s (when ignited with a match flame) \$ Have a total burning time no more than 5 min \$ <u>Not</u> produce large pieces of composition falling from the article when functioning; only sparks are allowed (C) \$ <u>Not</u> sag, from the point at which burning ceased, more than 30° from horizontal Articles <u>must</u> meet the >pinhole test< requirements (C) , i.e.: \$ No ignition or burning (scorching and some pinholes are allowed) through a single page of newspaper when the article is in a horizontal position 450 mm above the paper \$ Diameter of pinholes: no more than 2 mm \$ Number of pinholes allowed for 20-article sample: no more than 20 \$ Number of pinholes allowed per article: no more than 5

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SPARKLERS
13.4	Labels	<p>Labels affixed on the primary container, which is the smallest container sold to the public, <u>must</u> include the following information (C):</p> <p>\$ All general labelling requirements outlined in section 2.0 of Appendix A</p> <p>The primary container <u>must</u> also carry the following English <u>and</u> French labels (C):</p> <p>\$ <i>“WARNING: EMITS SHOWERS OF SPARKS. For use by adults or under close supervision by an adult. Not intended for children under 8 years old. Not recommended for indoor use. Do not touch glowing sparkler. Light only one sparkler at a time. Hold in hand with arm extended away from the body. Keep burning end and sparks away from clothing or other flammable materials.”</i></p> <p>\$ <i>“MISE EN GARDE: ÉMET UNE PLUIE D’ÉTINCELLES. Utilisation par des adultes ou sous la surveillance étroite d’un adulte. Non destiné aux enfants de moins de 8 ans. Non recommandé pour utilisation à l’intérieur. Ne pas toucher à la tige incandescence. N’allumer qu’un cerce magique à la fois. Tenir en maintenant la main le plus loin possible du corps. Tenir le bout incandescent et les étincelles à l’écart des vêtements ou de toute autre matière inflammable.”</i></p>

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14.0 Strobe Pots

Description: Strobe pots are small tubes or end plugs pressed, cast or loaded with strobe composition. They generate a blinking effect where bright flashes of light are produced at fairly regular intervals with relatively complete darkness between flashes.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR STROBE POTS
14.1	Charge Weight	Total pyrotechnic composition: no more than 40 g (C)
14.2	Labels	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <p>\$ All general labelling requirements outlined in section 2.0 of Appendix A</p> <p>The strobe pots <u>must</u> also carry the following English <u>and</u> French labels (C):</p> <p>\$ “<i>WARNING: EMITS FLAMES. For use by adults. For outdoor use only. Do not hold in hand. Place upright on firm, level ground (with base) or bury in sand or soil (without base). Light fuse and stand clear.</i>”</p> <p>\$ “<i>MISE EN GARDE: ÉMET DES FLAMMES. Utilisation par des adultes. N'utiliser qu'à l'extérieur. Ne pas tenir dans la main. Placer verticalement sur le sol à un endroit solide et bien à plat (avec base) ou Enfoncer dans le sable ou dans le sol (sans base). Allumer la mèche et se tenir à l'écart.</i>”</p>

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15.0 Toy Pistol Caps

Synonyms: *paper caps*

Description: *Toy pistol caps are small charges of explosive contained in a cup or confined between two sheets of paper.*

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR TOY PISTOL CAPS
15.1	<i>Construction</i>	<p><u>Articles:</u></p> <ul style="list-style-type: none"> \$ The dimensions and construction of the toy pistol caps are dictated by the device in which they are functioned. \$ Caps must be easy to remove from the primary package. \$ Caps must <u>not</u> have dirty or deformed surfaces. \$ Caps must <u>not</u> have holes. \$ There may be <u>no</u> loose composition (C). \$ There may be <u>no</u> loose or missing discs (C). <p><u>Plastic discs</u> must:</p> <ul style="list-style-type: none"> \$ Be covered with paper so that composition cannot fall out (C) \$ <u>Not</u> have any excess composition on the outside (C) \$ <u>Not</u> have any gouge, hole, leftover lump of plastic or other defect \$ <u>Not</u> have deformed rims <p><u>Paper rolls</u> must not:</p> <ul style="list-style-type: none"> \$ Have holes, tears or wrinkles (C) \$ Show leaching of chlorate into the paper surrounding the dot (C)
15.2	<i>Charge Weight</i>	<u>Consumer package:</u>

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR TOY PISTOL CAPS
		\$ no more than 0.04 g/ml, uniformly distributed (C) \$ no more than 1000 caps/primary container ⁵ (C) <u>Ring or strips:</u> \$ no more than 6.5 g/1000 caps (C) <u>Roll caps:</u> \$ no more than 5.0 g/1000 caps (C)
15.3	<i>Performance</i>	Toy pistol caps must <u>not</u> : \$ Be designed like flares, i.e., burning instead of production of a snapping sound, detected by a flame, flash or sound level more than 10 dB (A) within the preset operating range of the test equipment \$ Allow cap-to-cap communication (50-cap sample) (C) \$ Have a logarithmic average (50-sample) noise level higher than 153 dB (A) within a 45-cm radius \$ Contain sulphur (C)
15.4	<i>Labels</i>	Labels affixed on the primary container, which is the smallest container sold to the public, <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix A \$ All primary packages shall be marked with lot number traceable to the production unit. The primary container <u>must</u> also carry the following English and French labels (C) : \$ “ <i>WARNING: Do not fire within 30 cm of the ear. Misuse may cause damage to hearing. Do not fire indoors. Store in a cool dry place.</i> ” \$ “ <i>MISE EN GARDE: Faire exploser à au moins 30 cm des oreilles. Un mauvais usage peut causer des dommages à l’ouïe. Ne pas faire exploser à l’intérieur. Entreposer dans un endroit frais et sec</i> ”
15.5	<i>Packaging</i>	Multiple-unit primary packages shall be designed in such a manner that if the contents of one unit are ignited, the effects will not communicate to the contents of an adjacent unit.

⁵ The primary container is defined as the smallest container sold to the public and may consist of a cardboard box, closed plastic tube, a bag with a header, or card with a blister cover. If the primary container is divided into units, the units must be separated so that the ignition of one will not result in the ignition of another unit in the primary package.

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16.0 Wheels

Description: A revolving firework device fixed by an axle to a post above ground. When ignited, the attached drivers produce thrust, which causes the wheel to spin, producing a pattern of sparks.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR WHEELS
16.1	Construction	<p><u>Driver:</u> \$ A driver consists of a strong paper case with a nozzle or choke, charged with a fast burning pyrotechnic composition. In fact, it is a thrust producing gerb designed to propel the unit.</p> <p><u>Pinwheel:</u> \$ Short length of paper-wrapped composition wound in a spiral around the edge of a circular piece of cardboard or plastic. The centre is secured to a post by a pin.</p> <p><u>Saxon:</u> \$ A single driver with a hole in one end through which a nail is secured. The other end has a hole through the side with a fuse. When ignited, the driver rotates around the axis.</p> <p><u>Wheel:</u> \$ One or more drivers arranged on a sturdy support of wood, heavy cardboard, or other appropriate material. The centre has a hole for a nail.</p> <p>Articles must <u>not</u>: \$ Shoot stars as in Roman candles but may eject sparks, microstars or flames \$ Come loose during functioning (C) \$ Contain reports (C)</p> <p>Articles <u>must</u>: \$ Have grommetted or otherwise treated hole to assure smooth rotation \$ Be provided with a pin or nail of appropriate diameter; unless the wheel is in a sealed package, the nail shall be firmly affixed to the support \$ Have a fuse firmly affixed to the support and shall be well insulated to prevent cross-ignition</p>

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ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR WHEELS
16.2	<i>Charge Weight</i>	<p><u>Article:</u> \$ Total pyrotechnic composition: no more than 240 g \$ Total whistle composition per article: no more than 10 g</p> <p><u>Driver:</u> \$ no more than 60 g/driver \$ no more than 5 g whistle composition/driver</p>
16.3	<i>Performance</i>	<p>Wheels <u>must</u>:</p> <ul style="list-style-type: none"> \$ Revolve smoothly \$ Have a stoppage time no more than 5 s \$ Remain attached to their support \$ Project sparks no more than 5 m \$ <u>Not</u> ignite the post to which they are attached \$ <u>Not</u> contain stars but may contain microstars
16.4	<i>Labels</i>	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <ul style="list-style-type: none"> \$ All general labelling requirements outlined in section 2.0 of Appendix A <p>The wheels <u>must</u> also carry the following English <u>and</u> French labels (C):</p> <ul style="list-style-type: none"> \$ <i>AWARNING: EMITS SHOWER OF SPARKS. For use by adults. For outdoor use only. Do not hold in hand. Nail to a post, make sure wheel turns freely. Light fuse and stand clear.®</i> \$ <i>AMISE EN GARDE: ÉMET UNE PLUIE D-ÉTINCELLES. Utilisation par des adultes. N-utiliser qu-à l-extérieur. Ne pas tenir dans la main. Clouer à un poteau et s-assurer que la roue tourne librement. Allumer la mèche et se tenir à l-écart.®</i>

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PART II: FIREWORKS COMPONENTS (SECONDARY EFFECTS)

Fireworks components or secondary effects function or occur outside the fireworks articles. They are initiated in whole or in part by a fuse or other delay system. The various secondary effects listed below are permitted only as components of an article.

Ejected components must carry the label *Explosives - Danger - Explosif®*. This label must remain attached to the tube or shell after firing **(C)**.

17.0 Aerial Whistles

Description: Aerial whistles are firework devices that produce a whistling sound by the burning of a pyrotechnic composition. Aerial whistles are permitted as part of mines, shot tubes or Roman candles but they are not permitted as individual articles.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR AERIAL WHISTLES (SECONDARY EFFECTS)
17.1	Charge Weight	<u>Aerial whistle:</u> \$ no more than 3 g/whistle (C) <u>Aerial whistle with report at the end of the whistle:</u> \$ no more than 800 mg of flash composition/whistle (C)
17.2	Performance	Aerial whistles must be positioned properly in the firework article in order to ignite reliably.

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18.0 Comets

Description: Comets are single large stars that produce a burning tail. They may or may not include a report insert.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR COMETS (SECONDARY EFFECTS)
18.1	Construction	no more than 1 comet/tube (C)
18.2	Charge Weight	<u>Article:</u> \$ Total pyrotechnic composition (lift charge + comet): no more than 25 g (C) <u>Comet with report:</u> \$ no more than 130 mg flash composition or no more than 500 mg black powder (C) <u>Burst charge:</u> \$ no more than 400 mg of flash composition
18.3	Performance	Comets must be positioned properly in the firework article in order to ignite reliably.

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19.0 Reports

Description: Reports are tubes that contain flash composition or black powder. Flash composition refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used to produce an aural effect or used as a bursting charge, or propellant charge unless the time taken for the pressure rise is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance in the HSL Flash Composition Test (Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, 19th revised edition). Reports produce a loud noise and may also have the visual effect of a bright flash and smoke. They are available only as components in consumer fireworks. Reports must be ejected from the article.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR REPORTS (SECONDARY EFFECTS)
19.1	Construction	\$ Reports must be fused to ignite reliably. The fuse may be delay composition with colour. \$ If more than one report is present in a tube, they must be part of a mine.
19.2	Charge Weight	<u>Article with 1 report only:</u> \$ no more than 800 mg flash composition/report or no more than 2 g black powder/report (C) <u>Article with more than 1 report:</u> \$ Each report: no more than 130 mg flash composition/report or no more than 500 mg black powder/report (C) \$ Total report composition in the article: no more than 1 g and no more than 5% flash composition or no more than 4 g black powder (C)
19.3	Performance	\$ If more than one report is present in a tube, they <u>must</u> be ejected all at once and not sequentially (C) .

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20.0 Shells

Description: A spherical or cylindrical shell with a hard paper casing containing stars and/or small effects, and a burst charge with a lift charge to propel the shell into the air. These are allowed only as a component of a shot tube.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SHELLS (SECONDARY EFFECTS)
20.1	Construction	\$ Outside diameter: no more than 50 mm (C) \$ No more than 1 shell/tube
20.2	Charge Weight	\$ Total pyrotechnic composition (lift charge + shell): no more than 25 g (C) \$ Shells must <u>not</u> contain flash powder in their burst composition.
20.3	Performance	\$ When functioned, the shells must <u>not</u> project fragments causing injury by falling on people (C) . \$ Shells must be positioned properly in the firework article in order to ignite reliably.

21.0 Small Effects

Description: Small effects include, but are not limited to, small star bursts and miniature tourbillons. Mine stars are not considered a small effect.

Requirements:

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR SMALL EFFECTS (SECONDARY EFFECTS)
21.2	Charge Weight	\$ Total pyrotechnic composition in a small effect: no more than 8 g (C) \$ The use of flash composition is allowed but must be in compliance with the charge limitation described under reports (refer to section 3.0 above) (C) .
21.3	Performance	Small effects must be positioned properly in the firework article in order to ignite reliably.

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Appendix C B General Requirements for Display Fireworks

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ITEM	CHARACTERISTIC	GENERAL REQUIREMENTS FOR DISPLAY FIREWORKS
1	Shipping Packaging	Packaging must comply with the <i>Transportation of Dangerous Goods Act and Regulations</i> and the standards referred to therein.
1.1	Marking	<p>Markings on the case used for transport <u>must</u> include (C):</p> <ul style="list-style-type: none"> \$ UN classification \$ Proper UN shipping name \$ UN number \$ Dangerous goods safety marks \$ Type of explosives as per s.36 of ER, 2013 (i.e. F.2) \$ Name of the authorized explosives as per the list of authorized explosives (in either English or French) \$ Part number, if any \$ Name and address of the holder of the authorization \$ Packaging registration number
1.2	Condition of Packaging	Loose composition is <u>not</u> allowed in packaging (C) .
2	Labelling of Articles	<p>Labels affixed to fireworks <u>must</u> include the following information⁶ (C):</p> <ul style="list-style-type: none"> \$ Name of the authorized explosives as per the list of authorized explosives \$ Name and address of the holder of the authorization \$ Instructions for use and safety warnings in both English and French \$ For tube items, an arrow indicating the direction of exit of flame/fire \$ Date of manufacture and, if the manufacturer operates manufacturing operations in shifts, the shift of manufacture. \$ For angled articles, an arrow indicating the direction of the effect/fire/flame
2.1	Labels on Ejected Components	<ul style="list-style-type: none"> \$ Aerial shells and separately fused ejected components <u>must</u> carry the label <i>AExplosives - Danger - Explosif®</i>. This label <u>must</u> remain attached to the tube or shell after firing (C).
3	Construction of Articles	Articles must <u>not</u> :

⁶ If marking the firework is not practical, the markings must appear on every inner package. In the absence of an inner package, the markings must appear on the shipping container. When the fireworks are too small to carry all the markings and are to be sold without the shipping packaging, they must carry the most important safety messages appropriate to their mode of functioning and the markings must be approved by the ERD.

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ITEM	CHARACTERISTIC	GENERAL REQUIREMENTS FOR DISPLAY FIREWORKS
		\$ Possess metallic components posing a hazard of igniting other fireworks (C) \$ Possess metallic components posing a missile hazard (C) \$ Be a missile hazard when functioned or malfunctioned (C) \$ Have loose pyrotechnic powder present in an unintended part of the article (C) \$ Have a parachute or a flare attached to the shell (C) \$ Have a stick (stick rockets for example) (C) \$ Be damaged through normal shipping and handling \$ Be subject to rupture Articles <u>must</u> : \$ Be closed so that pyrotechnics cannot fall out of the tube (C) \$ Have a main fuse ⁷ that is clearly marked and firmly secured (C) \$ Be equipped with a fuse covered in a manner that prevents accidental or unintentional ignition (C) \$ Have the end fuse covered by a removable cap of a distinguishing colour
4	Performance	
4.1	<i>Fusing</i>	\$ The part of the fuse to be ignited should be a safety fuse and should have a fuse cover that will protect the fuse from accidental ignition. \$ If there is a receptacle for an electric match it should be covered to protect the black match from accidental ignition. \$ The average time (± 1 standard deviation) between lighting and the first effect must be 3 to 10 s.
4.2	<i>Function</i>	Articles <u>must</u> : \$ Function as described on the label (C) \$ Function in a safe, reliable, reproducible and predictable manner (C) Articles <u>must not</u> : \$ Bulge, shatter, rupture or burn through the case and/or closures unless designed to do so (C) \$ Project unlit composition

⁷ Some articles are approved without an ignition fuse for the firework. A distributor may add a fuse for the re-sale of a product subject to the following conditions:

- i) with the approval of the ERD (this approval can only be obtained if a description for the modified article is provided along with a description of the packaging method when these articles are re-packed);
- ii) the modification may only be done at a licensed site, under the conditions of the licence.

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ITEM	CHARACTERISTIC	GENERAL REQUIREMENTS FOR DISPLAY FIREWORKS
		<ul style="list-style-type: none"> \$ Endanger or cause to set fire to operators, spectators or the environment outside the 40-m radius firing zone or outside the spectator distance (as described in the Display Fireworks Manual) <u>whichever distance is less</u> (C) \$ Have an impulsive noise level higher than 140 dB(A) within a distance of 25 m and at a height of 1.5 m \$ Have a continuous noise level higher than 122 dB(A) within a distance of 25 m and at a height of 1.5 m
4.3	<i>Lift Charge and Height of Effects</i>	<p>The lift charge <u>must</u> be sufficient to propel the effect high enough that it:</p> <ul style="list-style-type: none"> \$ Poses no danger to the public (as per the requirements of the Display Fireworks Manual) (C) \$ Allows burning pyrotechnics to be completely consumed in the air, i.e., all stars are completely consumed at a minimum of 10 m before returning to the ground and sound shells must function at a minimum of 20 m above the ground (C) \$ Allows inert debris to extinguish itself at a minimum of 10 m before returning to the ground (C)
5	Physical Measurements	The measured gross weights and explosive charge weights must be as declared by the manufacturer.
6	Stability	Units subjected to the stability test (75°C for 48 h) must pass.
7	Pyrotechnic Composition	
7.1	<i>Chemical Analysis</i>	<p>Chemical analysis must <u>not</u> show the following discrepancies (C):</p> <ul style="list-style-type: none"> \$ Detection of a component not present in the declaration \$ Non-detection of a component present in the declaration \$ Detection of over 200% for components specified as under 25% in the declaration \$ Detection of over 150% for other components specified as 25% or over in the declaration \$ Detection of under 50% for components specified as over 10% in the declaration \$ Detection of chlorate with sulphur (chlorate is allowed under restricted conditions only)
7.2	<i>Flash Composition</i>	Flash composition refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used to produce an aural effect or used as a bursting charge, or propellant charge unless the time taken for the pressure rise is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance in the HSL Flash Composition Test (Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, 19th revised edition).

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Appendix D B Specific Requirements for Display Fireworks

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PART I: FIREWORKS ARTICLES

1.0 *Aerial and Nautical Shells*

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR AERIAL AND NAUTICAL SHELLS
1.1	<i>Calibre</i>	All shells (other than report shells) (C) : \$ no more than 305 mm (12 inches) Report shells (C) : \$ no more than 155 mm (6 inches) \$ no more than 1 report per shell
1.2	<i>Breaks</i>	\$ no more than 3 breaks, for all calibres (C) \$ final break may be a report.
1.3	<i>Fuse</i>	The fuse to be lit by flame <u>must</u> overhang at least 150 mm from the top of the mortar.
1.4	<i>Construction</i>	Shells larger than 155 mm (6 inches) <u>must</u> be equipped with a string to lower them into the mortar.
1.5	<i>Mortar</i>	Minimum difference between the shell and mortar diameters (mortar sizes are given as inside diameter for Schedule 40 steel pipe): \$ 5 mm Maximum difference between the shell and mortar diameters (mortar sizes are given as inside diameter for Schedule 40 steel pipe): \$ For shells no more than 76 mm (3 inches): 8 mm \$ For shells between 102 and 155 mm (4 and 6 inches): 12 mm \$ For shells greater than 155 mm (6 inches): 15 mm Unless specified by the manufacturer, the minimum length of the mortar is as per the US National Fire Protection Association (NFPA 1123).

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1.6	<i>Labels</i>	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <ul style="list-style-type: none"> \$ All general labelling requirements outlined in section 2.0 of Appendix C \$ The size of the mortar to be used \$ For nautical shells, a firing table (angle vs. distance) must be supplied. \$ All nautical shells must have a clear, highly visible indication on the articles that they are indeed nautical shells (to differentiate from coloured shells and the like).
1.7	<i>Charge Weights</i>	<p>Burst charge <u>must</u>:</p> <ul style="list-style-type: none"> \$ Be large enough to produce the effect described by the manufacturer \$ Meet the height requirements outlined in section 4.3 of the general requirements for display fireworks <p>Report shells must <u>not</u> have:</p> <ul style="list-style-type: none"> \$ over 85 g of flash composition
1.8	<i>Transport Classification</i>	<p>In July 2004, a working group within the UN Committee on the Transport of Dangerous Goods approved a default classification for the transport of fireworks that have not been tested. This default classification was implemented by the ERD on September 1, 2005. When a company prefers a more favorable classification, it has the option of testing. Similarly, if the ERD believes that the default position is inappropriate, it will require testing before a transport classification is granted (e.g., aerial colour shells over 155 mm but under 180 mm (with no more than 25% flash composition as loose powder and/or report effects)).</p>

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2.0 Aerial Wheels

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR AERIAL WHEELS
2.1	<i>Construction</i>	Drivers <u>must</u> : \$ Be securely attached to prevent any change in the direction of thrust produced by the jet (C) \$ Not come loose or separate from the article (C) Supports <u>must</u> : \$ Be sufficiently strong and not come apart in flight (C)
2.2	<i>Performance</i>	\$ Spinning and lifting drivers must not allow unintended communication between them. \$ The aerial wheel must spin on the ground before rising. \$ The angle of the trajectory must be no more than 30° from the vertical (C) . \$ When functioned, the height of the article must comply with the instructions on the labels (C) .
2.3	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix C \$ The additional warning "Erratic flight, take precautions for spectators. / Trajectoire aérienne imprévisible, assurez la protection des spectateurs."

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3.0 Battery / Combination

Synonyms: barrage, bombardos, cake, finale box, etc.

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR BATTERIES/COMBINATIONS
3.1	Performance	<ul style="list-style-type: none"> \$ Items must not tip over during functioning (C). \$ Items must not come apart during functioning (C).
3.2	Labels	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <ul style="list-style-type: none"> \$ All general labelling requirements outlined in section 2.0 of Appendix C \$ For angled articles, an arrow indicating the direction of the effect/fire/flame <p>Separately fused ejected components <u>must</u> carry the label <i>Explosives - Danger - Explosif</i>. This label <u>must</u> remain attached to the tube or shell after firing (C).</p>

4.0 Roman Candles

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR ROMAN CANDLES
4.1	Construction	Delay compositions or other barriers must be present to prevent the rapid unplanned passage of fire down the tube, but must minimize migration of expelling charge.
4.2	Performance	<ul style="list-style-type: none"> \$ All stars, shells, comets, etc. must function. \$ There must be no passage of fire down the tube. \$ The time interval between the shots must be between 2 and 5 s.
4.3	Labels	<p>Labels affixed to fireworks <u>must</u> include the following information (C):</p> <ul style="list-style-type: none"> \$ All general labelling requirements outlined in section 2.0 of Appendix C \$ An arrow indicating the direction of exit of flame/fire \$ The additional warning <i>This article must not be held in the hand. /Cet article ne doit pas être tenu dans la main.</i> <p>Separately fused ejected components <u>must</u> carry the label <i>Explosives - Danger - Explosif</i>. This label <u>must</u> remain attached to the tube or shell after firing (C).</p>

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5.0 Firecrackers

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR FIRECRACKERS
5.1	<i>Construction</i>	Physical dimensions <u>must</u> be: \$ Length no more than 5 cm \$ Diameter no more than 6.5 mm
5.2	<i>Charge Weight</i>	Charge weights <u>must</u> be (C) : \$ Black powder no more than 500 mg \$ Flash composition no more than 130 mg
5.3	<i>Performance</i>	\$ Debris permitted within a 3 m radius \$ Firecracker cluster must not explode simultaneously.
5.4	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix C

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6.0 Flares

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR FLARES
6.1	<i>Performance</i>	Must burn continuously with a steady flame
6.2	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix C

7.0 Fountains

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR FOUNTAINS
7.1	<i>Performance</i>	\$ When used as drivers on wheels, fountains must light within 1 s (C) . \$ Article must burn continuously with a steady flame. \$ Height of sparks must be no more than 20 m.
7.2	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix C.

8.0 Mines

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR MINES
8.1	<i>Performance</i>	All effects must be ejected at the same time
8.2	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in Section 2.0 of Appendix C \$ An arrow indicating the direction of exit of flame/fire Separately fused ejected components <u>must</u> carry the label <i>Explosives - Danger - Explosif®</i> . This label <u>must</u> remain attached to the tube or shell after firing (C) .

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9.0 Waterfalls and Set Pieces

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR WATERFALLS AND SET PIECES
9.1	<i>Construction</i>	The framework of a set piece and the wire of a waterfall must be strong enough and sufficiently secured to remain in position during functioning.
9.2	<i>Labels</i>	The individual pieces for the waterfall or set piece need not be labelled, provided that instructions be supplied with the articles.

10.0 Wheels

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR WHEELS
10.1	<i>Construction</i>	The nail supplied with the wheel must be sufficiently strong and long to hold the wheel in place (C) .
10.2	<i>Performance</i>	<ul style="list-style-type: none"> \$ Wheel must revolve smoothly, without stopping or hesitating (C). \$ Frame must not break, warp or catch fire (C). \$ Drivers must remain attached to their support or fall within 7 m of a vertical support when the wheel's nail is 3 m above ground (C).
10.3	<i>Labels</i>	Labels affixed to fireworks <u>must</u> include the following information (C) : <ul style="list-style-type: none"> \$ All general labelling requirements outlined in section 2.0 of Appendix C \$ For whistles, the additional warning AEmits a loud whistling noise. / Émet un son strident.®

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PART II: FIREWORKS ACCESSORIES

11.0 *Electric Matches*

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR ELECTRIC MATCHES
11.1	<i>Performance</i>	\$ 0/10 units must fire under the following conditions: 0.2 A of electric current for 30 s (C) . \$ 10/10 units must fire upon application of the all-fire current declared by the manufacturer (C) . \$ Matchheads shall deflagrate and not detonate.
11.2	<i>Labels</i>	Labels affixed to the fireworks or on the packaging containing the fireworks ⁸ <u>must</u> include the following information (C) : \$ All general labelling requirements outlined in section 2.0 of Appendix C \$ All-fire current \$ No-fire current \$ Resistance, including that of the leg wires

⁸ If marking the firework is not practical, the markings must appear on every inner package. In the absence of an inner package, the markings must appear on the shipping container. When the fireworks are too small to carry all the markings and are to be sold without the shipping packaging, they must carry the most important safety messages appropriate to their mode of functioning and the markings must be approved by the ERD.

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12.0 Portfires

ITEM	CHARACTERISTIC	SPECIFIC REQUIREMENTS FOR PORTFIRES
12.1	<i>Construction</i>	The construction must allow the attachment of an extension that remains cool while in use.
12.2	<i>Performance</i>	Ignition time: \$ By flame: no more than 10 s (C) \$ By friction: no more than 3 trials (C) Burn time: \$ Permitted variance from specified burn time: ± 10 s
12.3	<i>Labels</i>	The labelling must state the burn time of the portfire.

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