

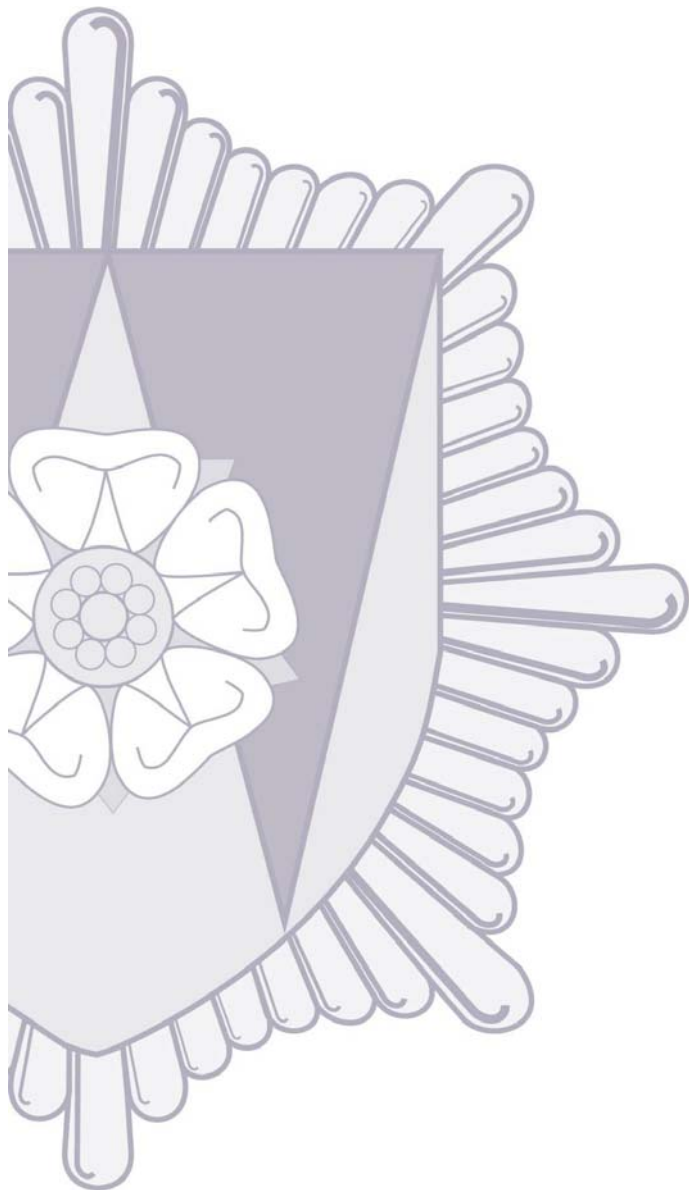
West Yorkshire Fire & Rescue Service

Fire Safety - Information Note FS-INF048

Manufacture & Storage of Explosives Regulations 2005

Edited Extract from Paragraphs 265 to 315 of the Approved Code of Practice
on the Manufacture & Storage of Explosives Regulations 2005

Storing Hazard Type 4 Fireworks



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Foreword:

Approved Codes of Practice (ACoP) are approved by the Health and Safety Commission, with the consent of the Secretary of State. They give practical advice on how to comply with the relevant (Health and Safety) law. If the duty holder follows the advice he will be doing enough to comply with the law in respect of those specific matters on which the Code gives advice. The duty holder may use alternative methods to those set out in the Code in order to comply with the law. However, the Code has special legal status. If the duty holder is prosecuted for breach of health and safety law, and it is proved that he did not follow the relevant provisions of the Code, he will need to show that he has complied with the law in some other way or a court will find the duty holder at fault.

The footnotes are a (fire safety inspector's) commentary on certain aspects of the ACoP.

Introduction:

This edited extract of the ACoP covers the storage of Hazard Type 4 fireworks. It is relevant to anyone storing/retailing this type of firework and specific guidance is given on the particular issues that need to be considered in shops (including supermarkets, DIY 'superstores' and garden centres) where quantities of fireworks are stored and displayed in places to which the public have access.

Fire Safety Regulations:

265. As well as duties under MSER, most businesses storing fireworks will have duties under the Regulatory Reform (Fire Safety) Order 2005. These duties include arranging for a competent person to carry out a risk assessment to identify risks to the public, employees and fire-fighters. 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 fireworks on the premises, then the person carrying out the risk assessment should be told that: -

- fireworks are present at certain times of the year;
- where they will be stored/displayed; and
- the maximum quantity to be held in stock at any time.

266. It is equally essential that the storage arrangements for fireworks 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.

General Precautions (to prevent and restrict the spread of fire):

267. The basic principles for the display, storage and handling of fireworks in retail and other premises (such as cash and carry stores) are the same as for other types of pyrotechnical articles. Retailers and wholesalers storing these articles must carry out a risk assessment and take the appropriate measures to control the risks identified by the risk assessment. These measures include:

- storing fireworks well away from flammable liquids and materials that can easily catch fire and burn; and
- 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 fireworks;
- ensuring that sources of heat, such as space heaters, are kept well away from the fireworks;

- keeping the fireworks in closed transport containers;
- storing the fireworks away from hazardous substances;
- protecting the fireworks from damp; and
- ensuring that other chemicals do not contaminate the fireworks.

Preventing the Spread of Fire from/or to Flammable or Dangerous Substances:

268. It is preferable to keep fireworks in a storage place that can be used exclusively for this purpose. A fire involving fireworks is likely to spread very quickly as burning projectiles are thrown around. Where the fireworks 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:

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

269. It is important to stress that the safety measures must be seen as a whole. Any container or enclosure must be:

- a. suitably constructed - it must be sufficiently robust to remain stable and effective throughout its expected working life taking into account the expected working conditions;
- b. suitably located - it must 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 (e.g. sand and cement or compost).

270. There must be a fire-resisting separation (for example, a breeze block, stud partition or other suitably constructed wall capable of resisting fire for at least half an hour) between the store (or warehouse containing the store) and the sales area.

271. Where fireworks 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 the following two paragraphs are taken.

272. The transport packages must 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 fireworks 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).

273. It is also important to avoid transferring fireworks from one transport package to another in order to avoid the spillage of the explosive composition.

274. Where it is not possible to reserve a place exclusively for the storage of fireworks, then ideally, the bulk of the fireworks should be away from the shop premises. Where this is not feasible, the fireworks must be kept (preferably in their closed transport packaging) in a fire-resistant¹ cabinet or container.

¹In this context, the term 'fire-resistant' can be taken to mean steel or timber construction that will afford some protection to the contents from an external fire or contain a fire for a short period of time should the fireworks be ignited from a fire within. It should not be confused with BS 476 'Fire tests on building materials and structures'.

275. It is not good practice to decant loose fireworks 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.

276. Under no circumstances should the fireworks be kept anywhere where, in the event of a fire, they might endanger the safety of those using escape routes from the building. Fireworks must not be stored anywhere where, in the event of a fire, the fire could quickly spread, from or to, any other flammable materials or materials that can easily catch fire (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).

277. It is advisable to restrict entry to the room or store used for storage of the fireworks to those members of staff who need to be there².

Housekeeping and Stock Management:

278. It is important that the storage area is kept clean of any loose powder³ and that unwanted empty packaging and other combustible waste materials are removed straight away when they are no longer required.

279. Damp fireworks can be dangerous³, especially to users. It is therefore very important to ensure that appropriate measures are taken to keep them dry.

280. 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 fireworks for transport and if in doubt advice from the supplier must always be sought on how unsold articles should be re-packaged for transport.

Storing Fireworks	
Some do's	Some don'ts
<ul style="list-style-type: none"> ✓ exclude sources of ignition ✓ keep in closed transport packaging ✓ use suitable storage & display cabinets ✓ - restrict entry to the store 	<ul style="list-style-type: none"> ✓ allow smoking ✓ decant into metal dustbins ✓ keep flammables nearby ✓ put space heaters nearby ✓ keep excessive amounts ✓ - block escape routes

Other Safety Measures:

²This can be taken to mean that the staff should be aware of the hazards posed by the presence of the fireworks and the control measures in place to prevent fires and fire spread.

³Wholesalers/retailers and members of the public should seek advice on the safe disposal of any damaged or damp fireworks(s) directly from the manufacturer or importer, whose name and contact details are printed on the firework label.

281. 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 fireworks that there is no risk of contamination.

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

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

283. 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.

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

ISO Containers:

285. ISO containers (or similar metal storage units) used for fireworks storage must, 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.

286. ISO containers storing Hazard Type 4 fireworks should be marked with a Fire Division 4 symbol. The symbol should be removed from the container when the fireworks have been removed. See table 2.

287. Where it is necessary to use an area of a car park, it is essential to take measures to prevent arson or some other malicious attack. The ISO or similar container must either be under constant supervision or other physical measures must be taken to prevent unauthorised access to the area around the container. Cars and other vehicles must not be permitted to park within 3 metres⁴ of the container⁵. 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.

Fire Division			
Fire Division	Placard Shape (symbol)	Hazard division	Hazard
1	Octagon (1)	1.1, 1.5	Mass explosion
2	Cross (2)	1.2, 1.6	Non-mass explosion, fragment producing
3	Inverted triangle (3)	1.3	Mass fire, minor blast, or fragment
4	Diamond (4)	1.4	Moderate fire, no blast

Movement:

⁴The 3m exclusion zone should also apply to the storage of combustible materials such as timber pallets and cardboard that if involved in fire could ignite the fireworks in the container through the effects of radiated or conducted heat.

⁵The separation distances for quantities of HT4 fireworks in excess of 250 kg are listed in the table in Appendix 1.

288. All movements of fireworks around the site must be properly supervised in order to ensure that
- a. the fireworks are never left unattended;
 - b. fireworks are not left, however briefly, in places where they could be inadvertently mixed up with other goods – especially flammable products;
 - c. boxes containing fireworks are not inadvertently handled by staff (or members of the public) unaware of their contents.

289. Ideally fireworks 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 designated for that purpose. If so:

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

290. It is recommended that fireworks in holding areas are kept in metal-caged trolleys⁶.

Storage and Display of Fireworks on the Shop Sales Area:

291. When fireworks are kept in places where members of the public are present there is both an increased risk that an accident could take place, and, if there were an accident, a larger number of people could be at risk.

292. These risks need to be controlled by storing and displaying the fireworks in a way that limits the risks of an accidental ignition and in taking precautions to protect people (both members of the public and employees) in the event of a fire.

Preventing Accidental Ignition:

293. Fireworks on the shop floor must be kept:
- a. in a designated area well away from sources of ignition (for example naked flames, lit cigarettes and portable gas heaters); and
 - b. in a display case or storage cupboard or cabinet.

(‘Well away’ means sufficiently far enough to remove the risk of ignition. This distance will depend on the nature of the heat source, and whether there are any barriers between the articles and the potential source of ignition).

294. Smoking must not be allowed anywhere where fireworks are stored or sold (‘No Smoking’ notices should be displayed).

295. Display cases and storage cabinets must be designed to protect against sparks or other sources of ignition and to prevent handling of unpackaged items by members of the public or by members of staff who are not specifically engaged in activities related to the sale of the fireworks.

⁶The Health & Safety Executives leaflet entitled ‘Storage of Fireworks in Retail Premises’ gives more detailed advice on the use of trolley cages for the storage of fireworks.

<http://www.hse.gov.uk/explosives/fireworks/storageoffireworks.pdf>

296. It is preferable to use appropriately labelled inert or non-explosive samples of fireworks for display. It is important to avoid mixing live articles and dummies. Where live samples are used for display purposes they must be kept in a suitable display case. When live samples are removed from a display case, they must be kept under the supervision of a member of staff until sold.

297. It is also preferable that the display case is not used for the display or storage of other articles (except any instruction leaflets/safety literature) so that the case is only opened when the fireworks are sold. In any event they must not be kept in the same display case as flammable substances, chemicals, or articles such as lifejackets with self-inflating gas cylinders.

298. It is essential to ensure that the cabinets and display cases do not present a spark or heat hazard to their contents. Lights or other electrical fittings may only be used if dummy fireworks are being displayed. If such cabinets are to be used to store or display live articles then they must be disconnected from the electrical supply and measures taken (such as warning notices) to prevent the apparatus from being inadvertently reconnected.

299. It is also essential to ensure that cabinets and display cases are dry before use to avoid the fireworks becoming damp. They must be thoroughly cleaned after use to ensure no loose composition is left behind.

300. Appropriate steps must be taken to prevent unauthorised access to display cases. Normally, this would mean using lockable cases that are locked when unattended.

Controlling the Quantity in the Sales Area:

301. It is essential to control the levels of stock held in the sales area. The guiding principle is to control the extent of the hazard to which people would be exposed in the event of a fire by avoiding storing unnecessary quantities of explosive on the shop floor. However, in considering how much stock to keep in the sales area it will also be necessary to avoid excessive transport movements through the shop, taking into account the anticipated trading levels for the day.

302. In any event, the amount kept on the shop floor must not exceed the levels set out in Table 3. It is important to stress that these figures are maximum quantities. Where significant quantities of highly flammable liquids or other highly flammable articles are likely to be present, then the amount that is to be stored will need to be reduced to take into account the additional fire loading from these substances. Again, the advice of the competent person carrying out the risk assessment should be followed as to what reduction will need to be made – this will in turn depend on factors such as whether the premises have an automated sprinkler systems etc. It is also important to remember that the licence (or registration certificate) quantity limit applies to the amount held on the premises, including the amount held on the shop floor.

303. The licensing authority may issue a licence to permit a greater amount to be kept than that specified in the table. Where the licensing authority is not the fire service they may need to consult the fire service. Regulation 13 (7) provides for the licensing authority to insert additional licence requirements in such cases. These licence conditions may cover:

- a. the amount of fireworks that can be kept in the area to which the public has

- b. the location of the sales/storage areas in relation to escape routes and the storage of flammable substances (if any);
- c. escape routes;
- d. fire safety measures such as the provision of smoke detectors or restrictions on the presence of flammable substances;
- e. other safety precautions.

304. The general principle behind the table is to take into account the size of the sales area where the fireworks are present and from which the public will need to escape. Where the premises are divided into a number of sales areas (whether rooms or otherwise enclosed areas) the size of the room or area where the pyrotechnics are sold must be used in determining the maximum amount of fireworks that may be kept in the *sales area* (as distinct from the maximum amount that may be kept on the site).

Table 1

Total floor area of the sales area (square metres)	Maximum quantity of that may be kept under registration	Maximum quantity that may be kept under a licence
	nec	
up to 20	12.5	20
up to 40	15	25
up to 60	20	35
up to 80	25	50
up to 100	30	60
up to 150	35	70
up to 200	40	80
up to 250	45	90
up to 300	50	100
up to 350	55	110
up to 400	60	120
up to 450	65	130
up to 500	70	140
500 and over	75	150

305. It must be stressed that the amount that can be kept in any given location will depend on the circumstances, and on the ability to comply with the requirements of the Regulations. For example, in considering where to locate the display/storage area it is essential to ensure that the items are located so that employees and members of the public can easily evacuate the area in the event of a fire.

306. The responsibility for controlling the amount of fireworks on the premises also extends to designing sales systems that avoid the need for customers to carry quantities of fireworks around the shop and enable/encourage customers to make (or collect) their purchases immediately before leaving the shop. This aim might, for example, be achieved by operating a system where customers can order their purchases and pick them up on their way out or by selling fireworks from a separate sale point located near to, but not impeding, the exit.

Slowing the Spread of Fire in the Sales Area:

307. As well as controlling the overall total of fireworks kept on the shop floor it is also essential to reduce the hazard by taking steps to slow the spread of fire both within the stock and from the fireworks to other flammable substances.

308. In order to slow the spread of fire, the fireworks must be divided between storage cabinets, or display cases, each holding no more than 12.5 kg net mass (50 kg gross).

309. The storage cupboards or cabinets may be of wood or metal or another substantial material that does not readily catch fire.

Protecting People in the Event of a Fire:

310. The key measures to be taken to protect people in the event of a fire are:
- a. ensuring that they are able to escape quickly from the area and from the shop;
 - b. controlling the quantity of fireworks present on the shop floor;
 - c. 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;
 - d. taking steps to ensuring that, if the fireworks catch fire, the fire does not easily spread to other flammable substances on the shop floor.

The more detailed requirements under each of these headings are set out in the following paragraphs.

Helping People Escape:

311. The provision of fire escapes and other precautions is covered by fire safety legislation. Anyone storing fireworks must 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.

312. In the event of a fire it is important to tell the fire service (and other emergency service personnel attending) that fireworks are present and where they are being stored.

Storage Adjoining or in the Same Building as Domestic/Sleeping Accommodation:

313. If more than 75 kg net of Hazard Type 4 fireworks are kept in a store within, or adjoining, a building containing domestic/sleeping accommodation, suitable steps must be taken to protect residents of those premises in the event of a fire. The following specific precautions must be taken:

- a. a fire detection system must be installed in the shop;
- b. the domestic parts of the building must have access/exit routes that are fire separated to those used for the pyrotechnic store;
- c. there must be suitable fire separation between the pyrotechnic store and the domestic accommodation (for example, doors and floors/ceilings offering 30 minutes fire resistance);
- d. the store must be closed off and secured from the domestic part of the property in order to both prevent unauthorised access (including by children connected with the domestic accommodation) and also to help prevent the accidental introduction of sources of ignition.

Where these precautions cannot be taken the licensing authority may decide that the

premises are not a suitable place for the storage of explosives and refuse a licence.

Note: Hazard Type 4 fireworks include items such as consumer fireworks, flares, smoke signals, cable cutters, explosive rivets, toy caps, party poppers and cracker snaps in bulk for Christmas crackers. While strictly not fireworks, some other Hazard Type 4 explosives, such as small arms ammunition and nail gun cartridges, may be treated in a similar way when kept in shops and other premises.

314. The explosive content in items such as party poppers, toy caps 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.

315. 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 must be treated with the same care as other explosive articles.

October 2007

Appendix 1

External Separation Distances

Hazard Type 4 Fireworks (Table 8 of Annex 3 of the ACoP)			
Quantity of Explosives (Kg)	Footpath, ^y Lightly Used Road, ^y Waterway (m)	Minor Road, ^y Railway Line ^w (m)	Major Road, ^y Place of Public Resort, Buildings ^x (m)
0.1-250	0	0	0
250-300	1	1	1
300-340	1	1	2
340-370	1	2	3
370-400	1	2	4
400-450	2	3	5
450-500	2	3	6
500-550	2	4	7
550-650	3	4	8
650-700	3	5	10
700-750	4	6	11
750-800	4	6	12
800-900	4	7	13
900-950	5	7	14
950-1000	5	8	15
1000-1100	5	8	16
1100-1150	6	9	17
1150-1200	6	9	18
1200-1300	6	10	19
1300-1350	7	10	20
1350-1400	7	11	21
1400-1450	7	11	22
1500-1550	8	12	23
1550-1600	8	12	24
1600-1650	8	13	25
1650-1700	9	13	26
1700-1800	9	14	27
1800-1850	9	14	28
1850-1900	10	15	29
1900-2000	10	15	30

^w Use these distances also for any aerodromes, dock, pier, jetty, river wall, sea wall, reservoir.

^x Use these distances also for any retail shop; government and public buildings, church, college, chapel, school, hospital, theatre, cinema or other building where the public are accustomed to assemble; motorway, caravan site for which planning permission for this area had been granted and on which is located an occupied caravan for a total period in excess of 28 days in any one calendar year; factory; building or works used for the storage in bulk of petroleum spirit, gas, or other inflammable substances; buildings or works used for the storage and manufacture of explosives or of articles which contain explosives.

^y "Footpath" includes a bridleway or other thoroughfare which is not a road, but does not include a footpath used by no more than 20 persons every 24 hours. "Lightly-used road" means a road used by more than 20 or fewer than 500 vehicles every 24 hours. "Minor road" means a road used by more than 500 vehicles every 24 hours, other than a major road, "Major road" means a road used by more than 10,000 vehicles every 24 hours "Waterway" does not include a waterway navigated by no more than 20 persons every 24 hours.