



FIREWORK HAZARD LEVELS

The specifications of this technical note are placed as conditions of licence or permit on holders of a Pyrotechnician's Licence, a Pyrotechnic Displays Business Licence, a Pyrotechnic Sales Business Licence and the holder of an Exempt Display Permit, under the Explosives Act 1936. These conditions form part of the licence or permit and must be complied with.

HAZARD LEVEL 1 Ground Level Fireworks

Ground Level Fireworks are manufactured firework items suitable for use by a pyrotechnician licensed to use outdoor fireworks of Hazard Level 1, or the holder of a Exempt Display Permit. Ground Level Fireworks are items, the pyrotechnic effect of which occurs, from the ground to a maximum height of 20 metres and less than or equal to 25 metres in diameter. The items fall within one of the categories listed in Table One.

TABLE ONE HAZARD LEVEL 1 FIREWORKS

Type name	Description	Principal effect
String Cracker	A firework consisting of a series of firecrackers (bangers) with their wicks intertwined to form a string	Emits a rapid series of sharp reports
Novelty	Article designed to resemble a toy, animal, etc., producing motion, and visual and aural effects. Contains a maximum of 40 grams of explosive composition	Combination of motion, emission of sparks, flames, pyrotechnic units, and visual and aural effects
Fountain	Cylindrical or cone fountain. Single tube containing pyrotechnic composition Maximum diameter 40 mm (1.6") †	Emission of sparks and flames with aural effect other than report or without any aural effect
Roman candle	Single tube containing alternate pyrotechnic unit and propellant charge Maximum diameter 20 mm (0.75") †	Ejection of a pyrotechnic unit, or several units in succession, producing a visual or aural effect, or a series of such effects, remote from the firework case
Mine ‡	Ground Effect Mine. A device fired on the ground containing a single propellant charge and pyrotechnic units. Maximum diameter 25mm (1") †	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual or aural effect.
Wheel	Device which is designed to rotate about a fixed point Maximum length 375 mm (15") †	Rotation, emission of sparks and flames, with or without aural effect
Multiple tube firework item	Assembly including several elements each corresponding to one of the devices listed above, in any combination, with a single point of ignition Maximum size, as for above components †	As for the individual elements

† Despite a maximum size being listed, the items must still be tested to ensure they meet the prescribed criteria and performance criteria.

‡ Does not include mine bags.

PRESCRIBED REQUIREMENTS FOR GROUND LEVEL FIREWORK ITEMS

- Maximum pyrotechnic composition of 200 grams per item.
- Maximum pyrotechnic content of 50 grams in any one tube.
- Item contains a wick for manual ignition using a port-fire. The wick must not be capable of instantaneous ignition, ie no exposed quickmatch. The fuse or wick must be of sufficient length to enable the person lighting the item to retire safely to a distance of 10 metres.
- Item must have a label in English detailing the safe method to use the item, and the effect on functioning of the item.

• ***Includes:*** Only the types of fireworks described in the above Table – String Crackers, Fountains, Roman Candles, Mines, Wheels, Multiple tube fireworks (Combinations, Batteries, Cakes or Roman Candle Cakes).

• ***Excludes:*** Any re-loadable items (such as shells or mines for use in a mortar), mine bags, shells, multiple tube shells, rockets, comets, parachute devices, excepting string crackers - any item the effect of which is solely percussive (salutes, maroons, bangers), items with percussive effect containing flashpowder composition, revolving fountains, bouquets, waterfalls, pigeons (line rockets), bombardos, barrages, tourbillions, serpents, illuminations and other set pieces, items containing electric match heads, electric igniters, aerial fireworks (effect over 20 metres).

PERFORMANCE REQUIREMENTS FOR GROUND LEVEL FIREWORK ITEMS

- Maximum height of functioning 20 metres.
- Maximum horizontal spread of function 25 metres diameter.
- Ground Effect fireworks must not, when used in accordance with the manufacturer's directions be capable of causing injury to a person standing 25 metres from the firework.
- Should the item topple over during functioning, all projected pyrotechnics must fall within the 40 metre audience safety zone.

HAZARD LEVEL 2 Low Level Fireworks

Hazard Level 2 fireworks are manufactured firework items suitable for use by a pyrotechnician licensed to use outdoor fireworks that have an effect on functioning up to 60 metres in height and less than or equal to 50 metres in diameter. A licence for Hazard Level 2 fireworks includes use of fireworks of Hazard Level 1. Hazard Level 2 includes larger ground level fireworks and set pieces. They also include low-level aerial firework items, the pyrotechnic effect of which occurs from the ground to a maximum height of less than 60 metres. The items fall within one of the categories listed in Table Two.

TABLE TWO

HAZARD LEVEL 2 FIREWORKS

Type name	Description	Principal effect
String Cracker	A firework consisting of a series of firecrackers (bangers) with their wicks intertwined to form a string	Emits a rapid series of sharp reports
Novelty	Article designed to resemble a toy, animal, etc., producing motion, and visual and aural effects. Contains a maximum of 40 grams of explosive composition	Combination of motion, emission of sparks, flames, pyrotechnic units, and visual and aural effects
Fountain	Cylindrical or cone fountain. Single tube containing pyrotechnic composition (maximum diameter 64 mm (2.5")).	Emission of sparks and flames with aural effect other than report or without any aural effect
Roman candle	Single tube containing alternate pyrotechnic unit and propellant charge (maximum diameter 25 mm (1")).	Ejection of a pyrotechnic unit, or several units in succession, producing a visual or aural effect, or a series of such effects, remote from the firework case
Mine ‡	Ground Effect Mine. A device fired on the ground containing a single propellant charge and pyrotechnic units (maximum diameter 76 mm (3"), maximum explosive content 500 g).	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual or aural effect.
Wheel	Device which is designed to rotate about a fixed point (maximum radius 500 mm).	Rotation, emission of sparks and flames, with or without aural effect
Shell	Device designed to be projected from a mortar tube and containing propellant charge, delay fuse, burster and pyrotechnic units (maximum diameter or length of shell 64 mm (2.5"))	Projection, bursting of the firework case and ejection of the pyrotechnic unit producing a visual or aural effect
Shell-in-mortar	Assembly comprising a shell inside a tube, from which the shell is designed to be projected, with the initial fuse fixed so that it connects with the outside of the tube (maximum internal tube diameter 51mm (2"))	Projection of the shell, bursting of its case and ejection of the pyrotechnic unit producing a visual or aural effect
Multiple tube firework item	Assembly including several elements each corresponding to one of the devices listed above, in any combination, with a single	As for the individual elements

TABLE TWO HAZARD LEVEL 2 FIREWORKS		
Type name	Description	Principal effect
	point of ignition Maximum size, as for above components †	

† Despite a maximum size being listed, the supplier must ensure they meet the prescribed criteria and performance criteria.

‡ Includes mine bags, does not include salute effect.

PRESCRIBED REQUIREMENTS FOR LOW LEVEL FIREWORK ITEMS

- Maximum pyrotechnic composition of 500 grams per item.
- Maximum pyrotechnic content of 100 grams in any one tube.
- Shell-in-mortar; maximum sizes:
 - up to 51mm (2”) tube size, item must not exceed 100 shots.
- Where the item contains a wick for manual ignition using a port-fire, the wick must not be capable of instantaneous ignition, ie no exposed quickmatch. The fuse or wick must be of sufficient length to enable the person lighting the item to retire safely to a distance of 10 metres.
- Item must have a label in English detailing the safe method to use the item, and the effect on functioning of the item.
- **Includes:** The types of fireworks described in the above Table – String Crackers, Fountains, Roman Candles, Mines, Wheels, Shell, Shell-in-mortar, Multiple tube fireworks (Combinations, Batteries, Cakes or Roman Candle Cakes).
Plus
Revolving fountains, pyro-driven lancework, bouquets, waterfalls, pigeons (line rockets), bombardos, barrages, tourbillions, serpents, illuminations and other set pieces, items containing electric match heads, electric igniters.
- **Excludes:** Except string crackers, any item the effect of which is solely percussive (salutes, maroons, bangers), items with percussive effect containing flashpowder composition.

PERFORMANCE REQUIREMENTS FOR LOW LEVEL FIREWORK ITEMS

- Maximum height of functioning 60 metres.
- Maximum horizontal spread of function 50 metres diameter.
- Hazard Level 2 fireworks must not, when used in accordance with the manufacturer’s directions, or when a reasonably foreseeable malfunction occurs (eg muzzle break), be capable of causing injury to a person standing at 50 metres from the firework.

HAZARD LEVEL 3 High Level Fireworks

Hazard Level 3 fireworks are manufactured firework items suitable for use by a pyrotechnician licensed to use outdoor fireworks that may have an effect on functioning of less than or equal to 200 metres in diameter and may be projected greater than 60 metres in height. A licence for Hazard Level 3 fireworks includes use of fireworks of Hazard Levels 1 and 2. Hazard Level 3 includes larger aerial fireworks to 152 mm (6"). The items fall within one of the categories listed in Table Three.

TABLE THREE

HAZARD LEVEL 3 FIREWORKS

Type name	Description	Principal effect
String Cracker	A firework consisting of a series of firecrackers (bangers) with their wicks intertwined to form a string	Emits a rapid series of sharp reports
Novelty	Article designed to resemble a toy, animal, etc., producing motion, and visual and aural effects. Contains a maximum of 40 grams of explosive composition	Combination of motion, emission of sparks, flames, pyrotechnic units, and visual and aural effects
Fountain	Cylindrical or cone fountain. Single tube containing pyrotechnic composition (maximum diameter 127 mm (5"))	Emission of sparks and flames with aural effect other than report or without any aural effect
Roman candle	Single tube containing alternate pyrotechnic unit and propellant charge (maximum diameter 51 mm (2"))	Ejection of a pyrotechnic unit, or several units in succession, producing a visual or aural effect, or a series of such effects, remote from the firework case
Mine ‡	Ground Effect Mine. A device fired on the ground containing a single propellant charge and pyrotechnic units (maximum size 500 g explosive composition, 102 mm (4") diameter) †.	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual or aural effect.
Wheel	Device which is designed to rotate about a fixed point (maximum size 500 mm radius)	Rotation, emission of sparks and flames, with or without aural effect
Shell	Device designed to be projected from a mortar tube and containing propellant charge, delay fuse, burster and pyrotechnic units (maximum diameter or length of shell 152 mm (6")) †	Projection, bursting of the firework case and ejection of the pyrotechnic unit producing a visual or aural effect
Shell-in-mortar	Assembly comprising a shell inside a tube, from which the shell is designed to be projected, with the initial fuse fixed so that it connects with the outside of the tube (maximum internal tube diameter 51mm (2")) †	Projection of the shell, bursting of its case and ejection of the pyrotechnic unit producing a visual or aural effect
Multiple tube firework item	Assembly including several elements each corresponding to one of the devices listed above, in any combination, with a single point of ignition	As for the individual elements

TABLE THREE

HAZARD LEVEL 3 FIREWORKS

Type name	Description	Principal effect
	Maximum size, as for above components †	

† Despite a maximum size being listed, the supplier must ensure they meet the prescribed criteria and performance criteria.

‡ Includes mine bags, does not include salute effect.

PRESCRIBED REQUIREMENTS FOR HIGH LEVEL FIREWORK ITEMS

- Maximum pyrotechnic composition of 1500 grams per item.
- Maximum pyrotechnic content of 200 grams in any one tube of a multi-tube item.
- Shell-in-mortar; maximum sizes:
 - up to 51mm (2”) tube size, item must not exceed 100 shots.
- Where the item contains a wick for manual ignition using a port-fire, the wick must not be capable of instantaneous ignition, ie no exposed quickmatch. The fuse or wick must be of sufficient length to enable the person lighting the item to retire safely to a distance of 10 metres.
- Item must have a label in English detailing the safe method to use the item, and the effect on functioning of the item, or the manufacturer’s instructions for safe use must be supplied with the item.
- **Includes:** The types of fireworks described in the Table for Hazard Level 3– String Crackers, Fountains, Roman Candles, Mines, Wheels, Shell or mortar, Shell-in-mortar, Multiple tube fireworks (Combinations, Batteries, Cakes or Roman Candle Cakes).
Plus
 Revolving fountains, bouquets, waterfalls, pigeons (line rockets), bombardos, barrages, tourbillions, serpents, illuminations and other set pieces, items containing electric match heads, electric igniters.
- **Excludes** Any item with a salute effect (candle, shell-in-mortar, shell, multiple tube item etc)

PERFORMANCE REQUIREMENTS FOR HIGH LEVEL FIREWORK ITEMS

- Maximum horizontal spread of function 200 metres.
- Hazard Level 3 fireworks must not, when used in accordance with the manufacturer’s directions, or when a reasonably foreseeable malfunction occurs (eg muzzle break), be capable of causing injury to a person standing at the relevant minimum safety distance from the firework.

HAZARD LEVEL 4

High Level – Wide Burst Fireworks

Hazard Level 4 fireworks are manufactured firework items suitable for use by a pyrotechnician licensed to use outdoor fireworks that may have an effect on functioning greater than 200 metres in diameter, and may be projected greater than 60 metres in height. A licence for Hazard Level 4 fireworks includes use of fireworks of Hazard Levels 1, 2 and 3, plus aerial fireworks up to 305mm (12”) unless the licence is restricted to a smaller size. The items fall within one of the categories listed in Table Four.

TABLE FOUR HAZARD LEVEL 4 FIREWORKS

Type name	Description	Principal effect
String Cracker	A firework consisting of a series of firecrackers (bangers) with their wicks intertwined to form a string	Emits a rapid series of sharp reports
Novelty	Article designed to resemble a toy, animal, etc., producing motion, and visual and aural effects. Contains a maximum of 40 grams of explosive composition	Combination of motion, emission of sparks, flames, pyrotechnic units, and visual and aural effects
Fountain	Cylindrical or cone fountain. Single tube containing pyrotechnic composition (maximum size 127 mm (5”)) †.	Emission of sparks and flames with aural effect other than report or without any aural effect
Roman candle	Single tube containing alternate pyrotechnic unit and propellant charge (maximum size 76 mm (3”)) †.	Ejection of a pyrotechnic unit, or several units in succession, producing a visual or aural effect, or a series of such effects, remote from the firework case
Mine ‡	Ground Effect Mine. A device fired on the ground containing a single propellant charge and pyrotechnic units (maximum explosives content 750 g, maximum size 102mm (4”)) †.	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual or aural effect.
Wheel	Device which is designed to rotate about a fixed point (maximum radius 500 mm) †	Rotation, emission of sparks and flames, with or without aural effect
Shell	Device designed to be projected from a mortar tube and containing propellant charge, delay fuse, burster and pyrotechnic units (maximum size 305 mm (12”)) †.	Projection, bursting of the firework case and ejection of the pyrotechnic unit producing a visual or aural effect
Shell-in-mortar	Assembly comprising a shell inside a tube, from which the shell is designed to be projected, with the initial fuse fixed so that it connects with the outside of the tube, often comprise an array of tubes (maximum internal tube diameter 51mm (2”)) †	Projection of the shell, bursting of its case and ejection of the pyrotechnic unit producing a visual or aural effect
Multiple tube	Assembly including several elements each	As for the individual elements

TABLE FOUR HAZARD LEVEL 4 FIREWORKS

Type name	Description	Principal effect
firework item	corresponding to one of the devices listed above, in any combination, with a single point of ignition Maximum size, as for above components †	

† Despite a maximum size being listed, the supplier must ensure they meet the prescribed criteria and performance criteria.

‡ Includes mine bags, maximum size for salute effect 51 mm (2”).

PRESCRIBED REQUIREMENTS FOR HIGH LEVEL, WIDE BURST FIREWORK ITEMS

- Maximum pyrotechnic composition of 5,000 grams per item.
- Maximum pyrotechnic content of 300 grams in any one tube (applies to Roman candle, Shell-in-mortar, Multiple tube firework item).
- Where the item contains a wick for manual ignition using a port-fire, the wick must not be capable of instantaneous ignition, ie no exposed quickmatch. The fuse or wick must be of sufficient length to enable the person lighting the item to retire safely to a distance of 10 metres.
- Salute shell to maximum size of 76 mm (3”).
- Maximum quantity of salute powder in a single shell must not exceed 142 grams (quantity must be divided over: the components of a multiple component shell; or a multi-break shell).
- Maximum quantity of salute powder in any single salute item must not exceed 71 grams (quantity applies to: a single break salute; each of the multiple internal components of a single break salute; each of the components of a multi-break salute; a single maroon.).
- Item must have a label in English detailing the safe method to use the item, and the effect on functioning of the item, or the manufacturer’s instructions for safe use must be supplied with the item.

• **Includes:**

- The types of fireworks described in the above Table – String Crackers, Fountains, Roman Candles, Mines, Wheels, Shell or mortar, Shell-in-mortar, Multiple tube fireworks (Combinations, Batteries, Cakes or Roman Candle Cakes).
- Revolving fountains, bouquets, waterfalls, pigeons (line rockets), bombardos, barrages, tourbillions, serpents, illuminations and other set pieces, items containing electric match heads, electric igniters.
- Salutes and maroons (if trained).
- Multi-break shells (shell on shells, peanut shells)

PERFORMANCE REQUIREMENTS FOR HIGH LEVEL, WIDE BURST FIREWORK ITEMS

- Hazard Level 4 fireworks must not, when used in accordance with the manufacturer’s directions, or when a reasonably foreseeable malfunction occurs (eg muzzle break), be capable of causing injury to a person standing at the relevant minimum safety distance from the firework.

NOTE: Pyrotechnic items that fall outside the above definitions for fireworks, are not authorised explosives. Such items must be individually authorised, and their use specifically approved.

Examples are:

- **out of date distress flares, modified at a factory for electrical ignition to enable use in a firework display;**
- **aerial shells of size larger than specified above for Hazard Level 4;**
- **fireworks of gross weight or explosives composition greater than that listed above for Hazard Level 4;**
- **shell-in-mortar or multi-tube items larger than those specified.**