

Guidance for the Storage of Pyrotechnic Articles in Retail & Distribution Centres



Issued by the Office of the
Government Inspector of Explosives
GD 9/2010

First Issued July 2010

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Additional Reading References

Explosives Act 1875
S.I. No 804 of 2007 Stores for Explosives Order
S.I. 174 of 2015 Making Available on the Market of Pyrotechnic Articles
Guidance for Fire Safety in Stores for Explosives (2008)
Guidance Notes for Public on Fireworks in Ireland
Guidance for Importers Distributors and Retailers of Category F1 Fireworks

Guidance for

Storage for Pyrotechnic Articles in Retail Outlets and Distribution Centres

1. Scope

This Guidance mainly covers the storage of Category F1 fireworks and other pyrotechnic articles at retail outlets and distribution centers, including pyrotechnics displayed in sales areas to which the public have access. In practice the only fireworks permitted for sale to the public are Category F1 fireworks. Other pyrotechnics commonly sold include marine distress flares (in ships chandler shops) and Category P1 "Hilti" type fixing cartridges (in hardware shops). The safety guidance and principles in this section also generally applies to the sale to the public of small arms ammunition (such as Shotgun cartridges) in firearms dealers¹ premises.

2. Category F1 Fireworks and other pyrotechnics

2.1. **Category F1 Fireworks** Category F1 fireworks² are fireworks which present a very low hazard and negligible noise level and are intended for use in confined areas, including indoors. Examples include Bengal flames, Bengal matches, Bengal sticks, Christmas Crackers, Crackling granules, Flash pellets, Fountains, Ground spinners, Hand Held sparklers, Non-Hand Held sparklers, Novelty Matches, Party Poppers, Serpents, Snaps, Table bombs, and Throw downs, provided they meet the requirements in the relevant standards. Category F1 fireworks are the least hazardous category of firework. In fact the explosive content in items such as party poppers, and Christmas crackers is so small that, in the quantities in which they are normally likely to be found on retail premises, they present minimal risk on open display in their retail packaging. Other Category F1 fireworks such as sparklers and fountains contain relatively high energy pyrotechnic material

¹ Firearms dealers are also subject to separate firearms legislation and security requirements

² Note that for the purpose of this Guidance, Cat F1 also includes certain low hazard fireworks authorised for importation under transitional arrangements (See GD 8/2010 for more details). Note that bangers, rockets, or roman candles are NOT Category F1 Fireworks and their possession or sale to the general public is expressly forbidden by existing law

that can burn intensely and in certain extreme circumstances (of bulk high quantity storage and containment) can even explode.

2.2. Other Pyrotechnics Other pyrotechnic articles which might be found for sale to the public are :

- Marine Pyrotechnics (including distress flares, smoke signals, illuminating rockets, line rockets etc). These are sold in ships chandlers but are also stored in lifeboat stations, life-raft servicing facilities. The hazard can vary but most are UN Hazard 1.3G or 1.4G in a fire.
- Category P1 Fastening cartridges such as "Hilti" or nailgun cartridges for sale in hardware shops and DIY stores. These are generally of very low hazard class (UN 1.4S) and behave similar to small ammunition in a fire.

3. Storage - Legal requirements under Explosives Act 1875:

3.1. Sales Areas and Storage areas. Sales areas are parts of the premises where the public have access and where a relatively small quantity of pyrotechnics may be displayed for sale in their retail packaging. (e.g. on shelves, shop-floor or in display cabinets). Storage areas are areas where the bulk of the pyrotechnics are kept (generally in their transport packaging), and would generally be a cabinet, fire safe, room or for larger quantities a separate building or structure where the public would not have access. Fire officers should make themselves aware of the location within a premises where the bulk of pyrotechnics are kept. (See also Para 11 below on "Display in Sales Areas").

3.2. Regardless of the quantity, pyrotechnics for sale to the public (with the sole exception of Christmas Crackers³) may only be stored in one of the following.

³ Note that Christmas crackers in their retail packaging are NOT considered to be explosives due to the nature of the article, packaging and the very small amount of pyrotechnic material in each. They are therefore exempt from the licensing requirements of the Explosives Act for importation and Storage

3.2.1. **Registered Premises**; Generally retailers will only require to hold relatively small stocks of explosives/pyrotechnics. Regardless of the quantity⁴, the premises must be registered with the Local Fire Authority, since the purpose of registration is to alert the Fire Officer that explosives are stored at the premises (in the event of a fire), and also to give him powers under the Explosives Act to enter and inspect the premises. There are two modes of storage allowed:

- **Mode A**: Storage of up to 90 Kg net explosive content (NEC)⁵ is permitted in a Mode A Registered Premises. Mode A requires a substantial building (constructed of brick, iron, stone or concrete or a fireproof safe detached from a dwelling at a safe distance from a street or public place).
- **Mode B**: Storage of up to 22 Kg NEC in a Mode B Registered Premises. Mode B requires a substantial receptacle or safe inside a house or public room. (Double the amount can be kept if in a fireproof safe).

Note that under S.I. 129 of 1984, up to 45 kg of certain low hazard small fireworks, (known in the old legislation as “shop goods”) can legally be kept in a public sales area of a registered premises, however GIE recommend that this be kept to a minimum (5kg NEC) and out of reach of under-aged children (See Table 1 below for GIE recommendations for different sized sales area)

In either case the registration must be renewed on an annual basis.

Application forms available at

<http://www.justice.ie/en/JELR/Pages/fireworks>

3.2.2. **Local Authority Store**; Storage of up to 2,000 Kg NEC is permitted subject to complying with all the regulations in S. I. 804 of 2007 Stores for Explosives Order

⁴ It is intended that the current legislation requiring registration will be amended under draft legislation currently being prepared to give an exemption for small quantities of pyrotechnics.

⁵ See Table 2 at back of Guide for some idea of the quantity of Category F1 fireworks which corresponds to this NEC - it is a very large quantity, so that a Registered Premises will suffice for most retailers

(http://www.justice.ie/en/JELR/Pages/SI_804_of_2007). This

licence can be issued for a period of up to 5 years and application form is available at

http://www.justice.ie/en/JELR/Pages/Storing_explosives

4. **ISO containers:** ISO containers are sometimes used as registered premises or local authority stores for bulk storage of pyrotechnics (e.g. at the rear of large retail stores)
 - ISO containers (or similar metal storage units) used for pyrotechnic storage should, wherever possible, be kept in an area away from public access. It is recommended that measures are taken to prevent smoking in the immediate area of the container.
 - ISO containers storing pyrotechnic articles should be marked with an appropriate Fire Division symbol. The symbol should be removed from the container when the pyrotechnic articles have been removed.
 - Where it is necessary to use an area accessible by the public or other workers (e.g. a car park or delivery yard), it is essential to take measures to prevent arson or some other malicious attack. The ISO or similar container should either be under constant supervision or other physical measures should be taken to prevent unauthorised access to the area around the container. Cars and other vehicles should not be permitted to park within 3 m of the container. Where the container is kept in a goods delivery yard it is important to put it in a suitable place in order to reduce the risk of it being hit by vehicles.
5. **Risk Assessment** As well as duties under explosives legislation, most businesses storing pyrotechnics and other explosives articles will also have duties under health and safety, fire safety and building regulations. Some of these regulations include arranging for a competent person to carry out a risk assessment to identify risks to the public, employees and firefighters. Even where it is not required by law, it is good practice for the business owner to carry out an appropriate risk assessment. It is essential that the risk assessment takes into account the presence

of fireworks in the premises. If the assessment is carried out at a time of year when there are no pyrotechnics on the premises, then the person carrying out the risk assessment should be told that pyrotechnics are present at certain times of the year. It is equally essential that the storage arrangements for pyrotechnics take account of the advice of the person carrying out the risk assessment who will have had the opportunity to consider all the circumstances at the site, including in particular any additional fire loading from, for example, the presence of highly flammable liquids.

6. **General Safety and Fire Precautions** The basic principles for the display, storage and handling of pyrotechnic articles in retail and other premises (such as wholesale shops and chandlers) are the same as for other types of explosive. The following are common sense measures to control the risks identified by the risk assessment. These measures include:

- Storing and displaying pyrotechnic articles well away from flammable liquids and materials that can easily catch fire and burn;
- controlling the quantities being stored, handled or displayed in areas where people work or gather. This is obviously especially relevant to the shop floor area of shops;
- prohibiting smoking anywhere near the stored and displayed fireworks or other pyrotechnic articles;
- ensuring that sources of heat, such as space heaters, are kept well away from the fireworks or other pyrotechnics;
- keeping the fireworks and pyrotechnic articles in closed transport packaging;
- storing and displaying the fireworks and other pyrotechnic articles away from hazardous substances;
- protecting the fireworks and other pyrotechnic articles from damp; and

- ensuring that other chemicals do not contaminate the fireworks or other pyrotechnic articles.

7. **Additional Fire Precautions**

7.1. Preventing the spread of fire from or to flammable or other dangerous

substances It is preferable to keep pyrotechnic articles in a storage place that can be used exclusively for this purpose. A fire involving pyrotechnic articles (such as flares), is likely to spread very quickly as burning projectiles are thrown around. Where the pyrotechnics are kept in a warehouse (or similar room or building) that also holds significant quantities of other combustible materials, the storage arrangements will need to be designed to prevent the spread of fire by fragment throw. This will involve either:

- storing in an ISO transport container(or similar fully enclosed metal structure);
- using storage cupboards or cabinets;
- building a structural partition;
- or using a wire mesh screen or cage.

7.2. It is important to stress that the safety measures should be seen as a whole.

Any container or enclosure should be:

- suitably constructed - it should be sufficiently robust to remain stable and effective throughout its expected working life taking into account the expected working conditions; and
- suitably located - it should be located well away from flammable or hazardous substances. For example, in the warehouse of a DIY superstore it should be located in the area of the warehouse used to store inert non-combustible building materials or gardening products (for example, sand and cement or compost).

7.3. Fire Separation: Between bulk storage area and sales area there should be a fire-resisting separation (for example, a breeze block, stud partition or other suitably constructed wall capable of resisting fire for at least 1 hour) between the store (or warehouse containing the store) and the sales area.

7.4. Protecting people in the event of a fire The key measures to be taken to protect people in the event of a fire are:

- ensuring that they are able to escape quickly from the area and from the shop;
- controlling the quantity of pyrotechnic articles present on the shop floor;
- breaking that quantity down into smaller units (so that if there is a fire this does not immediately involve the whole stock) and taking steps to slow the spread of fire between the units; and
- taking steps to ensuring that, if the pyrotechnic articles catch fire, the fire does not easily spread to other flammable substances on the shop floor.

7.5. Helping people escape

- The provision of fire escapes and other precautions is covered by fire safety and building regulations. (See also S.I. No 804 of 2007 Stores for Explosives Order and associated Guidance Doc on Fire Safety in Stores for Explosives) Anyone storing pyrotechnic articles should ensure that they comply with the relevant requirements of that legislation and in particular ensure that the explosives are not stored or placed anywhere where they would endanger people escaping from a fire, or impede their exit routes.
- In the event of a fire it is important to tell the fire service (and other emergency service personnel attending) that pyrotechnic articles are present and where they are being stored.

- Under no circumstances should the pyrotechnic articles be kept anywhere where, in the event of a fire, they might endanger the safety of those using escape routes from the building. Pyrotechnic articles should not be stored anywhere where, in the event of a fire, the fire could quickly spread, from or to, any other flammable materials (for example, white spirit, barbeque-lighting fluid, paint thinners or other flammable liquids, matches, firelighters) or materials that can easily catch fire (for example, bulk quantities of paper, cardboard, surplus wooden pallets, video tapes, tights or stockings).

7.6. Storage adjoining or in the same building as domestic/sleeping

accommodation If more than 5 kg net explosive content (NEC)⁶ of pyrotechnic articles are kept in a Registered Premises within, or adjoining, a building containing domestic/sleeping accommodation, suitable steps should be taken to protect residents of those premises in the event of a fire. The following specific precautions should be taken:

- a fire detection system should be installed in the building;
- the domestic parts of the building should have access/exit routes that are fire-separated from those used for the pyrotechnic storage;
- there should be suitable fire separation between the pyrotechnic storage and the domestic accommodation (for example, doors and floors/ceilings offering 1 hour fire resistance); and
- the store should be closed off and secured from the domestic part of the property in order to both prevent unauthorized access (including by children connected with the domestic accommodation) and also to help prevent the accidental introduction of sources of ignition.

7.7. Packaging: Where pyrotechnic articles are kept in a store used exclusively for this purpose, the transport packaging alone may be considered to provide sufficient protection providing that the safety measures set out in sub-

⁶ See Table 2 for some idea of the quantity of Category F1 fireworks which corresponds to 5 kg NEC - it is generally considerable

paragraphs below are taken. The transport packages should not be left opened in the storage area. The packages should normally only be opened when needed (or if the contents are to be transferred to a storage cupboard or cabinet). After opening, it is important to close the flaps securely if pyrotechnic articles remain in the package (for example, by taping the flaps down; interleaving the flaps; or securing them in some other way to ensure that the flaps do not open).

- It is also important to avoid transferring pyrotechnic articles from one transport package to another in order to avoid the spillage of explosives.
- It is not good practice to decant loose pyrotechnic articles into metal dustbins. There is a danger that the articles will become mixed up or damaged, with loose compound collecting at the bottom of the dustbin.

8. Housekeeping and stock management

- 8.1. Where it is not possible to reserve a place exclusively for the storage of pyrotechnic articles, then ideally, the bulk of the articles should be away from the shop premises. Where this is not feasible, the pyrotechnic articles should be kept (preferably in their closed transport packaging) in a fire-resistant cabinet or container.
- 8.2. It is advisable to restrict entry to the room or store used for storage of the fireworks/pyrotechnics to those members of staff who need to be there.
- 8.3. It is important that the storage area is kept clean of any loose powder and that unwanted empty packaging and other combustible waste materials are removed straight away when they are no longer required.
- 8.4. Damp pyrotechnic articles can be dangerous, especially to users. It is therefore very important to ensure that appropriate measures are taken to keep them dry.
- 8.5. It is also important to manage stocks to avoid the need to repack fireworks. However, it is a good idea to retain some of the empty transport packages so that any unsold fireworks can be repacked in the appropriate transport

packaging for return to the supplier (if the items have been supplied on sale or return) or transport to the site where they are to be disposed of. There are legal requirements on the packaging of pyrotechnic articles for transport and if in doubt advice from the supplier should always be sought on how unsold articles should be repackaged for transport.

8.6. Marine Pyrotechnics: In the case of marine pyrotechnics, it is important that

- It is not recommended to have live marine pyrotechnic articles on display. Even for less hazardous types, it is preferable to use appropriately labelled inert or non-explosive samples of articles for display. It is important to avoid mixing live articles and dummies. Inert or dummy articles should be clearly and unambiguously marked and labeled as “**inert/dummy**”. Where live samples are used for display purposes they should be kept in a suitable display case. When live samples are removed from a display case, they should be kept under the supervision of a member of staff until sold.
- Time expired pyrotechnics (TEPs) are kept segregated from "in time" stocks and preferably fire separated, either by separate location, or by a fire resistant wall or compartment.
- Misfired, corroded, faulty or other TEPs considered to be in a dangerous condition should not be taken into storage but should be reported to the Gardai for assistance.
- Under no circumstances should TEPs be stored unpackaged. TEPs should be carefully packed (preferably in original packs) and correctly marked and labelled with the appropriate hazard markings and the words "Time Expired Pyrotechnics
- TEPs should be kept to an absolute minimum and should be processed and disposed of on a regular basis in accordance with Marine Notice No 13 of 2000 from Department of Transport, and in compliance with exemptions from the ADR given in Regulation

9. Other safety measures

9.1. Chemical Contamination: As well as the risk from fire, it is also essential to bear in mind that certain other chemicals may be hazardous where there is a risk of chemical contamination or an additional explosion hazard. They should therefore be stored far enough away from pyrotechnic articles so that there is no risk of contamination.

9.1.1. Examples of products that could present a contamination hazard include:

- products containing caustic substances (acids or alkalis) such as drain cleaners and paint cleaners; and
- products including certain wood preservatives which might have chemical incompatibility.

9.2. Additional Explosion Hazards: Products that might create an additional explosion hazard include:

- products such as fertilisers containing oxidising agents; and
- products containing peroxides such as certain fibreglass hardeners.

9.2.1. Aerosols and bottled gas canisters can have devastating effects if involved in a fire.

10. Movement

10.1. Road Transport:

The road transport of explosives including pyrotechnics should comply with all the provisions of the Carriage of Dangerous Goods by Road regulations (ADR) regarding driver training and certification, vehicle certification,

vehicle placarding and marking and all relevant documentation. For road transport of small quantities in certain limited circumstances some of these provisions may be waived. The limits are set out in the ADR. In all cases it is recommended that distributors use the services of a recognised, competent transport operator. It is unlikely that all such requirements will apply in respect of Category 1 fireworks, because of their relatively low explosive content, (except perhaps for very large shipments) - however if you have any doubt about which provisions of the ADR apply then you should contact a Dangerous Goods Safety Advisor (DGSA) and a list of current DGSAs can be found on their association web page at <http://www.dgsaai.ie/>

10.2. On-Site Movement: All movements of pyrotechnic articles around the site should be properly supervised in order to ensure that:

- They are not left unattended
- They are not left, however briefly, in places where they could be inadvertently mixed up with other goods - especially flammable products; and
- boxes containing fireworks or other explosives are not inadvertently handled by staff (or members of the public) unaware of their contents.

10.3. Ideally articles should be taken direct from the store to the shop floor. However, there may be cases where it is necessary to keep fireworks temporarily in a holding area specified for that purpose. If so:

- the quantity in movement at any one time should be kept to the minimum necessary;
- the stock replenishment should be timed to avoid the articles being in movement for an unnecessarily long period of time;
- the holding area should be away from other goods; and
- the articles should not be left unattended.

10.3.1. It is recommended that articles in holding areas are kept in metal-caged trolleys.

11. **Display of Category F1 Fireworks in the Sales Area**

- "Age Limit" signs should be displayed in the sales area, (unless bar coding or other means are used to alert sales staff to age restrictions)
- The following Category F1 fireworks are permitted to be openly displayed in a sales area in their retail packaging : Christmas crackers and party poppers.
- The following is recommended for other Category F1 fireworks in the sales area:
 - Quantities < 5 Kg NEC should as a minimum be kept in a designated area which prevents unauthorised access and which is located well away from sources of ignition, sparks and flammable materials and which does not compromise escape routes.
 - Quantities > 5 Kg NEC should be kept in a display case or storage cupboard or cabinet, which prevents unauthorised access and is designed to protect against sparks or other sources of ignition, and which is located in a designated location away from sources of ignition and flammable materials and that does not compromise escape routes.
- Display cases and storage cabinets should
 - not be used for the display or storage of other substances or articles particularly flammable substances, chemicals or articles such as life jackets with self inflating gas cylinders.
 - not present a spark or heat hazard to their contents and should be disconnected from the electrical supply and measures taken (such as warning notices) to prevent them from being inadvertently reconnected..
 - be kept clean and dry at all times.
- Appropriate and common sense steps should be taken to prevent unauthorized access to shelves, display cases or storage cabinets, especially by under-aged or mischievous persons

- The Category F1 fireworks should be divided between storage cabinets, or display cases, each holding no more than 12.5 kg net mass (50 kg gross weight)
- The quantities of Category F1 fireworks authorised to be kept in the sales area should be controlled to ensure that the authorised maximum quantities in the Table hereunder are not exceeded.
- The general principles of this Guidance may be applied in a similar way when such items as small arms ammunition and "hilti" or nailgun cartridges, are kept and displayed for sale in shops and other premises.
- The explosive content in items such as party poppers and Christmas crackers is so small that, in the quantities in which they are normally likely to be found on retail premises, they present minimal risk. These articles may be kept on open display in their retail packaging. However, it is important to remember that although the quantity of explosive in each item is small, very large quantities may altogether contain a significant quantity of explosive and should be treated with the same care as other explosive articles.

Table 1
Max Quantity Recommended in Sales Area

Total floor area of the sales area (square metres)	Maximum quantity of Category F1 Fireworks to be kept (NEC – kg)	Maximum quantity of Category F1 Fireworks to be kept (gross weight – kg)
up to 20	2	8
up to 40	2.5	10
up to 60	3.5	14
up to 80	5	20
up to 100	6	24
up to 150	7	28
up to 200	8	32
up to 250	9	36
up to 300	10	40
up to 350	11	44
up to 400	12	48
up to 450	13	52
up to 500	14	56
500 and over	15	60

Storing Pyrotechnic Articles – Summary

DO

- exclude sources of ignition;
- keep in closed transport packaging;
- use suitable storage and display cabinets;
- restrict entry to the storage area;
- Display "Age Limit for Purchase" signs where appropriate
- Prevent easy access by under-aged or mischievous persons in a sales area

DON'T

- allow smoking;
- decant into metal dustbins;
- keep flammables nearby;
- put space heaters nearby;
- keep excessive amounts;
- block escape routes.

Table 2
Category F1 Fireworks - Typical⁷ Net Explosive Content

Cat 1 Item	Max NEC g	Qty per Kg	Qty Per 5 Kg	Qty per 22 Kg	Qty per 90 kg
Bengal Flames	20	50	250	1,100	4,500
Bengal Sticks	7.5	133	667	2,926	11,970
Fountains	7.5	133	667	2,926	11,970
Hand held Sparklers	7.5	133	667	2,926	11,970
Non-hand-held Sparklers	7.5	133	667	2,926	11,970
Ground Spinners	5	200	1,000	4,400	18,000
Bengal Matches	3	333	1,667	7,326	29,970
Crackling Granules	3	333	1,667	7,326	29,970
Serpents	3	333	1,667	7,326	29,970
Flash Pellets	2	500	2,500	11,000	45,000
Table bombs	2	500	2,500	11,000	45,000
Novelty matches	0.05	20,000	100,000	440,000	1,800,000
Throwdowns	0.025	40,000	200,000	880,000	3,600,000
Christmas Crackers (K Cl +P)	0.016	62,500	312,500	1,375,000	5,625,000
Party Poppers	0.016	62,500	312,500	1,375,000	5,625,000
Snaps (KCl + P)	0.016	62,500	312,500	1,375,000	5,625,000
Christmas Crackers (Ag fulm)	0.0016	625,000	3,125,000	13,750,000	56,250,000
Snaps (Ag Ful)	0.0016	625,000	3,125,000	13,750,000	56,250,000

⁷ NEC shown is based on max permissible NEC for each type in harmonised standards for Category F1 Fireworks EN 15947