

Guidance Document

for

Organised Pyrotechnic Displays

January 2006

(Note: This Document replaces Guidance Document on Organised Firework Displays, July 2003. The latest revision of the current Guidance will be published on DJE Website)

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Notes on Status of Guidance Document

- This Document replaces Guidance Document on Organised Firework Displays, 2003. This Guidance may be amended or updated from time to time. To see the latest current Guidance, please see Department of Justice Website (www.justice.ie).
- This document is not a legal interpretation of the governing statutes and regulations relating to fireworks or firework displays. It should not be taken or quoted as an authority for action.
- Compliance with this guidance document alone may not be adequate to meet all the responsibilities placed by the provisions of the various relevant Acts and Regulations (inter alia) listed below.
- Neither the Minister, Department, or any Officer thereof, shall be liable in damages or in any manner whatsoever in respect of anything recommended, done or omitted to be done arising out of this document. The contents of this document are for guidance only and interested parties are not entitled to rely on its contents.
- The issuing of this document is not an assumption of responsibility for firework displays and it is recommended that advice be taken from relevant experts in relation to the display and that the safety and security procedures be followed in each case.

Chapter 1

Introduction

1. General

- 1.1. The use of pyrotechnics and other explosives in entertainment has become increasingly common in recent years. The best known and most common types of pyrotechnics are fireworks, which have been used since about 800 A.D. throughout the world, in celebration of significant cultural and religious events. Pyrotechnics may also be used for special effects at pop concerts, theatrical performances, film making and sporting events, and even model rocket launches. Black powder, which is one of the main explosive constituents of fireworks, is sometimes used in historical re-enactments as prepared charges for muzzle loaded muskets or cannon. Other types of explosive powder such as gunpowder and smokeless propellant powder is also used.
- 1.2. All pyrotechnics are a form of explosives. The hazards of pyrotechnics include explosion, fire and projection hazards. In addition, hazards such as falling debris, hot ash, sparks, burns, noise and smoke pollution are associated with certain types of pyrotechnics. Major disasters¹ have occurred resulting from fires associated with pyrotechnics, either in storage or indoor use.
- 1.3. Pyrotechnic displays can take many and varied forms:
- Displays can be held indoors, outdoors or in semi-enclosed spaces such as sports arenas or stadiums.
 - Firework displays can vary in scale, from small wedding reception displays, typically at hotel grounds (involving one or two operators), to major city centre displays, such as St Patrick's Skyfest displays, which may involve days of preparation involving dozens of professional operators.
 - Theatrical pyrotechnic displays can be special pyrotechnic effects used on stage in proximity to performers and spectators in the course of pop concerts or in drama theatres.
 - Model rocket displays which use solid propellant rocket motors can reach hundreds of metres in height.

¹ On 13 may 2000, a fireworks storage depot blew up in Enschedde, Holland killing 22 people. On 20 February 2003, 96 people died in a nightclub in Rhode Island USA, when pyrotechnics used on stage caused a fire. On 31 December 2004, 188 people died in a disco when fireworks were set off which ignited the ceiling.

- Pyrotechnic displays can also form only a part of a bigger event such as a sports event or festival.
- 1.4. The aim of this Guidance Document is to help all involved in the organisation of pyrotechnic displays to plan and manage the events safely and to provide safety guidance to organisers, safety officers and operators of organised pyrotechnic displays. It should be of assistance to local authorities, emergency services, Gardai and other officials involved in regulating various aspects of pyrotechnic displays, or events at which pyrotechnics are used.
- 1.5. This Guidance gives guidance on conventional firework displays, theatrical/indoor displays and model rocket displays.
- 1.6. This Guidance should be read with the following Codes, already published:
- Code of Practice for Safety at Sports Grounds – Department of Education, Dublin 1996.
 - Code of Practice for Safety at Outdoor Pop Concerts – Department of Education, Dublin 1996.
 - Code of Practice for Safety at Indoor Concerts – Department of Environment and Local Government, Dublin 1998
 - Code of Practice for the Management of Fire Safety in Places of Assembly, - Stationary Office, Dublin 1991
- 1.7. The safety of the public in places of assembly is the responsibility of those who organise the event and those who administer and own the ground or venue in which it is held. This responsibility arises from the common law duty of care owed by the person in control to those whom he/she has invited to participate in the event. Responsibilities for safety also arise under Occupational Health and Safety legislation, and Fire Safety Legislation, (inter alia). The division of responsibility between all the parties involved in the event, such as the organiser/promoter, venue owner and venue operator, administrator and principal pyrotechnic operator (PPO) should be clearly defined, agreed and recorded before the event; this must include public liability and other relevant insurances.
- 1.8. **In this Guidance Document, the person in control and responsible for safety at the event will be referred to as the Organiser. The organiser may appoint a competent person or persons to deputise or undertake specific functions on his behalf.**

1.9. A number of statutory provisions may apply in relation to events and venues.

The guidance in this Guidance Document may be altered by statutory bodies in relation to particular aspects in which they may have a statutory role.

1.10. The guidance in the Guidance should be regarded as setting out minimum requirements for the safe organisation and management of pyrotechnic displays. It is applicable to many types of events, but may not apply to all such events. Organisers should consider whether additional measures will be needed having regard to the nature of certain events.

Chapter 2

Pre-Event Planning and Event Management

2. Planning

- 2.1. **Planning Factors** Good planning is required to ensure safety at pyrotechnic events. Planning should begin as early as possible. Factors to be considered include:
- Suitability of proposed venue, including:
 - Size in relation to crowd capacity and safety distances
 - Crowd control facilities
 - Fire safety issues including means of escape
 - Public address
 - Access/egress for emergency services
 - Security of pyrotechnics
 - Notification, liaison and consultation with regulatory bodies and interested parties
 - Legislative requirements
 - Advance planning matters such as licence applications, (Event Licence, Importation Licence, Storage Licence etc).
 - Appointment of competent principal pyrotechnic operator (PPO). This does not preclude the PPO from being the Organiser and vice versa as appropriate
 - Public Liability Insurance Organisers and operators should ensure that adequate levels of public liability insurance are in place to cover any liabilities arising as a consequence of the display.
 - Appointment of competent event management officers, appropriate to the scale of the event (See Small Events below), which may include:
 - Deputy Organiser (Where required to carry out the duties of the organiser in his absence)
 - Event Controller (Should be appointed for indoor events or outdoor events which require an event licence)
 - Event Safety Officer (Should be appointed for indoor events or outdoor events which require an event licence)
 - Chief steward (Should be appointed for indoor events or outdoor events which require an event licence)

- Event Medical Officer (On call for indoor events or outdoor events which require an event licence. For all other displays a trained first-aider should be present)
- **Small Events** For certain small events not requiring Event Licenses, and depending on the type of event and its scale and hazard, the Organiser may appoint the Principal Pyrotechnic Operator (PPO) to fill any or all of the rolls of Deputy Organiser, Event Controller and/or Event Safety Officer, provided that he is satisfied that the PPO is competent to carry out these roles and responsibilities. (This situation could apply, for example, to a small wedding reception fireworks display, where the pyrotechnic element is the predominant event, and the PPO would be the only professional involved). In some cases where the display comprises the main event, the PPO may opt to organise the entire display and take on the entire responsibilities of the Organiser.
- **Events involving pyrotechnic operators from other States** For certain events involving pyrotechnic operators based abroad (e.g. a world tour act which use their own operators), it is recommended that the Organiser appoints an Irish based competent PPO, who is familiar with the Irish legislation and regulatory requirements, to oversee the pyrotechnic safety aspects of the display and also to participate in the consultation and fulfilment of legal requirements concerning importation of pyrotechnics for the display.
- **Agreements between participating parties.** Discussion and recorded agreements should be made between the organiser and all participating parties , prior to the event, regarding areas of responsibility and liability in the event of an accident. This is especially important when participating parties are from outside the state or for complex events.

2.2. Management

2.2.1. **Safety Management System** Whereas risk management is concerned at the operational aspects of assessing and controlling risks in a given situation (e.g. at the display itself), safety management is concerned with the management aspects of the organisation itself. Any organisation involved in pyrotechnic displays (e.g. venue management company, firework display company) should have a safety management system. This system should include:

- A defined safety policy
- Safe operating procedures, e.g. a fireworks company should have written procedures for:

- Purchase of fireworks (specifications, classification, MSDS etc)
- Maintenance of equipment (Mortar tubes etc)
- Transport, storage and security of fireworks
- Use and handling procedures including set-up, firing, misfire drill, disposals etc.
- Reporting of accidents
- Responsibilities and competencies of all key persons
- Reporting, recording and auditing procedures
- Provision and communication of safety information to staff
- Emergency plans and procedures

2.2.2. Risk Management Risk management is widely used for managing the hazards and risks and for reducing risks to acceptable levels. Risk management is the term normally applied to the whole process of risk identification, estimation, evaluation, reduction and control. It can be considered to have at least six interlinked phases, each incorporating a potential number of actions according to the event to be managed. The first four steps are collectively termed “Risk Assessment” and the last two are termed “Risk Management”. These are:

- Hazard identification
- Hazard analysis
- Risk estimation
- Risk evaluation
- Implementation
- Monitoring and auditing

(For more details on Risk Management see Chapter 9.).

2.3. Duties of Display Officers

2.3.1. Organiser

- Put in place an adequate and competent safety management structure and system to safely manage the display, taking into consideration the scale and hazard of the event.(See definition of competent person in glossary of terms)
- Appoint a competent Principal Pyrotechnic Operator to safely manage the technical aspects of the display. (Note that current Department of Justice policy is to issue import licences for display fireworks, only in the case of organised displays, conducted by professional/competent operators..

Operators must be competent persons and have extensive experience in the conduct and safety techniques involved in public firework displays.

Documentary evidence of CVs, experience and qualifications of all operators should be held by the organiser and PPO. This may be required by regulatory authorities and may also be required as evidence, in the event of an accident.

- Comply with all legal and statutory requirements, relevant Codes of Practice and best practice guidelines regarding safety at the display.
- Ensure that adequate public liability insurance is in place to cover any liabilities arising out of the event.
- Ensure that all notifications and consultations listed in this Guidance are carried out.
- Ensure that appropriate written safety procedures are in place to safeguard the safety of all persons at the event, including procedures for an accident or emergency at the event
- Ensure all staff are competent, sufficiently well trained and familiar with their duties and responsibilities regarding safety for the display

2.3.2. Principal Pyrotechnic Operator

- Ensure that all pyrotechnics used are:
 - suitable for the venue,
 - Classified and authorised
 - Imported, stored and transported in accordance with explosives regulations
 - Used in accordance with manufacturer's instructions, best practice and this Guidance Document.
- Ensure that all operators are competent, sufficiently well trained and familiar with their duties and responsibilities regarding use and handling of pyrotechnics and safety for the display.
- Ensure that an appropriate Safety Management System with written safety procedures are in place to safeguard the safety of all persons at the display, including procedures for an accident or emergency at the display.
- Ensure that adequate public liability insurance is in place to cover any liabilities arising out of the display.
- Carry out a site survey and risk assessment
- Put in place control measures to ensure all risks are as low as is reasonably practicable

- Prepare a scaled site plan/map showing as a minimum
 - Firing location
 - Location of pyrotechnic devices
 - Danger area of pyrotechnics
 - Safe area for spectators
 - Access/Exit routes for spectators and emergency services
- Notify and consult with local authority, Fire Services, Gardai and other interested parties as appropriate (as listed in Chapter 3.5), providing them with copies of the risk assessment, site plan and control measures proposed. The PPO should carry out any instructions from the notified bodies provided safety is not compromised.
- Advise and consult with the organizer and safety management officers (where appointed) on all aspects of safety for the display on an ongoing basis.
- Ensure that appropriate written emergency procedures are in place to safeguard the safety of all persons in the event of an accident or emergency at the display
- Ensure the display is conducted with all due regard to public safety
- Ensure adequate fire fighting and first aid facilities are in place for the display.
- Monitor and control all safety arrangements for the display to ensure that control measures are effective and adequate and that the display is halted if safety is compromised

2.3.3. **Duties of other Event Management Officers** Note that the duties of these officers are detailed in the appropriate Codes of Practice, (as listed in Paragraph 1.6 above)

Chapter 3

Preparation for Display

3. Actions before the Display

3.1. Sequence of events

Step	Detail	Person responsible
1	Apply for Event Licence (If Applicable)	Organiser
2	Appoint competent PPO	Organiser
3	Appoint Event Management Team (as appropriate)	Organiser
4	Carry out Site Survey	Organiser or Deputy (usually PPO)
5	Carry out Risk Assessment	Organiser or Deputy (Usually PPO)
6	Prepare site plan (Showing locations, danger areas, spectator areas access etc)	Organiser or Deputy (usually PPO)
7	Consult authorities and interested parties with site plan and risk assessment. Local Fire Officer, Garda, & other interested parties likely to be affected by display	Organiser or Deputy (usually PPO)
8	Agree & implement control measures	Organiser or Deputy (usually PPO)
9	Apply for importation licence for pyrotechnics (To Dept Justice)	Organiser or Deputy (usually PPO)
10	Demonstration of effects to authorities and interested parties (Particularly applies to indoor or unusual display sites)	Organiser or Deputy (usually PPO)
11	Agree and finalise Display Plan , (may require modification after demonstration)	Organiser

3.2. Site survey

3.2.1. Site surveys are necessary to evaluate the suitability of venues for the planned event and as part of the risk assessment for the event.

3.2.2. Separate or joint surveys may be required by the event management officers, or outside regulators.

- 3.2.3. If the display is part of a bigger event, there may be additional risks associated with the event to consider, such as crowd surges, or street performances, which may have an effect on the display, and vice versa. In these circumstances a joint survey conducted by all Display Officers, Event Management persons and other authorities may be appropriate.
- 3.2.4. An accurate scaled map or plan of the proposed site should be prepared, which shows firing area, spectator area, fallout area, and safety area in accordance with the appropriate distances for the pyrotechnics proposed. This map should be used, (together with the risk assessment described below), for liaison with all agencies and authorities listed for liaison hereunder.
- 3.2.5. A physical survey of the site should be conducted to confirm that all danger areas are free from features which could affect the safety of the display or which could be put at risk from the display.
- 3.2.6. Particular attention should be paid, for outdoor event, to :
- Occupied buildings, schools, hospitals, institutions, churches, factories, recreation areas or places of assembly or employment, and any other interested or vulnerable parties which might be adversely affected by the display.
 - Traffic routes, rail lines, boating zones, air traffic routes.
 - Storage areas for flammable or dangerous goods, flammable buildings, flammable vegetation, electrical substations.
 - Overhead power or communications lines, pylons or trees.
 - Likely sound levels and noise pollution. (In particular from particular types of fireworks involving “report”² effects).
 - Prevailing wind direction and speed and weather forecast for the display.
 - Crowd control and enforcement of safety distances
 - Access for emergency services

For indoor events, in addition to above issues, particular attention should be paid to:

- Safety of performers and stage hands

² “Report” or “Maroon” fireworks are those which are louder than normal and are often used to signal the start or end of a display. They usually contain powerful compositions such as “flash powder”

- Means of escape
- Fire prevention and fire safety
- Stage material (fire protection of curtains ceilings furniture etc)
- Structural and electrical safety
- Noise levels
- Smoke pollution and ventilation
- Public address and emergency communications

3.2.7. Public safety or property should not be put at risk from the display and if the site is found to be unsuitable for the planned display as a result of the survey, then either a satisfactory alternative site should be identified, the planned display modified or the display should be cancelled altogether.

3.2.8. Restricted or unusual display sites or firing areas may require additional precautions, other than those outlined in this document. Any such proposals should be supported by a comprehensive risk assessment and include reference to certified manufacturers recommended safety distances and appropriate internationally recognised standards or codes of practice.

3.3. Note that in all cases, the distances given in this guideline are for guidance only. Where fireworks manufacturers or appropriate standard references recommend greater distances, the greater distance should be used. The Principal Pyrotechnic Operator is responsible for assessing the pyrotechnic and explosive risks and using the appropriate safe distances for the fireworks or other explosives used and circumstances prevailing.

3.4. Risk Assessment

- 3.4.1. The risk assessment is a key element to the safety management of the event. Its purpose is to identify all hazards, estimate risks and identify control measures to reduce the risks to tolerable or acceptable levels. Additional guidance on risk assessments is given in Chapter 9
- 3.4.2. The type of risk assessment carried out depends on the type and size of the event and whether the pyrotechnic display element is a part of a larger event. For large events, or unusual or high-risk sites it is strongly recommended that risk assessment is carried out with the assistance of professional safety consultants
- 3.4.3. Circumstances of displays and sites vary, **it is emphasised that risk assessments should be site specific**, in order to take into account particular circumstances and hazards of each site, based on the site survey. The completed risk assessment, together with the scaled site-plan showing all proposed firing areas, danger areas, spectator viewing areas and any vulnerable facilities provide pertinent safety information to all interested parties.

3.5. Consultation

- 3.5.1. The Organiser or his appointed deputy should use the prepared site map/plan and completed risk assessment as the basis for liaison with all principal emergency services and interested parties.
- 3.5.2. The Organiser, or his deputy, should liaise with the local Garda authorities regarding their role (as outlined in Chapter 4.2.5) If An Garda Síochána are not satisfied with the site or event from a policing perspective, then, unless their concerns can be met, the fireworks display should not be held.
- 3.5.3. The Organiser, or his deputy, should liaise with the local authority Fire Officer, regarding fire safety for the display. If the fire authorities are not satisfied with the site or event from a fire safety perspective, then, unless their concerns can be met, the fireworks display should not be held.
- 3.5.4. The Organiser, or his deputy, should liaise with the local authority and other appropriate emergency services (such as Health Boards), regarding emergency procedures, first aid and medical precautions, access for emergency services, adequacy of Organiser's public liability insurance, noise and litter control and other areas of concern for local authorities and emergency services.

- 3.5.5.** The Organiser, or his deputy, should liaise with other interested parties, where appropriate, to ensure that the display will not disrupt or have an adverse effect on local residents, livestock owners, property owners and institutions. He should also liaise with Government Departments and agencies where the display could impact on their property or areas of concern. (e.g. with Department of the Marine if a display is near the coast to ensure that false distress alarms are not caused, and with the Irish Aviation Authority and relevant air traffic and airport authorities to ensure that disruption or hazard is not caused to air traffic, note S.I. No. 25 of 2000 - (Irish Aviation Authority Rockets and Small Aircraft Order 2000), for fireworks/model rocket displays above 400 ft above ground level, controlled airspace and aerodrome traffic zone))
- 3.5.6.** The Organiser, or his deputy should carefully retain a record of the consultation conducted for each display to include names, dates, contact details of persons consulted as evidence of having conducted adequate consultation.
- 3.5.7.** Any objections to the display should be identified and resolved by the organizer directly with all interested parties at this stage of the consultation. Every effort should be made by all interested parties and authorities to resolve all issues relating to objections by direct consultation in plenty of time before the event is due to take place.
- 3.5.8.** If there are still unresolved issues despite this consultation, any authority or agency may use its powers (relating to its area of responsibility or expertise), to prohibit or apply conditions to any display or event if its concerns have not been met, regardless of whether an import license has been granted for the pyrotechnics, or not.

3.6. Written Safety Procedures

- 3.6.1.** In the Codes of Practice listed, (in Paragraph 1.6 above), written safety procedures and plans are required for different types of event. These are called variously:
- Event Safety Strategy (Indoor Concert)
 - Statement of safety Procedures (Outdoor Concerts)
 - Safety Policy (Sports Grounds)
- 3.6.2.** In general, the following elements are required, where appropriate:
- Management structure for the event (including appointments, names and contact details)
 - Duties and responsibilities of all key persons

- Provisions for crowd control, barriers, traffic, policing and stewarding
- Provisions for fire precautions, fire fighting and emergency evacuation.
- Provisions for public address/communications
- Procedures for handling, transport, storage, set-up and firing the pyrotechnics in the display.
- Provisions for emergencies and emergency services
- Monitoring provisions for control measures identified in the risk assessment

3.7. The detail provided in the written Safety Procedures should be appropriate to the scale and hazard of the display. It is obvious that the plans and risk assessment for a large scale city-centre fireworks display would require to be much more comprehensive than the plan for a small wedding display in a rural setting, nevertheless, the principle is the same.

3.8. All safety plans, risk assessments, site plans and other relevant records should be carefully preserved by the Organiser, PPO and other appointed officers for regulatory inspection and/or legal purposes in the event of an accident.

3.9. In addition, employers are required by law to have a written Safety Statement to deal with occupational health and safety matters. (Section 20 of Safety Health & Welfare at Work Act, 2005).

3.10. The Organiser, or his deputy, should ensure that all staff and participants/performers/operators are fully trained and briefed on all procedures and safety matters contained in this Guidance and are competent (see Glossary) to carry out any duties and responsibilities arising from this Guidance. Documentary evidence of such training and competence should be retained for inspection by regulatory authorities if requested.

Chapter 4

Relevant Legislation

and Roles of

Government Departments, Local Authorities and Agencies

4. Statutory roles

4.1. Main Primary Legislation Involved

- Explosives legislation: Explosives Act 1875
- Fire Legislation: Fire Services Acts, 1981 and 2003
- Health and Safety Legislation: Safety Health & Welfare at Work Act, 2005
- Planning Legislation:
 - Planning and Development Act, 2000
 - Licensing of Indoor events Act, 2003

4.2. Role of agencies

4.2.1. Department of Justice and Equality

- The Explosives Act 1875 and associated regulations, under which Inspectors appointed under the Act may search premises (including factories, magazines, stores and registered premises), vessels and vehicles, seize and detain explosives where offences under the Act are suspected.
- Involvement of Department of Justice and Equality relating to fireworks include the following:
 - Importation licences.
 - Transport by road arrangements (under Carriage of Dangerous Goods by Road Regulations)
 - Storage licences and arrangements

4.2.2. The Health and Safety Authority

The Health and Safety Authority is responsible for advising upon and the enforcement of occupational safety and health legislation for all work practices.

- The Safety Health & Welfare at Work Act, 2005, places duties on all employers to protect their employees (Section 8).

- Temporary or Fixed Term workers are deemed by the 2005 Act to be an employee of the person in control of the place of work so that all the duties of employers to their employees also apply to these workers
- It also requires that every employer and every self employed person conducts his undertaking in such a way that persons not in his employment who are at or near the place of work are not exposed to risks to their safety, health or welfare (Section 12).
- A safety statement must be prepared by every employer and every self employed person (Section 20).
- This legislation provides for (inter alia):
 - Powers of inspection by authorised HSA Inspectors of all work activities (Section 64 of 2005 Act).
 - Powers of enforcement including prohibition of specific activities, which, in the opinion of the Inspector, constitute a serious risk of imminent danger. (Section 67 of 2005 Act).
- Enforcement powers in addition to prohibition (Sections , 65, 66, 68 and 71 of 2005 Act).
- Inspectors of the Health and Safety Authority may investigate the circumstances of workplace accidents and the Authority may initiate legal proceedings on foot of findings where deemed appropriate.
- Attention is also drawn to the Safety, Health and Welfare at Work (General Application) Regulations which place duties on all employers and self-employed persons in relation to emergency duties, risk assessment, provision of information, training, personal protective equipment, manual handling of loads, etc.

4.2.3. Fire Services Regulations

- The Fire Services Acts, 1981 and 2003, and associated regulations provides for (inter alia):
 - Powers of inspection by authorised persons (Section 22).
 - Prohibition of use of land by order of High Court (Section 23).
 - Licensing (Section 24).
 - Fire and emergency Operational Plans (Section 26).
 - Ancillary powers (Section 28).
 - Fire Safety Precautions related to escape routes from places of assembly ((S.I. No 249 of 1985).

- In accordance with Section 18(4) of the Fire Services Act 1981, the fire services may give advice on fire safety.

4.2.4. Department of the Environment and Local Government - Planning and Development regulations

- Part XVI of the Planning and Development Act, 2000 and related Regulations (S.I. 600 of 2001) require the organisers of certain types of large scale outdoor events, including fireworks displays, to obtain a licence from the local authority.
- The Regulation listed provides that a licence will be required to hold such an outdoor event where the audience comprises 5,000 or more people. The regulations also set out the procedures relating to applications for outdoor events. Applications must be made at least 16 weeks prior to holding the event and must be accompanied by a draft plan for the management of the event.
- The Licensing of Indoor Events Act, 2003 also provides for the licensing of certain indoor events as defined in the associated regulations. . Organisers will need to familiarise themselves with any regulations made under this Act.

4.2.5. Garda Siochana

- The Gardai may make recommendations on:
 - Crowd control.
 - Public Order.
 - Emergency access.
 - Local traffic management and parking.
 - Any other appropriate matters falling within the role of the Gardai.
 - The Gardai may wish to accompany the operator in a physical survey of the site.

4.3. Licensing the event

4.3.1. Outdoor Events Depending on the type of venue and event, the Codes of practice for Safety at Sports Grounds and/or Safety at Outdoor Pop Concerts may apply. For events which qualify under the Planning and Development Act 2000 and associated regulations (i.e. a large scale outdoor event where the audience comprises 5,000 or more people), a local authority Event Licence must be applied for.

- 4.3.2. **Indoor Events** Depending on the type of venue and event, the Guidance of Practice for Safety at Indoor Concerts may apply. For events which qualify under the Licensing of Indoor Events Act 2003 and associated regulations, a local authority Event Licence must be applied for. Organisers will need to familiarise themselves with any regulations made under this Act.
- 4.3.3. **Importation of Fireworks or other Explosives** If fireworks or other explosives are required to be imported for a display, an importation licence from Department of Justice must be applied for. (see also additional information Chapter 10.1 below)
- 4.3.4. **Storage of Fireworks or other Explosives** Other than temporary storage during the set-up phase of the display, all storage must be licensed in accordance with the explosives legislation. (see additional information Chapter 10.3 below)

Chapter 5

Guidance for

Conduct of Firework Displays

5. Conduct of Display

5.1. Site Preparation and facilities

- 5.1.1. Fire precautions and equipment (e.g. Fire extinguishers, fire blankets, etc.) should, as a minimum, satisfy any control measures relating to fire identified in the risk assessment.
- 5.1.2. First aid precautions and equipment should satisfy any control measures relating to first aid identified in the risk assessment.(e.g. a first aid kit with eye wash and burn treatment should be provided and a trained “First-Aider” should be present
- 5.1.3. Access, barriers, emergency exits, traffic control, crowd control, parking and stewarding levels should be in accordance with the recommendations of the appropriate Garda authority and local authority and Health and Safety Authority.
- 5.1.4. Personal Protective Equipment (PPE). e.g. Suitable fireproof overalls, hard hats, protective footwear, eye/face protection, hearing protection and gloves should be provided for (and worn by) all operators and employees who may be in the vicinity of the firing area, in accordance with best practice. It is recommended that a higher level of PPE (e.g. fire-fighter protective equipment and appropriate ear, face, hands and other body protection) be worn by actual firers). Identifying clothing (e.g. reflective vests-with distinctive logo,) should be provided for stewards and key officials.
- 5.1.5. Effective communications system and arrangements between operator, stewards and assistants and between operator and emergency services, should be provided by the operator.
- 5.1.6. Effective public address arrangements for emergency announcements should be provided by the operator.

5.2. Display Set-up Area

- 5.2.1. A secured set-up area should be used by the operator in the vicinity of the firing area in order to carry out preparation of the display. Access to this area should be strictly controlled and access confined to the operator, employees directly under his control, or authorised persons carrying out inspections.
- 5.2.2. The set-up area should be clearly marked off (e.g. using warning placards, high-vis tape, stewards or barriers to prevent ingress from the public. It should have a minimum exclusion zone of 30m radius, or half the safety distance of the most hazardous firework used, whichever is greater.
- 5.2.3. The quantity of fireworks removed from their packaging, at any one time, should be kept to a minimum. All fireworks should be carefully unpacked, sorted and inspected by the operator, prior to use to ensure correct nature, type and calibre, (in accordance with the list of authorised fireworks on the importation licence,) and that the fireworks have not been damaged en transit. Damaged, defective or moisture damaged fireworks (defectives) should not be fired, but should be set aside in marked closed boxes for subsequent disposal by the operator.
- 5.2.4. No fireworks, other than those listed in the importation licence may be fired.
- 5.2.5. Preparation and fusing of fireworks is potentially hazardous. Preparation and fusing should only be done at a safe distance from the location where the bulk of fireworks are stored and using the minimum of persons, consistent with safe best practice.
- 5.2.6. Consideration should be given to using wooden trestle tables and tents for complex preparations.
- 5.2.7. Non-ferrous or other approved non-sparking tools should be used if fuzes are cut or exposed. Appropriate PPE should be worn for any high risk preparation. Extreme care should be taken that friction./spark sensitive items are not initiated by cutting actions.
- 5.2.8. Care should be taken that fireworks are not dropped or shaken during handling and transport as some fireworks can explode as a result of impact or shaking.
- 5.2.9. Hazards from electro-magnetic radiation to electrically initiated devices should be considered and mobile phones or other radio devices should be excluded from set-up areas where electrically fired igniters are fitted or stored.

- 5.2.10. All associated accessories and firing equipment should be carefully inspected and tested where appropriate, by the operator, to ensure correct type and functioning of equipment.
- 5.2.11. Care and precautions should be taken to ensure that adverse weather does not affect either the fireworks or firing equipment between the time of arrival on site and the planned time of display.
- 5.2.12. Principal Pyrotechnic Operator should ensure that he, all operators and assistants, are competent persons for the tasks which they carry out, and that he maintains sufficient records or evidence to demonstrate competence to the relevant authorities.
- 5.2.13. Fireworks Quality. The quality of manufacture of all fireworks can vary and should not be taken for granted by display operators. Display fireworks should only be sourced from reputable manufacturers and suppliers. Operators should be fully aware of manufacturer's instructions regarding set up, recommended safety distances and disposal of all display fireworks used by them. Fireworks or other explosives from dubious or unknown sources, or sources which do not supply and certify performance and safety information, should not be used. Accidents can still occur, due to defective fireworks, equipment failures, or unsafe procedures by operators or their assistants. For this reason, it is strongly recommended that the additional safety guidelines in this document be observed and regarded as minimum safety requirements

5.3. High Level Displays - Setting up Mortars. (Note – detailed guidance is available in the references mentioned at Appendix 2 below)

- 5.3.1. Mortars are used for firing aerial shells for high-level displays. (i.e. fireworks reaching 50m or more in height). Accidents have occurred in the past due to:
- Tube toppling over, or shifting, causing erratic trajectory of shell.
 - Tube bursting due to unsuitable or defective tube construction or weak tube material, causing fragmentation injuries and possible initiation of adjacent tubes.
 - Low burst of shell due to incorrect tube diameter or length or shell not fully lowered into tube.
 - Premature ignition of shell due to faulty fusing or faulty fuse lighting.
- 5.3.2. Operators should choose suitable tubes to withstand the forces of projection and the possibility of shell malfunctions such as premature bursting in the tube. Due regard should be taken of the safety advantages and disadvantages of the

various available tube materials and specifications. When in doubt, the operator should always be conservative in his choice and err on the safe side. Reference data on selection of safe mortar specifications is available in the references mentioned at Appendix 2 below. Note that metal tubes present serious fragment hazards in the event of bursting. It is therefore recommended that metal tubes not be used, unless adequate additional precautions are taken to protect against this hazard

- 5.3.3. As a general guide, length of mortar tubes should be at least six times the shell calibre.
- 5.3.4. Operators should inspect all mortar tubes for defects, including dents, bent ends, damaged interiors, damaged plugs, cracks and bulges. Defective mortars should never be used. Tubes should only be sourced from reputable suppliers. Improvised or “home made” tubes should be avoided. Due regard should be taken of manufacturers recommendations regarding cumulative number of firings and or lifetime/replacement period permitted for each tube.
- 5.3.5. There should be no reloading of tubes at a display. Therefore one tube should be allotted to each shell.
- 5.3.6. Mortar frames and supports should be sound and of adequate strength to support the tubes and fixed to prevent any possibility of toppling or shifting trajectory during firing. Tubes should either be separated from each other by sufficient distance, or barricaded and supported in such a way as to prevent a malfunctioning premature bursting shell from damaging or realigning an adjacent tube.
- 5.3.7. Freestanding tubes should not be used
- 5.3.8. Metal brackets or components of frames and supports should be kept to a minimum and if used, should be designed and used in such a way that in the event of a tube bursting, that metal fragments will not be projected into the audience area.
- 5.3.9. Tubes should be buried or barricaded (e.g. with sand or earth), to protect against fragmentation from a shell bursting in the tube. This is particularly important if metal frames and brackets are used to support the tubes. The governing principle, which should be used, is that the firers and spectators should be protected from any possible blast, shrapnel or projectile effect. Detailed guidance is available in the references mentioned at the beginning of this document.

5.3.10. Operators should be aware of the possibility of water ingress into buried tubes from wet ground and should take necessary precautions to minimise this danger.

5.3.11. Tubes should be inspected to ensure they are free of dirt and water immediately before loading. Shells and tubes should be matched for correct dimension and smooth fit. Undue force should not be used to insert shells. Shells should be lowered smoothly to rest on the bottom of the tube using lowering cords or fuse. It is recommended that a light tape be placed across the mouth of the loaded tube to indicate that the tube is loaded. (This also has the advantage of identifying the appropriate tube in the event of a suspected misfire).

5.3.12. Once the tubes are loaded, the area above and in front of the mouths of the tubes, (where an accidental initiation would cause the shell to emerge), should be regarded as a danger area to be avoided by all persons involved in the display.

5.3.13. Once the fireworks have been set up, the firing area should be secured and should not be left unattended.

5.4. **High Level Displays – Firework Rockets**

5.4.1. Firework rockets can be erratic in flight. Only rockets which require a predetermined length and diameter of stick to stabilise the flight should be used. Launchers, which depend solely on gravity to control the rocket during launching, should not be used. Note that the stabilising stick and spent rocket motor comprise potentially hazardous fallout and should be taken into account in calculating danger areas.

5.5. **Low Level Displays** (Note – detailed guidance is available in the references mentioned at at Appx 2 below)

5.5.1. These are displays involving fireworks whose effects are designed to rise to heights of less than 50m. Low-level fireworks should be kept separated from high-level fireworks. The most common types are called Roman Candles, Mines and Barrages/Bombardo.

- **Roman Candles:** These are paper or plastic tubes, generally less than 50mm diameter, housing projectiles such as stars, shells and reports. The projectiles rise one at a time to give a shower of sparks or a report. Groups of Roman Candles fired together are known as batteries. Candles should be buried or securely supported in order to be able to withstand

malfunctions without significant damage or deviation in angle of fire.

Candles should be set up and used only as designed or specified by the manufacturers and should not be confined (e.g in metal tubes) in order to prevent metallic fragments in the event of premature explosion.

- **Mines:** These have a light casing and contain no delay element. They may contain stars, whistles, salutes or small shells. They may have an integral mortar or may be a separate shell or bag. They project multiple effect fireworks into the air and are generally 76mm(3in) or 102mm (4in) in diameter. If fired from mortars, the same general setting up precautions as for mortars in high-level displays should be applied.
- **Barrages/Bombardo Boards/Combinations/Cakes:** These are multiple sets of 25-65mm (1-2.5in) tubes fastened to a plastic or wooden base. Designed to be fired into the air in rapid sequence giving star or sound effects. They should be placed on firm, flat surfaces and securely anchored to prevent toppling over, and fired in accordance with manufacturer's instructions.

5.6. **Ground Level Displays** (Note – detailed guidance is available in the references mentioned at at Appx 2 below)

5.6.1. Ground level displays are those using fireworks designed to function at heights of 15m or less. They include such items as gerbs, fountains, waterfalls, lance work (set pieces), wheels and flares. Since hot sparks may shoot out or reach the ground, flammable materials should not be placed within the danger area. Dry grass or vegetation in the vicinity of ground level displays should be wetted down beforehand. They should be set up outside the firing area for high-level fireworks.

- **Gerbs:** These are cylindrical devices designed to produce a controlled spray of sparks. Usually 13-76mm in diameter and 125-300mm long. They are normally fastened to the ground.
- **Fountains:** These are a smaller version of gerb normally not over 25mm diameter. Precautions as for gerbs.
- **Flares:** These are paper tubes filled with coloured fire compositions, designed to burn with an intense flame and sometimes used as illumination. These should be tied to a firm stick
- **Waterfalls:** These are strings of open-ended tubes suspended fuse down and designed to produce a curtain of colourful,

falling sparks. They should be strung between two poles in accordance with manufacturer's instructions and with the fuse secured to prevent blowing in the wind.

- **Lancework:** These are patterns of small tubes filled with colour producing fireworks composition. Tubes are normally 10mm diameter by 100mm long and are normally attached to a lattice to produce the pattern required. Small lance work is normally pre assembled and only requires erection on poles. Larger pieces should be assembled in accordance with manufacturer's instructions on site.
- **Wheels:** These are rotating frames, pivoting around a fixed centre attached to a pole and driven by fireworks fastened along the perimeter. Poles should be secure and braced to remain in place throughout the display. Wheels should be able to turn freely and be securely fastened to the pole and drivers securely attached to the wheel.

5.7. Conduct of the Display

5.7.1. Final Check. A final check of the site and equipment should be conducted by the PPO (accompanied by display safety officers where appointed) to make sure no circumstances have changed since his previous survey and inspection.

5.7.2. Adverse Weather. Particular regard should be had to wind direction and speed and to the local updated weather forecast. (see Fig 2 and table 3). Wind can have a considerable effect on the trajectory of shells and rockets and on the fallout pattern of chaff, ash, debris and smoke. If the wind conditions are such that the trajectory of aerial shells or rockets could veer off course and/or fallout pattern could cause a danger to spectators or property, then the display should be curtailed, (e.g. confined to low level or ground level fireworks), or cancelled altogether. If the wind speed exceeds 45km/hr (30km/hr in built up areas), then the display should be cancelled. Heavy rain could also adversely affect firework performance and could cause misfires.

5.7.3. Trial Shots. If the display is going ahead, it is recommended that a trial shot of at least one large shell be fired shortly before the main display. Trial shots are particularly appropriate where available safety distances are marginal, or where adverse wind conditions exist. The operator should monitor fall out at all vulnerable positions. This will verify trajectory and meteorological conditions, ensure fallout and debris are landing safely and alert the crowd that the display is about to start. Trial shots should also be conducted for all theatrical pyrotechnics prior to admitting public to the venue, to verify effects and safety distances used and/or to demonstrate effects of pyrotechnics to safety officials or interested parties.

5.7.4. Safety of Public. The safety of the public should be the primary consideration at all times. The display should be stopped immediately if safety is compromised by any unforeseen situation, (e.g. insufficient crowd control, people or vehicles straying into danger zones, sudden adverse weather change etc.) Throughout the display, the Principal Operator (and/or Safety Officer where appointed) should monitor the fallout area and the spectator area and ensure that the aerial explosions are over a zone free of people and free of fire hazards and that debris is also falling in that area. If not, the firing should be

stopped immediately until the situation is rectified. Measures should be taken, either by adjusting the trajectory and burst area to a safe location, or if this is not possible, to move the spectators a safe distance away from the affected area.

This procedure should also be applied in the event of a shift in wind direction or speed during the display. The person conducting the display should take all reasonable measures to guard against the outbreak of fire in consequence of the display.

5.7.5. Misfires. Misfires should be clearly marked, (at the time of the misfire happening,) for subsequent disposal by the operator or firer and all other firing crew should be warned of the misfire.

5.8. After the Display

5.8.1. Search of Site. A search should be conducted of the site immediately after the display to ensure that no dangerous items or residue remain. This should be followed up by a daylight search as soon as possible after the display, (e.g. at first light the following morning.)

5.8.2. Declaration that site is safe. Barriers and stewards and emergency services should remain in place and the firing area and danger areas secured until such time as PPO is satisfied and has declared that the site is free of misfires or shells which have failed to explode (blinds) or have partially exploded leaving dangerous debris.

5.8.3. Disposal of blinds, defectives and misfires. Blinds, defectives and misfires are inherently dangerous and therefore should be treated with extreme caution. Movement or transport of such articles is dangerous. They should therefore be disposed of within the fallout danger area. Safe disposal of misfires, defectives or blinds is the responsibility of the operator alone and should be done in accordance with manufacturers instructions and with due regard to personal and public safety. Misfires should not be approached for at least 30 minutes to allow for the possibility of a slow burning fuse. No attempt should be made to dismantle or salvage blinds, defectives or misfires. . Under NO circumstances should an operator leave a site which has residual live components or articles in the location. If the operator is unable to dispose of a dangerous firework himself, the Gardai should be informed, and the operator should remain on site until such time as the disposal is safely completed, either by the operator himself or by an Explosive Ordnance Disposal team.

5.8.4. Unfired fireworks. Unfired fireworks should be repacked carefully in their original packaging and set aside for safe removal or disposal by the operator.

5.8.5. Reporting accidents and incidents.

- Any accident, or incident involving malfunctions, whether causing injury or not, should be reported by the operator to the Government Inspector of Explosives in the Department of Justice and Equality within 24 hrs of the occurrence.
- All accidents involving injury or damage should be reported immediately to an Garda Siochana.

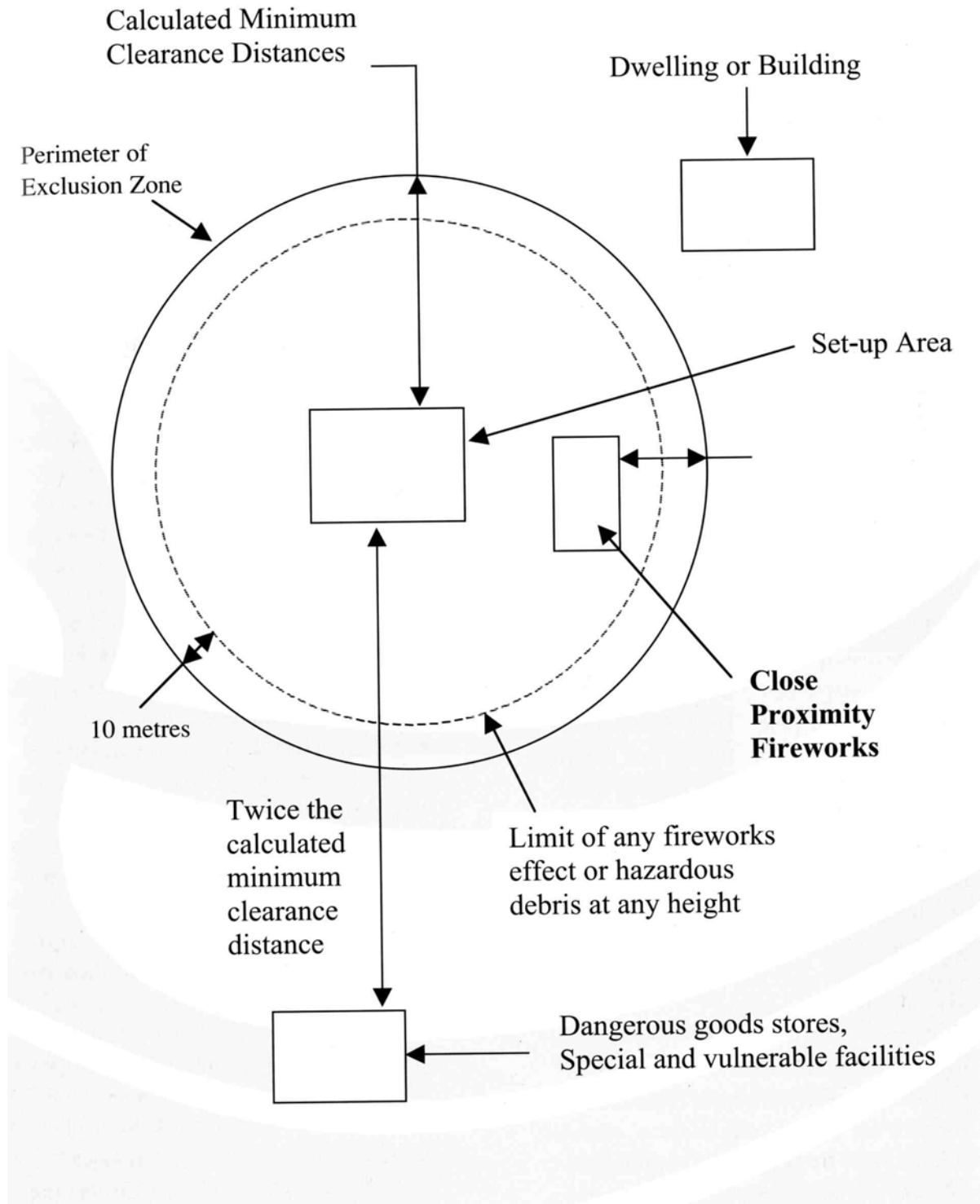
Guidance Document on Organised Pyrotechnic Displays - 2006
Revised 6 April 2011

- In addition, any accident to an employee or person at work at the display, causing them to be unable to carry out normal duties for more than 3 days, should be reported to the H.S.A. Furthermore, any accident to a member of the public, which results in the need for medical attention, should be reported to the H.S.A.
- Accident sites and accident debris should be preserved undisturbed (apart from first aid measures) until all investigations have been completed.

**Guidance on Minimum Danger Areas –
Outdoor Fireworks Displays**

(All data in this Appendix adapted from Ref 25 at Appx 2 below))

Fig 1 -Diagram of Typical Fireworks Display Site Area



5.9 Minimum Clearance Distances

The minimum clearance distance is the distance from any firework to the perimeter of the fireworks display area referred to as the exclusion zone. It is calculated to establish an exclusion zone around the firework at the display from the fireworks requiring the largest clearance distance. Each firework will have its own clearance distance. For the purposes of simplicity, the overall clearance distances are estimated from the fireworks requiring the largest clearance distances. The minimum clearance distance calculated should not be considered to be the optimum clearance distance. It is simply the minimum requirement based upon known conditions, estimations and assumptions to achieve acceptable risk. The PPO in the safety management system and the fireworks operator at the display site should aim to significantly exceed the calculated minimum clearance distance to reduce the level of risk of harm to people and property as much as reasonably practicable. They should also allow for changes of conditions and incorrect estimations and assumptions leading up to and during the firing of the display. Information to estimate the calculated minimum clearance distance should be provided by the fireworks manufacturer or supplier in the Technical Data Sheet and incorporated into the Organiser's safety management system.

5.10 Considerations To calculate the minimum clearance distance for a fireworks display, various factors must be assessed, including —

- the default minimum clearance distance (i.e. the minimum clearance distance for the fireworks in ideal conditions) and the manufacturer's recommended minimum clearance distance;
- the effects of wind;
- the effects of angled fireworks (i.e. aerial shells, candles) or angled (sloping) land at the display site;
- the effects of fall-out from hazardous debris;
- the potential impact on special and vulnerable facilities; and
- the known effects and performance of the fireworks and any influences from equipment.

The minimum clearance distances calculated apply to any person not directly involved in the fireworks display (i.e. other than fireworks operators, fireworks operators' assistant(s) and security persons). No other person is permitted to be within those distances. The numbers of authorised persons within the exclusion zone must be kept to a minimum to minimise the exposure to the risk and thereby minimise the risk of persons within the exclusion zone.

This prohibition applies to all other persons, including persons involved with the event with which the fireworks display is associated, such as —

- stage performers (e.g. musicians at concerts) and stage crew;
- sports persons and associated crew or officials;
- camera crew photographers; and
- emergency services persons.

Under certain circumstances people involved with the event may be permitted within the exclusion zone, with the permission and knowledge of the PPO, and only after risk assessment and when effective risk control measures has been implemented.

5.11 Calculation of Minimum Clearance Distances for Exclusion Zone

The person calculating the minimum clearance distance for the exclusion zone must take into account all the factors discussed in Section 5.10. The distance calculated applies to all types of fireworks in the display. In practice, the calculation of this distance is based on those fireworks having the maximum effect on the clearance distance. For example, for 75 mm and 100 mm aerial shells to be fired from an area, the calculation would be based on the 100 mm aerial shells closest to the perimeter of the exclusion zone. The calculations for 75 mm shells may be redundant unless their angle was significantly different or there was some other factor that gave much wider spread of the fireworks effect or hazardous debris.

The clearance distance for close proximity fireworks to be fired closer to the perimeter of the exclusion zone can be calculated separately.

5.12 Default Minimum Clearance Distances

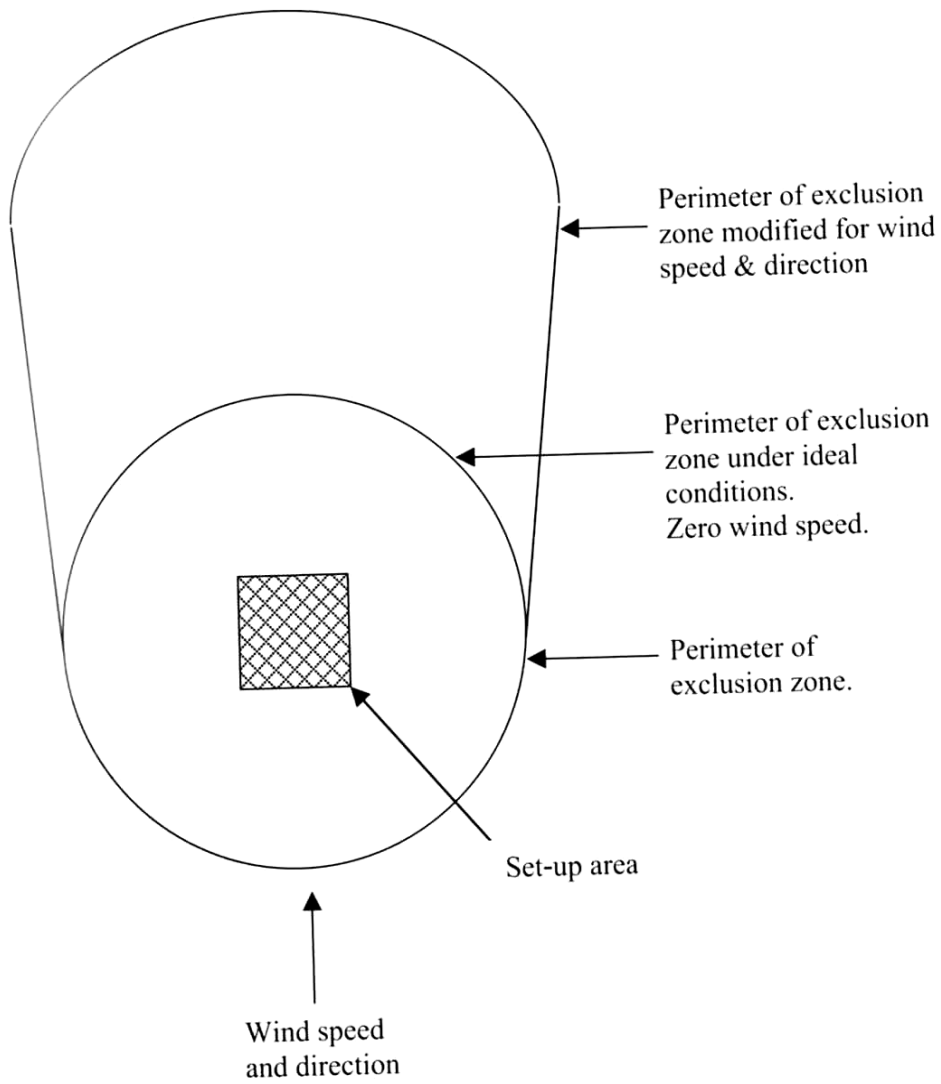
The default minimum clearance distances under ideal conditions for all fireworks are presented in Table 2. These distances are based on the consequences of a malfunctioning firework, not extending beyond the exclusion zone. These distances are based on zero wind speed and on the true vertical firing of all fireworks. Because of factors such as variations and tolerances, all fireworks effects fired and propelled will have a randomness or scatter effect and will not have a truly vertical trajectory.

If the 'manufacturer's' recommended minimum clearance distance differs from the default minimum clearance distance in Table 2 above, the greater of the two minimum clearance distances should be used.

Table 2 provides for the doubling of minimum clearance distances for fireworks that are chain-fused. This applies to all chain fused-fireworks, regardless of who does the chain-fusing (e.g. the manufacturer, supplier, PPO or operator).

5.13 Close Proximity Fireworks For close proximity fireworks used at outdoor fireworks displays, the minimum clearance distance will depend on the default minimum clearance distance of the close proximity firework; The minimum clearance distance for the outdoor fireworks will apply to those close proximity fireworks using Table 2. The calculation of minimum clearance distances for close proximity fireworks used outdoors will be subjected to the adjustment of clearance distances due to wind, angling, etc as applied to outdoor fireworks. (See also Chapter 6).

Figure 2 – Effect of Wind on Exclusion Zone



14.5.2.6 Potential Impact on Sensitive

5.14 Effect of Wind The supplier of the fireworks should provide information or recommendations on the effects of wind drift on fireworks performance. In windy conditions, the clearance distances used with aerial shells must be increased by at least the distances given below on the downwind side of the display area. If the clearance distances cannot be increased or the wind is stronger than 40 km/h (or 30km/h in urban or close proximity setting), the display must not proceed. The fireworks event organiser must be advised in advance of a possible increase in wind speed to provide for such contingencies.

The minimum clearance distance for all fireworks firing effects higher than 15 metres vertically must be taken into account for the final calculation of clearance distance. Table 3 provides an illustration of the effects of wind on the drift of aerial shell performance

The practice of angling fireworks into the wind to negate the effects of the wind is discussed in Section 5.15. Fireworks should not be angled towards the crowd on the basis of adjusting the calculated minimum clearance distance to an acceptable distance to negate the effects of the wind.

The contribution of the effect of wind on the calculated clearance distance must be calculated separately in addition to the estimations for the exclusion zone from the fall-out of hazardous debris. The fireworks operator must have accurate estimates of wind speed, wind direction and wind rotation or wind veering to ensure the effectiveness of the calculated minimum clearance distance and that the display will be conducted at a level of acceptable risk. The effect that wind may have on the exclusion zone is illustrated in Figure 2.

5.15 Effects of Angled Fireworks From a safety point of view, it is preferable to keep all fireworks vertical, but, for aesthetic reasons, many operators do set-up fireworks at an angle to produce, for example, cross-over effects. When angling occurs, the minimum clearance distance becomes ineffective because a malfunctioning firework will land closer to spectators than if it was fired vertically. Accordingly, if any types of fireworks are angled, the angle must be determined and the minimum clearance distance recalculated. Appendix 23 to Ref 25 (see Appendix 2), provides data on the necessary increase to the minimum clearance distance that must be applied for given product types and angles and at different wind speeds. The point of launch of the fireworks may be a trade-off between the angling of the fireworks and the effects of the wind where one is used to balance the effect of the other.

However, fireworks operators must be cautious in this regard as a wind shift may amplify the flight distance of any firework if the wind blows in the same direction as the firework is angled. The clearance distance cannot be reduced should the firework be angled away from crowd because the clearance distance will be calculated from the point of launch of the firework. Fireworks should not be angled towards the crowd in order to get a calculated minimum clearance distance that will overcome circumstances, constraints and features for that difficult site for the fireworks proposed to be fired. Mortars which are not aligned exactly vertically will also have significant effects on shell drift and the clearance distances necessary to ensure a safe display. For example, a 2 degree tilt (which represents a tilt of approximately 10 mm at the top of a 300 mm long mortar) can send a 75 mm shell about 13 metres down-range. It is not uncommon for a mortar rack to allow this level of movement of the mortars. It is also very difficult to secure a rack to this degree of accuracy without using a measuring instrument. A 5 degree tilt will send a 75 mm shell about 30 metres downrange,

effectively using up a significant proportion of the required 75 metre minimum clearance distance. A small tilt, therefore, may require clearance distances to be at least doubled in the direction of the tilt.

In many situations the land at the display site may not be level. Operators must determine the angle of the secured firework from the vertical. The clearance distance will also be affected by the slope of the land and may need to be adjusted. Mortars may be angled intentionally during a display to allow for the effects of wind and to carry shells away from the main spectator viewing areas or where spectator viewing areas are on all sides, to keep the shells predominantly above the point of firing.

The mortars may be angled so that any dud shells fall at a point approximately equal to the offset of the mortars from the centre of the display site, but in the opposite direction.

Many boxed items are supplied with the tubes fanned, viz fanned box items. The clearance distances must consider the angle of the angled tubes in this firework for the calculation of minimum clearance distance.

5.16 Effects of Fail-Out from Hazardous Debris on Exclusion Zone

The fall-out area for hazardous debris (any debris produced or expelled by the functioning of a firework that is capable of causing personal injury or property damage, including hot sparks, burning fireworks effects, heavy casing fragments, components of fireworks effects and unignited components) must be a large open area within the exclusion zone bounded by the calculated minimum clearance distance. Hazardous debris including debris from the small components and the casings must not land outside the exclusion zone. Spectators, parking areas, unauthorised vehicles including watercraft, premises, sensitive and vulnerable facilities and readily combustible materials must not be located within the fall-out area for hazardous debris during the display.

The minimum clearance distance for the fall-out area from hazardous debris must account for wind speed, wind direction and changes in wind direction and the type and performance of fireworks being fired. For stronger winds, the clearance distances downwind should be relatively much larger than the clearance distances across wind and upwind. The crowd and other significant exposures should not be located downwind unless there are large areas available for the exclusion zone.

Consideration must be taken for wind speed at the height of functioning of fireworks, e.g. aerial shells, as opposed to ground level wind speeds. Exposures downwind are always a major concern. The effect of wind speed and direction on the perimeter of the exclusion zone is demonstrated in Figure .2.

**Table 2 Default Minimum Clearance Distances –
 Outdoor Display Fireworks**

Display Fireworks	Default Minimum Clearance Distance (meters)
Lances and Strings of firecrackers	10
Fountains Up to 25mm max inside diameter Greater than 25mm inside diameter	20 35
All other fireworks not listed above including ground level and aerial fireworks	1 metre per millimetre of internal diameter of ground display firework and 1 metre per millimetre diameter of aerial firework. (For example, a 75 mm aerial shell will have a minimum clearance distance of 75 metres and a 50 mm Roman candle will have a minimum clearance distance of 50 m). However, this distance must not be less than 35 metres
	The minimum clearance distance must be doubled when items of ground level fireworks or aerial shells* are delay chain-fused by the manufacturer, the Organiser or the fireworks operator, e.g. a large multi-shot boxed item or a preloaded aerial barrage
	For multi-break aerial shells, the minimum clearance distance for aerial shells under 200 mm diameter must be based on treating the shell as the next largest diameter shell. For example, a 100 mm diameter multi-break shell must have the minimum clearance distance for a 125 mm diameter single break aerial shell. For multi-break aerial shells 200 mm diameter and greater, the minimum clearance distance must be based on calculating the minimum clearance for a shell using the rule 1 metre per millimetre diameter of aerial firework and adding 50 per cent or half the distance to the calculated minimum clearance distance. For example, a 200 mm diameter multi-break shell must have a minimum clearance distance of 300 metres and a 400 mm (16 inch) diameter multi-break shell must have a minimum clearance distance of 600 metres.
*Note: Fireworks including aerial shells instantaneous chain fused are not subjected to doubling of the default minimum clearance distances	

Table 3 Typical Aerial Shell Drift in Windy Conditions

AERIAL SHELL DRIFT IN WINDY CONDITIONS				
Wind Speed	Description	Shell Drift (Shell Diameter)		
		75 mm	150 mm	300mm
Light breeze 8km/h (5 mph)	<ul style="list-style-type: none"> • wind felt on face; • leaves rustle; • ordinary vane moved by wind. 	15m	16m	17m
Gentle breeze 16km/h (10 mph)	<ul style="list-style-type: none"> • leaves in constant motion; • wind extends light flags. 	30m	32m	34m
Moderate breeze 24 km/h (15 mph)	<ul style="list-style-type: none"> • raises dust and paper; • small branches move. 	45m	48m	52m
Fresh breeze 32 km/h (20 mph)	<ul style="list-style-type: none"> • small leafy trees sway; • crested waves form on inland waters. 	60m	65m	69m
Strong breeze 40 km/h (25 mph)	<ul style="list-style-type: none"> • large branches move; • wires whistle; • umbrellas difficult to use. 	75m	81m	87m

5.17 Potential Impact on Sensitive and Vulnerable Facilities

General

The minimum clearance distance from sensitive and vulnerable facilities and the point of launch of the firework must be at least double the calculated minimum clearance.

Dangerous Goods Locations Dangerous goods present a risk of explosion, flammability or toxicity. The nine classes of dangerous goods are —

- Class 1 - explosives;
- Class 2 - gases;
- Class 3 - flammable liquids;
- Class 4 - flammable solids, substances liable to spontaneous combustion, and substances that in contact with water emit flammable gases;
- Class 5 - oxidising substances and organic peroxides;
- Class 6 - toxic and infectious substances;
- Class 7 - radioactive substances;
- Class 8 - corrosive substances;
- Class 9 - miscellaneous dangerous

Dangerous goods locations include premises that are placarded for dangerous goods, including service stations. The minimum clearance distance between dangerous goods locations and the point of launch of the firework must be at least double the calculated minimum clearance distances.

The fuel tanks on vehicles or other motorised equipment located in the display site are not taken into the calculation of minimum clearance distance, provided that they have been fully protected from the effects of a malfunctioning firework as determined from a risk assessment.

High Fire Risk Substances High fire risk substances include combustible liquids and combustible solids. The minimum clearance distance between premises containing such substances and the point of launch of the firework must be at least double the calculated minimum clearance.

Other Effects Any other known effects not described above which might affect the health and safety of the public should be taken into consideration for the calculated minimum clearance distance. Examples of features from fireworks to be considered include

- fireworks producing a large volume of smoke, toxic product, asphyxiants or irritants which unacceptably affects members of the public who may or not have sensitised respiratory systems or respiratory disorders; and
- effects of noise from strings of crackers or maroons.

5.18 Sample Calculations of Minimum Clearance Principles

This Section illustrates the concepts, principles and process that must be used when determining the clearance distances for the exclusion zone for the safe conduct of a fireworks display. These calculations should be done at three different stages for the display. These stages are —

- the planning stage which includes assessing the suitability of the proposed site for the fireworks proposed in consultation with the fireworks event organiser ,
- setting up the display at the display site for the forecast conditions that are anticipated at the time of the display; and
- immediately before the commencement of the display should the existing conditions be at variance with the forecast conditions for the display and will affect the actual clearances distances required for the display.

Below are detailed worked examples showing how the calculation of minimum clearance distance for the exclusion zone may be undertaken.

Example

An event organiser wants a display on a field 200 metres round (in diameter). It is proposed to fire 75 mm aerial shells with a delay chain-fused finale of 75 mm shells at the end. The fireworks event organiser has advised that there is normally a 8 km/h breeze blowing at the time of the display from the south east. A service station is located 350 metres away from the north fenced boundary of the oval.

Planning Stage

The minimum default clearance distances

The minimum default clearance distances are determined using Section 5.12 and Table 2 of this Code.

- For 75 mm aerial shells 75 metres minimum is required
- For delay chain-fused 75 mm aerial shell finale: 150 metres minimum is required
(Note: These distances are calculated using the 1 millimetre per metre rule of Table 2 and doubling the distance for delay chain-fusing.)

Effect of wind

The effect of wind using Section 5.14 of this Guidance then needs to be calculated.

All fireworks have their effects reaching higher than 15 metres (reference supplier's Material Safety Data Sheet and Technical Data Sheet), therefore wind needs to be considered and the added risk assessed.

From Table 3, addition to minimum clearance distance for an 8 km/h breeze is 15 metres minimum. (In practice, manufacturer supplied-information would be used.)

Effect of angled fireworks

The fireworks will be fired vertically, therefore no correction for angle is planned.

Effects on fallout zones

Suppose that advice from manufacturer is that hazardous debris fallout will extend 50 metres downwind for a wind speed of 8 km/h. Therefore the firing site needs to be at least 60 metres minimum downwind from spectators (perimeter of the exclusion zone) -allowing 10 metres buffer

Location of special and vulnerable facilities

The location of the nearest special and vulnerable facility is a service station 350 metres away from the north fenced boundary.

Calculation of minimum clearance distance.

The minimum clearance distance required for the display is then calculated by using the minimum default clearance distance for a particular firework and adding corrections for wind, angled fireworks, fallout of hazardous debris, location of special and vulnerable facilities, etc.

For 75 mm aerial shells

In this instance, the minimum clearance distance is calculated by summing the following —

Description	Distance (metres)
Minimum default clearance	75
Allowance for 8 km/h wind	15
Allowance for angled mortars	0
Total	90

Suppose the manufacturer of the fireworks has recommended that hazardous debris fallout will extend to 50 metres downwind at a wind speed of 8 kilometres per hour and hence these fireworks would require at least 60 metres distance from spectators (perimeter of the exclusion zone).

Hence the greater of these two calculations is used to determine the required minimum clearance distance - in this case 90 metres minimum, and hence such a display on a field having a 100 metre radius is possible.

For delay chain fusing of 75 mm aerial shells

In this instance, the minimum clearance distance is calculated by summing the following —

Description	Distance (metres)
Minimum default clearance	150
Allowance for 8 km/h wind	15
Allowance for angled mortars	0
Total	165

Hence in this instance, because the field only has a 100 metre radius, delay chain fusing is not possible. As the service station is more than twice the minimum clearance distance, it should not be problem.

Setting Up Display Stage

When setting up the display, the forecast is for winds from a southerly direction at 15 kilometres per hour. Such a wind would suggest a 30 metre correction (using Fig 2). The calculated minimum clearance distance would now be —

Description	Distance (metres)
Minimum default clearance	75
Allowance for 15 km/h wind	30
Allowance for angled mortars	0
Total	105

This would now suggest that the field with just 100 meters radius is insufficient for the display. However, this issue may be resolved by —

- clearing spectators from the area affected by the wind (adjusting the perimeter of the exclusion zone);
- moving the display site away from the centre of the field upwind by 5 metres, thereby making all minimum clearance distances satisfactory; or
- some other risk mitigation method which reduces the risk from the higher winds.

The service station is still at an acceptable distance.

Time of Display Stage

Before firing the display, the conditions must be revalidated and reassessed to ensure that the clearance distances for the display remain appropriate for an acceptably safe display.

5.19 Floating Vessels and Floating Platforms

5.19.1 General

Specific Hazards Firing fireworks from a floating platform, such as a raft, pontoon or barge, presents a special hazard since this type of platform can be unstable from waves and currents. The floating platform can recoil from the fireworks being fired, causing it to shift and the trajectory of an aerial shell to deviate. Space is also much more confined than on conventional land sites, and the fireworks operator and fireworks operator's assistants cannot move about the platform as freely as on firm ground. Additional hazards and risks on vessels and platforms include —

- the closeness of the fireworks operator and the operator's assistant(s) to the fireworks;
- the increased potential for the fireworks operator or the operator's assistant to slip or trip; and
- the hazards associated with the water itself.

5.19.2 Requirements for a Floating Vessel or Floating Platform.

Construction A floating vessel and or floating platform must be of sufficient strength and stability to enable all activities associated with the firing of the display to be conducted safely. The types of fireworks and the placement of the fireworks, fireworks equipment (including mortars and securing equipment) must not jeopardise the stability of the site structures and seaworthiness of the floating vessel when the fireworks are fired.

Identification The floating vessel or floating platform must be identified as an explosives vessel or platform from the time that the fireworks are taken on board at initial set-up until the fireworks operator declares the vessel or platform free from fireworks.

The platform or vessel must be fitted with standard fireworks warning signs. The number of signs used should be based on permitting the ready identification of the presence of fireworks on the barge from the perimeter of the exclusion zone during day and night in —

- all conditions of weather; and
- all directions of approach.

The platform or vessel may also be required to fly flags and display a red light at night in accordance with the Dept of Marine requirements or Meanings of International Maritime Signal Flags.

Staffing A floating vessel or floating platform may be staffed or unstaffed, provided that —

- the fireworks operator remains in control at all times of the floating vessel or floating platform and firing of the display; and

- the security of the exclusion zone is maintained.

Freedom from Flammable and Combustible Materials Floating vessels and floating platforms must be free of all nonessential flammable and combustible materials. Any permanently mounted equipment on board the vessel not being used and containing flammable or combustible material (such as a motor fitted with a fuel tank) must be shielded from exposure to the fireworks. Portable power-generation equipment and material-handling equipment deemed necessary for the performance of the display may be permitted.

Safety Shelter Floating vessels and floating platforms that are staffed during electrical firing must have a safety shelter which is located as far as practicable away from the fireworks. The safety shelter must be designed and constructed to withstand the impacts and effects from the fireworks to be fired (such as low bursting aerial shell, impact from a dud aerial shell, direct impact from a Roman candle, barage or cake). The design must also —

- be of sufficient size to accommodate all persons present during the actual firing of the display; and
- provide adequate protection for these persons from the fireworks display set-up and above, e.g. malfunctioning fireworks and dud aerials.

The design may include an observation window made of laminated glass protected by expanded metal or LEXAN to allow observation of the firing by the fireworks operator and the fireworks operator's assistants.

5.19.3 Requirements for Fireworks

Small calibre fireworks, such as ground level fireworks, may be fired from a floating platform, such as a raft, if:

- they are fired electrically; and
- the appropriate calculated minimum clearance distances are complied with (The calculation of the clearance distance must include an additional provision for the firework firing up to an additional angle of 10 degrees to the horizontal.)

Aerial fireworks must be fired only from a vessel or platform of substantial size where stability is ensured.

Storage

The storage of fireworks for a future display on board a floating vessel or platform when the floating vessel or platform is already set up for a display is prohibited.

5.19.4 Requirements for Health and Safety Equipment

PPE In addition to the requirements for PPE identified elsewhere in this Code, the provision and wearing of PPE including flotation devices must be determined by undertaking a risk assessment for the activities to be undertaken. Persons undertaking activities on a floating vessel or platform involving

managing the display and post-display must wear a flotation device. All PPE including flotation devices when not required to be worn must be readily available.

Fire Protection Equipment The requirements for fire protection equipment are the same as elsewhere in this document.

5.19.5 Setting Up Display

The setting-up phase of the display varies from other types of displays in that the display may be set up on vessels (such as barges) away from the planned display site and the set-up display may be transported to the display site on the vessel. The set-up display can be sited in two locations:—

- the set-up location; and
- the display site.

The following requirements for setting up the displays are in addition to the requirements elsewhere in this document.

Electric Firing of Display Only electric firing of displays on a floating vessel or platform is permitted. Hand firing is prohibited.

Egress Paths The display must be set up to provide a minimum of two separate egress paths which are unobstructed. Only one egress path is required from a safety shelter.

Overhead Obstructions The display must not be set up (either at the set-up location or the display site) where there are overhead obstructions such as bridges and overhead wires.

Minimum Clearance Distances The requirements for calculating minimum clearance distances for the display and for setting-up are the same as those described earlier in this Code. The vessel must be positioned to maintain the minimum clearance distance at all times during the display.

Exclusion Zone for Setting Up and Transport The exclusion zone for setting up the display and for transporting the display set-up on the vessel is the same as for land displays. The exclusion zone must be defined so that unauthorised persons and unauthorised vessels and vehicles are restricted from entry.

Emergency Response A watercraft ready and capable of providing rapid emergency response must be present during the display.

Persons During the display, only necessary persons must be aboard the floating vessel or floating platform. All persons, other than the spotters or the

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fire watch, must be in safety shelters. All persons aboard a floating vessel or floating platform during the display must wear a floatation device with a visual location device.

Communication System An effective communication system, such as mobile phones, or a two-way radio, must be available on the vessel to communicate with the emergency support team, the fireworks event organiser and other agencies.

Chapter 6

Guidance for

Theatrical/Proximate Audience Displays

(Note – detailed guidance is available in the references at Appendix 2 below)

6. General

- 6.1. These are displays, either indoors or outdoors, where pyrotechnics are used in conjunction with theatrical, musical, sporting or similar productions in proximity to audiences, performers or support persons. The general precautions pertaining to firework displays listed in this document shall apply to theatrical/proximate displays also.
- 6.2. Note that fire is a particular hazard in all enclosed/indoor and proximate display sites and operators should consult with and seek the advice of the appropriate Fire Officer on matters relating to fire safety for the site.
- 6.3. Organisers will need to familiarise themselves with any regulations made under the Licensing of Indoor Events Act 2003.
- 6.4. **Pre-Display Actions**
 - 6.4.1. Organisers should ensure that a pre-display demonstration is held for fire officers, safety officers and other interested authorities of samples of all the types pyrotechnics involved in the display. This should be held where possible in the venue to be used under display conditions, (e.g. at a dress rehearsal) and should be used to enable the authorities to evaluate the risks involved in the various effects. An alternative venue may be used at the discretion of the authorities.
 - 6.4.2. After assessing the risks, a decision should be taken regarding distances to be maintained from each effect to the audience, performers and stage staff. Special attention should be paid to performers clothing wigs etc and to vulnerable sets and stage materials.
 - 6.4.3. Detailed guidance is available in the references mentioned at the beginning of this document. In addition, the following provisions apply:
 - 6.4.4. In addition to the preparation and liaison measures to be taken before the display listed above, the Safety Officer and principal operator should

prepare and provide the following information to the appropriate agencies, (including the local authority fire officer):

- Diagram of facility showing precise location of pyrotechnic devices to be fired, fallout/danger radius for each device and line behind which audience and other vulnerable persons shall be restrained.
- Risk assessment carried out and control measures proposed.
- Certification that the set, scenery, rigging material and all materials worn by performers performing in the fallout area, are either inherently flame proof, or have been treated to achieve flame retardancy.
- Material Safety Data Sheets for all pyrotechnic materials used, (where available).
- Manufacturer's recommended safety distances and instructions.

6.5. Pyrotechnics to be used

6.5.1. Improvised or home-made pyrotechnics should NOT be used.

6.5.2. Pyrotechnics manufactured for use in the open air should not be used inside a building or confined space. Pyrotechnic operators should use only products provided with written information provided by the manufacturers, detailing the following:

- Name of device and description of effect.
- Performance characteristics including duration, height and radius of effect, fallout and safety distances.
- Material Safety Data Sheet for the pyrotechnic materials.
- Manufacturer's statement regarding whether device is suitable for indoor or outdoor use and any special cautions or considerations, which apply.
- Manufacturer's instructions for the placing, setting and using the pyrotechnics.

6.6. Electrically Firing Equipment

6.6.1. Pyrotechnic operators should use only firing equipment for which the manufacturer has provided instructions for use and which has been approved for use with the specific pyrotechnic devices used in the display. Firing equipment should be inspected and tested for functioning and safety prior to each display or performance. Manufacturer approved firing boxes fitted with isolating firing keys should be used. All devices

should be capable of being electrically isolated from firing supply until required for firing.

6.6.2. Electrical devices can be initiated by stray current, electrostatic spark or electro magnetic radiation. All electrically fired devices should be isolated from power supply during set-up. Mobile phones, radio sets and other sources of electromagnetic radiation or stray current should be switched off and electrostatic precautions should be taken, while handling electrically fired devices.

6.7. Location of devices

6.7.1. Pyrotechnic devices should be mounted and placed and fired in such a manner that no sparks, fallout, noxious or toxic fumes, or effect shall endanger human life or cause injury or cause damage to property. The operator should ensure that no persons or flammable materials are in the danger areas before firing the devices. In particular pyrotechnics should not be used:

- Where they could discharge into the audience or orchestra pit,
- Downstage of safety curtain or main tabs except with specific approval,
- Where any escape route could be affected,
- Where any persons are exposed to danger,
- Where adjacent props, sound-proofing, ceilings, scenery or drapes would be exposed to ignition.

6.7.2. The operator/s should have a clear view of the entire danger area around each device and should not fire until the area clear and it is safe to do so.

6.7.3. Devices with hazardous effects (such as concussion mortars,) should be placed in a secure location, which prevents audience or support persons from gaining access to them. Operators should be conscious of noise hazard and excessively loud devices should not be used in confined spaces. Maroons should only be fired in purpose built robust welded metal bomb tanks with open metal mesh tops, suitable for the type of device used. Such tanks should have warning notices at all sides reading

“Danger – Explosives – Keep Clear!”, and should be located in a safe isolated area off stage.

6.8. **Specific Devices** The following specific guidance is given for different types of device:

- **Rotating pyrotechnic devices** should be mounted securely so that their rotation does not cause the holder to fail.
- **Rockets** should not be fired in indoor or restricted areas. Tethered rockets which are specifically designed for tethered flight in front of proximate audiences may be fired outdoors, if they are attached securely to a guideline or cable (of adequate strength and material to withstand the exhaust flame of the rocket motor), with both ends securely attached and placed on an impact resistance surface at the terminal end of the guide. There should be no possibility of a rocket breaking up in flight or on impact. An effective arrangement to stop the rocket should be provided.
- **Flares** should be placed so that debris falls into a safe, flame-resistant area.
- **Comets and mines or any other projected pyrotechnic** should only be fired if the trajectory of their pyrotechnic material is not carried over the audience and if there is no possibility of fallout or projectiles reaching or adversely affecting the audience.
- **Waterfalls, Gerbs, Fountains** or other fireworks producing hot sparks or flame should be placed so that there are no flammable materials within their fallout area.
- **Airbursts** should not be fired to burst over the audience.

6.9. **Misfires.** Misfires should be electrically isolated and left for at least 15 minutes and then removed to a safe area outside in a non combustible container, covered in dry sand and disposed of in accordance with manufacturer’s instructions.

6.10. **Safety Distances.** The guiding principle for operators is that people or property should not be harmed, and particular attention should be given to the danger from projectiles, fallout and fire. As a general rule, audiences should be separated from a pyrotechnic effect by the greater of the two following distances:

- The distance recommended in manufacturer's instructions.
- Twice the device's fallout radius.

6.11. Use of flame effects on stage Although not classified as pyrotechnics, the use of Lycopodium powder or other gas/fuel flame generators to cause flame effects can be a major fire hazard. The use of such flame generators should be strictly controlled in accordance with a recognized safety standard such as "NFPA 160 – Standard for Flame Effects before an Audience". A decision on the use of such devices should be taken only after careful consideration in the overall risk assessment, and consultation with appropriate authorities. Special care taken that the concurrent use of flame generators and pyrotechnics does not cause a mutually increased hazard.

6.12. Use of Firearms special effects on stage

- All firearms should be properly licensed in accordance with Firearms Legislation.
- Firearms should not be of a larger caliber than is necessary for the event
- Firearms should be inspected by a competent person prior to use, to ensure they are in working order, free of corrosion and adequately maintained.
- All ammunition/charges should be inspected by a competent person prior to use, to ensure the ammunition is serviceable and appropriate for the event and that no live/ball ammunition is used. Wadded charges should not be used if crimped safety cartridges are available for the weapon
- Firearms should never be directly aimed at either the audience or any person on stage. Users of firearms with venting should be familiar with the venting direction and ensure that the venting is away from the user and other persons in the vicinity.
- Appropriate hearing protection should be used by all persons firing or in proximity to firearms.

Chapter 7

Guidance for Model Rocket Displays

7. Model Rocket Displays.

- 7.1. Model rockets are defined in Ref 20 at Appx 2 below. Model rockets should not be confused with firework rockets. Although they are not fireworks, many of the safety principles and regulations listed in this document for firework displays are applicable also to model rocket displays, and it is considered appropriate to include guidance for such displays in this document.
- 7.2. The Code for Model Rocketry NFPA 1122 (Ref 20 at Appendix 2 below), should be used as the main safety reference for such displays. The Irish Aviation Authority (Rockets and Small Aircraft) Order 2000, S.I No 25 of 2000 is the statutory regulation relating to certain model rockets, and should be consulted.
- 7.3. Rockets which exceed the performance of model rockets as defined in above ref require additional precautions and are not included in this Guidance Document, but are covered in The Code for High Power Rocketry NFPA 1127.(Ref 21 at Appx 2 below)
- 7.4. Modifications to model rockets other than those specifically permitted in above references or manufacturer's instructions should not be carried out.

Chapter 8 – Reserved

8.

Chapter 9

Guidance for carrying out Risk Assessments and Risk Management at Displays

9. Introduction:

- 9.1. The Guidance Document makes reference to the recommendation that the Safety Officer and/or Principal Operator carry out a risk assessment prior to the display. The completed risk assessment, together with the site map, is then used for liaison with interested parties and submission to fire authorities.
- 9.2. Whereas some fireworks companies have comprehensive risk management systems, and submit detailed risk assessments and site surveys, many do not.
- 9.3. The purpose of this document is to provide operators with a sample format for providing Risk Assessment and Safety Information to interested parties such as organisers, safety officers, fire officers, regulators etc in circumstances where they do not have their own comprehensive company risk assessment format. Note that this document, like the Guidance Document, is for guidance only and has no legal status. This format may not satisfy the authorities concerned and additional information may be required. (Additional information on risk assessment may be got in Refs at Appx 2)
- 9.4. For large events, or unusual or high-risk sites it is strongly recommended that the operator carries out the risk assessment with the assistance of professional safety consultants. Professional risk assessments may be complex and often incorporate statistical methods and risk modelling .
- 9.5. Circumstances of displays and sites vary, Even though some of the information listed in the checklist will be common to many displays, **it is emphasised that risk assessments should be site specific** and should take into account particular circumstances and hazards of each site, based on the site survey. The completed risk assessment, together with the scaled site-plan showing all proposed firing areas, danger areas, fall-out areas, spectator viewing areas and any vulnerable facilities provide

pertinent safety information to all interested parties.

9.6. Risk Assessment

- 9.6.1. The basic concepts of risk assessment are simple. The key terms are:
- Hazard: which is a source of potential harm or damage or a situation with potential for harm or damage.
 - Risk: which is the combination of the likelihood and the consequences of a specified hazardous event. Risk always has these two elements:
 - The likelihood that a hazard may occur,
 - The consequences of the hazardous event.
- 9.6.2. Risk assessment involves three basic steps:
- Identify hazards.
 - Estimate the risk from each hazard; i.e. The likelihood and severity of harm of each hazard.
 - Decide if the risk is tolerable. (“tolerable” means here that the risk has been reduced to the lowest level that is reasonably practicable.)
- 9.7. Risk control or management is the next logical step and involves:
- Putting control measures in place to reduce risks
 - Re-assess the risks with control measures in place.
 - Review and monitor the effectiveness of the control measures.

9.8. Risk Assessment Steps

- 9.8.1. Identifying the hazards All work activities should be listed and grouped or classified in a logical sequence. This can be done by use of a pro-forma or checklist.(e.g. transport, handling, fuzing, set-up, firing, disposal etc). Examine each activity and ask :
- Is there a source of harm?
 - Who or what could be harmed or damaged?
 - How could harm occur?
- 9.8.2. All the usual work related hazards should be considered such as slips, trips falls, manual handling, use of machinery, driving etc, but also special attention should be paid to the firework related hazards such as fire, explosion, malfunction, danger to operators, danger to spectators, danger to public property etc.

9.8.3. Determine the Risk Level Each hazard should be rated (given a number) according to potential severity, e.g.:

- Slightly harmful - (1)
- Harmful- (2)
- Extremely harmful- (3)

9.8.4. And also according to the likelihood or frequency of occurrence, e.g.:

- Highly unlikely (1)
- Unlikely (2)
- Likely (3)

9.8.5. Determine if risk is tolerable The overall risk level is then simply the product of these two numbers and gives an indication of which hazards require the most priority in deciding control measures Using this system, 9 is highest risk (intolerable), and 1 the lowest (trivial). The following table shows all possible combinations:

Severity vs Likelihood	Slightly harmful Rating 1	Harmful Rating 2	Extremely harmful Rating 3
Highly unlikely Rating 1	1 Trivial Risk	2 Tolerable Risk	3 Moderate risk
Unlikely Rating 2	2 Tolerable Risk	4 Moderate Risk	6 Substantial Risk
Likely Rating 3	3 Moderate Risk	6 Substantial Risk	9 Intolerable Risk

9.8.6. The following levels need consideration

- Trivial: Obviously if the risk is trivial, then no further action is required.
- Tolerable: If the risk is tolerable, then the activity should be monitored to ensure it remains tolerable.
- Moderate: If the risk is moderate, efforts should be made to reduce the risk. The likelihood and consequence should be closely monitored and assessed.

- Substantial: Substantial risk requires urgent action to reduce the risk. The activity should not be started until the risk has been reduced
- Intolerable: This activity must cease and cannot start until effective measures are in place to reduce risk to tolerable levels.

9.9. **Example of Risk Assessment Table.** The following table shows an example of how a risk assessment might look, prior to control measures being put in place, based on a few sample activities, (note that a full risk assessment should cover **all** activities and associated hazards.):

Example – Risk Assessment before Control Measures					
Activity	Hazard	Severity	Likelihood	Initial Risk level	Conclusion on risk level
Transport	Crash Driver at risk	3	1	3	Moderate
Transport	Fire on vehicle leading to explosion Driver/public at risk	3	2	6	Substantial
Loading unloading	Back injury operator at risk	2	1	2	Tolerable
Fuzing Cutting fuze	Spark leading to premature explosion Operator at risk	3	2	6	Substantial
Set-up Loading tubes	Premature Ignition RF Hazard Operator at risk	3	2	6	Substantial
Firing display	Insufficient danger area Public at risk	3	3	9	Intolerable

9.10. **Controlling the Risk (Hierarchy of Control)**

9.11. Controls should be chosen taking the following hierarchy of control principles:

- Eliminate the hazard altogether (e.g. eliminate the activity)
- Reduce the risk (by a control measure)
- Adapt the activity to the operator (taking into account mental and physical capabilities)
- Make use of new/better technology (e.g. electrical/electronic firing systems, new tubes, state of art fireworks etc)
- Measures that protect everyone (public as well as operators)
- Technical and procedural controls to be considered
- Use of PPE
- Emergency arrangements

9.12. Re-assess the hazards with the new control measures in place (repeat steps 10, 11 above)

9.13. The completed risk assessment will now show activities, hazards, initial risk level, control measures and residual risk level. Any residual risks which are not tolerable should be subject to further examination and further control measures where necessary.

9.14. The completed risk assessment for the sample activities might appear as follows:

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Company Name:			Venue:	Date of Display:		
Operator carrying out Assessment:			Operator at Display:	Date of Site Survey:		
Before Control Measures			Control Measures	After Control Measures		
Activity	Hazard	Initial Risk level		Severity	Likelihood	Residual Risk level
Transport 1	Crash Driver at risk	3	Drivers trained Seat belts Vehicle well maintained	2	1	2
Transport 2	Fire on vehicle leading to explosion Driver/public at risk	6	Fire extinguishers Diesel vehicle ADR Measures	3	1	3
Loading unloading	Back injury operator at risk	3	Training in manual handling Identify heavy loads	2	1	2
Fuzing Cutting fuze	Spark leading to premature explosion Operator at risk	6	Use non-sparking cutter Use PPE	2	1	2
Set-up Loading tubes	Premature Ignition RF Hazard Operator at risk	6	Eliminate mobile phones/radio from Set up area Shunting wires	2	1	2
Firing display	Insufficient danger area Public at risk	9	Adequate safety distances Barriers /stewarding	2	1	2

9.15. **Review and Monitor Control Measures**

9.15.1. The adequacy of the control measures should be constantly reviewed, before, during and after the display. It is not sufficient to carry out a risk assessment as a paper exercise, without pro-active monitoring of its effectiveness. Monitoring the effectiveness of control measures such as safety distances, barriers etc is vital during the display. Spotters with communications to the PPO are required, so that additional measures can be taken in the event of changes in circumstances such as wind direction/speed, crowd encroachment, unforeseen firework performance, etc. Lessons should be learned from mistakes and “near-misses”, and each display should be reviewed to ensure that lessons are incorporated and control measures enhanced, to improve the safety of the next display.

9.16. **Pitfalls of risk assessments**

9.16.1. Care should be taken to ensure that:

- risk analysis should take place after site survey to ensure all site specific hazards are taken into account.
- assessor does not become complacent and underestimate risks. (It is often useful to get a second opinion from a neutral viewpoint or even use a risk assessment team).
- hazards are based on reality and plausible.
- risk assessment is not an end in itself but is part of an information gathering and risk evaluation process to assist the operator and all interested parties to improve safety at firework displays.
- residual risk levels should not be misrepresented to give the appearance of effective controls.

Chapter 10

Guidance for

Importation, Transport and Storage **of Fireworks and other explosives**

10.Importation Transport and Storage Requirements

10.1. Importation

10.1.1. Explosives, (including fireworks) may only be imported into Ireland if an importation licence is granted by the Minister for Justice and Equality . (Note that, on safety and security grounds, the sale of consumer fireworks of any category to the general public, is not permitted under current Government policy. Importation licenses for fireworks can be issued, but only for fireworks used in organised displays, conducted by professional/ competent operators.) Application forms and guidance is available on the Department of Justice website

10.1.2. The organiser of the display, or the operator acting on his behalf, must submit a completed application form to the Department of Justice and Equality at least one month in advance of the date of the display, in order to facilitate the processing in time to allow importation.

10.1.3. The organiser may apply for importation, however, since much of the information required is of a technical nature, the principal operator normally fills out the form. (The organiser and operator should however sign the declaration on the form).

10.1.4. It should be noted that the Department of Justice and Equality does not issue a license for the firework display or event, *per se*, and that the license granted by the Department is for importation of the fireworks into the State only. The issuing of this license does not preclude any authority or agency from using their powers and relevant legislation to stop, prohibit, or impose conditions on any proposed display at any time. The Department will however notify the local authority Fire Officer, the Gardaí and the Health and Safety Authority, of each import application, to give them further notice (i.e. in addition to

that undertaken in accordance with Section 3.5 of this Guidance Document) of intended displays so that they can contact the organizers directly regarding any remaining concerns they might have about the displays.

10.2. **Transport Requirements**

10.2.1. Transport of fireworks into and within this state must be in accordance with relevant UN international transport regulations (as transposed into Irish legislation,) for the transport of dangerous goods.

10.2.2. For road transport within Europe, the relevant publication is known as the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) and it's associated EU Directives. These Directives are given effect in Ireland, by the Carriage of Dangerous Goods by Road Regulations 2004 (S.I No 29 of 2004 et al).

10.2.3. The regulations include, inter alia, duties of consignor, carrier, driver, training, vehicle requirements, packing, marking and labeling requirements.

10.2.4. Additional guidance on transport of fireworks is available on the Department of Justice website

10.3. **Storage Requirements**

10.4. Storage of fireworks overnight is not normally permitted and fireworks are normally used on the same day as importation.

10.5. In certain circumstances, storage may be permitted under the following conditions:

- Storage of all explosives in the state must be in accordance with the Explosives Act of 1875.
- For large displays, requiring lengthy set-up time, display fireworks may be stored for a limited period prior to the display, in a safe and secure location, providing all due precautions for public safety and security are observed. (Permission of local authority fire services and local Garda are required for each such temporary storage).
- In the event of the applicant not having a licensed premises or registered premises in his own name for storage of fireworks, storage may be permitted, provided the application is accompanied by a certificate from the occupier of a licensed or registered

premises stating the occupier's agreement to store the fireworks in accordance with current explosives regulations and permitted explosive limits.

- Local authority fire services and Garda authorities must be informed by the occupier of proposed storage of fireworks in any licensed or registered premises.
- Under no circumstances should any preparation work (such as fitting of fuzes or fitting to frames etc.) be carried out on fireworks in the storage location, nor should any packages be opened or fireworks exposed in the storage location.

Appendix 1

Glossary of Terms

- **Applicant for Importation:** The applicant is the person or company applying for the importation licence. He may be the organiser or the principal operator (acting on his behalf) of the event or display.
- **Blind:** Firework which fails to function after launch and lands intact.
- **Competent Person:** A person shall be deemed to be competent where, having regard to the task he or she is required to perform, and taking account of the size or hazards (or either of them) of the undertaking or establishment in which he or she undertakes work, he or she possesses sufficient training, experience and knowledge appropriate to the nature of the work to be undertaken.
- **Fallout Danger Area:** The area to be kept clear because of the danger of spent fireworks, blinds and firework debris falling to ground.
- **Firing area:** The location from which fireworks are launched or initiated. Different Firing Areas within the one display may be appropriate for different types of fireworks.
- **Ground Level display:** Display using fireworks designed to function at 15m or less in height.
- **High Level Display:** Display using fireworks designed to reach 50m or more in height.
- **Interested Parties:** Interested parties include the local authority, Gardai, HSA, other Government agencies, who may have an advisory or statutory role and property owners, residents or others who may be adversely affected by the proposed display.
- **Low Level Display:** Display using fireworks designed to reach less than 50m in height.
- **Malfunction:** Failure to perform in accordance with designed performance.
- **Mortar:** Tube from which aerial shells are launched.
- **Misfire:** Firework which fails to initiate at the launch site. (In the case of a mortar, the shell remains in the tube).

- **Operator**: Person or company with responsibility for site survey, liaison, pyrotechnic safety, conduct, control and initiation of the display. He/they should be professional/s or competent person/s in the use of fireworks or pyrotechnics. He may be an employee/agent of the organiser or may be contracted to conduct the display.
- **Organiser**: The person in control and responsible for safety at the event will be referred to as the Organiser . He may be a person or company with overall responsibility for organising, operation and safety management of the display or event where the pyrotechnics are to be used.
- **Premature**: A firework which functions before intended (can cause burst tubes in mortars or can function at an unsafe height)
- **Organiser**
- **Principal Pyrotechnic Operator (PPO)** Most senior pyrotechnic operator or operator having overall control of pyrotechnic display, whether that display is a firework display, pyrotechnic display, re-enactment display, model rocket display or any other event where explosives are used for entertainment purposes.
- **Pyrotechnic Article**: An article containing a pyrotechnic substance. (this includes all fireworks).
- **Pyrotechnic Substances**: Substances or mixtures of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as a result of non-detonating, self-sustaining exothermic chemical reactions.
- **Safety Officer** Person appointed by organiser to take particular responsibility for the overall safety of an event. For large public displays or events, this should be a specific role filled by a professional safety advisor. For smaller displays, the organizer may appoint the Principal Pyrotechnic Operator to assume the duties of the Safety Officer.
- **Spectator area**: This is the designated area for location of spectators, within which the organisers, safety officer and operator have a duty to ensure that spectators of the display are safe.
- **Theatrical/Proximate Audience Displays**: These are displays, either indoors or outdoors, where pyrotechnics are used in conjunction with

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theatrical, musical, sporting or similar productions in proximity to audiences, performers or support persons.

Appendix 2

References

- Ref 1. **Australian Standard (1998)**, *Explosives – Storage, Transport and Use – Part 4: Pyrotechnics-Outdoor Displays*” AS 2187.4-1998. NSW.Standards Australia.
- Ref 2. **British Standard B.S. 7114 (1998)**. “*Classification, Specification and Testing of Fireworks*” British Standards Institution 1998.
- Ref 3. **Department of the Environment, (1989)** . “*Code of Practice for the Management of Fire Safety in Places of assembly*” . Dublin. The Stationary Office.
- Ref 4. **Department of the Environment, (1998)** . “*Code of Practice for Safety at Indoor Concerts*” . Dublin. The Stationary Office.
- Ref 5. **Department of Education (1996)**, “*Code of Practice for Safety at Outdoor Pop Concerts*” . Dublin. The Stationary Office.
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- Ref 7. **Department of Justice, Equality and Law Reform (DJELR) (2003)**. “*Guidance Document on Organised Firework Displays July 2003*” Available from: [http://www.justice.ie/80256DFF005F2D06/\\$\\$Search?OpenForm&Seq=1](http://www.justice.ie/80256DFF005F2D06/$$Search?OpenForm&Seq=1) (Accessed 6/8/2004.)
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- Ref 11. **HSA, Health and Safety Authority , (2003b)**, “*Guidelines on Preparing Your Safety Statement and Carrying Out Risk Assessments*”. Available from: <http://hsa.ie/pub/publications/ssguide.htm> (Accessed 13/1/03).
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- Ref 14. **HSE, Health and Safety Executive, (1991)** “*Successful Health and Safety Management*” HSE Books Norwich UK
- Ref 15. **HSE, Health and Safety Executive, (1998)** “*Acquisition and use of explosives by historical societies*” HSE Books Norwich UK
- Ref 16. **Heffernan, J . (1991)**. “*Hazard Identification and Risk Assessment for Safety Statements*” Paper delivered to Seminar on Safety Statements, UCD Dublin on 26 March 1991
- Ref 17. **Home Office/Scottish Home and Health Department, (1990)**. “*Guide to Fire Precautions in Existing Places of Entertainment and like premises*” London, HMSO.
- Ref 18. **NFPA (National Fire Protection Association), (2000)**. “*NFPA 1123 Code for Fireworks Display*” USA. NFPA International
- Ref 19. **NFPA (National Fire Protection Association), (2001)**. “*NFPA 1126 Standard for the use of pyrotechnics before a proximate audience*” USA. NFPA International
- Ref 20. **NFPA (National Fire Protection Association)(2002)**, “*NFPA 1122 – Code for model rocketry – 2002 Edition -*” USA. NFPA International
- Ref 21. **NFPA (National Fire Protection Association), (2001)**. *NFPA 1127 Code for High Power Rocketry – 1998 Edition*” USA. NFPA International
- Ref 22. **National Standards Authority of Ireland (2003)** “*Irish Standard I.S. EN 14035 – Fireworks*” 12 September 2003 NSAI ILI Dublin.
- Ref 23. **NRC. Natural Resources Canada (1999)**. *Display Fireworks Manual*” Canada. Minister of Public Works and Government Services.
- Ref 24. **NRC. Natural Resources Canada (2003)**. “*Pyrotechnics Special Effects Manual*” Canada. Minister of Public Works and Government Services.
- Ref 25. **Queensland Government (2003)**, “*Code of Practice- Control of Outdoor Fireworks Displays*” Queensland, Australia: Department of Natural Resources and Mines
- Ref 26. **Smith D, Hunt G and Green C., (1998)** “*Managing Safety the BS 8800 Way*”. London: British Standards Institute v 1.

- Ref 27. **Smith T, (2004)**, “Glossary of Firework Terms”. Available from:
<http://www.saxtonsmith.co.uk/fw/glos2.htm> (accessed 28/07/2004)
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- Ref 29. **TNO, (2002)** “*Effect Distances for the Use of Display Fireworks*”.
April 2202 Report for Ministry of Housing, regional development and the
Environment, The Hague.
- Ref 30. **United Nations (2002)** “*ADR European Agreement concerning the
International Carriage of Dangerous Goods by Road*” – United Nations New
York

Form of Application for a Licence to Import Display Pyrotechnics

(Note: Form to be submitted to Department of Justice and Equality (FAO Crime 4 Division,, 94 St Stephens Green, Dublin 2), one month in advance of proposed date of display.)

Ref	Details Required		Notes
1	Applicant for importation	Name:	Include company name and individual
		Address:	
		Phone:	
		Fax:	
		E Mail:	
2	Principal Operator of Display	Name:	If different from above Note: Company name alone is not sufficient.
		Company:	
		Address:	
		Phone:	
		Fax:	
3	Organiser of Display	Name:	If different from above
		Address:	
		Phone:	
		Fax:	
		E Mail:	
4	Safety Officer for display	Name:	If different from above
		Address:	
		Phone:	
		Fax:	
		E Mail:	

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5	Display Details	Display date/time		
		Location:		
		Reason for Display (Give details)		e.g. Wedding, public/ private Sports event etc
		Event status		Is event licenced by local authority
		Type of Display:		High Level, Low Level, Ground or Indoor/Theatrical
		Category of Model Rocket		High /Low power per NFPA 1122
		Category of fireworks: (1,2,3 or 4)		As per British Standard BS 7114
		Quantity of Pyrotechnics		Use attached schedule to give full technical details
		Gross total weight (kg)		
		Net Explosive Content (NEC) weight (kg)		
6	Consignment Details	Place of Embarkation		Include country
		Place of Importation		Include County
		Consignor:		
		Est date/time of importation:		
		Mode of transport		(Road sea etc)
7	Road transport	Vehicle type		
		Do ADR load exemptions (para 1.1.3.6) apply?		Yes/No
8	Storage	Location		For overnight storage
		Licensee or Occupier		In local authority or reg premises
		Have local authority and Gardai been informed?		Yes/No/NA

9	Certification of Pyrotechnics	
a	I certify that all pyrotechnics to be used are listed in attached Schedule	
b	I certify that all scheduled fireworks of UK Category 1-3 manufacture conform to BS 7114, 1998 Parts 1-3	
c	I certify that all other scheduled fireworks (other than in 9b above) conform with the safety requirements of HS (G) 114 - Conditions for Authorisation of Explosives in Great Britain	
d	I certify that current National Competent Authority Document (CAD) or LOCEF Listing (or equivalent certification) is attached for all pyrotechnics on the schedule	See Notes on Schedule
e	I certify that the pyrotechnics for this display will not be stored overnight in this state other than in a licensed magazine, store or registered premises in accordance with the Explosives Act or by prior arrangement with GIE	
Declaration		
10	<p>I/We confirm that:</p> <ol style="list-style-type: none"> 1. We have read and are aware of the contents of the "Guidance Document for Organised Pyrotechnic Displays (Jan 2006)" 2. All operators used in this display are competent. (Para 2.3.1 of Guidance Document and Note 10 of notes to completion of application form. 3. Adequate public liability insurance is in place (Para 2.1 of Guidance Document) 4. I/We have consulted with all relevant interested parties and have kept records of such consultation, including details of persons consulted (Para 3.5 of the Guidance Doc and Note 10 of notes to completion of application form) 5. I/We will implement all control measures required by above parties. 6. All information/certification given in this application is true to the best of my/our knowledge. <p>Signed: _____ <u>Principal Operator</u></p> <p>Name: (Block Capitals): _____ Date: _____</p> <p>Signed: _____ <u>Organiser</u></p> <p>Name: (Block Capitals): _____ Date: _____</p>	<p>Declaration must be signed by principal operator and <u>Organiser</u>.</p> <p>Note : All details confirmed are in relation to this particular display</p>
11	<p><u>Signature of Applicant for importation</u></p> <p>Signed: _ _____</p> <p>Name (Block Capitals): _____ Date of Application: _____</p>	<p>Must be signed by applicant</p>

Appendix - Schedule of Pyrotechnics

	Article # 1	Article # 2	Article # 3
Commercial Name			
Part/catalogue No			
Manufacturer			
Country of Manufacture			
Firework Type (e.g Shell, Roman Candle, Fountain etc)			
Firework Intended use (e.g High/Low/Ground Level or indoor/theatrical)			
Diameter (mm)			
UN Number			
Hazard Classification Code			
Proper Shipping Name			
NCA or HSE Reference Number			
Manufacturer recommended safety distance from spectators (m)			
Quantity of each to be fired			
Net Explosive Content of each (kg)			
Gross Weight of each (kg)			
Total Gross Weight (Kg)			
Total Net Weight (Kg)			
Additional Information For Model Rocket Displays Only			
Motor Installed Total Impulse (N-sec)			
Equivalent Motor Type			
Rocket Model Type			
Rocket Model Manufacturer			
Max Altitude of Rocket/Motor Combination			
Min Site Dimension Required (m)			
Igniter Manufacturer type & model			

Note: Continue on other sheets as required. This information may be submitted in any convenient tabular form if preferred, but all required information must be included

Notes on Completion of Import Application Form

Section of Form	Notes	Guide Doc Ref
1. Applicant for importation	The applicant is the person or company applying for the importation licence. He may be the organiser or the principal operator (acting on his behalf) of the event or display	Chapter 10
2. Principal Operator of Display	Most senior pyrotechnic operator or operator having overall control of pyrotechnic display, whether that display is a firework display, pyrotechnic display, re-enactment display, model rocket display or any other event where explosives are used for entertainment purposes.	2.3.2 Chapter 3
3. Organiser of Display	The person in control and responsible for safety at the event will be referred to as the Organiser . He may be a person or company with overall responsibility for organising, operation and safety management of the display or event where the pyrotechnics are to be used	1.8 2.3.1 Chapter 3
4. Safety Officer for display	Person appointed by organiser to take particular responsibility for the overall safety of an event. For large public displays or events, this should be a specific role filled by a professional safety advisor. For smaller displays, the organizer may appoint the Principal Pyrotechnic Operator to assume the duties of the Safety Officer.	2.3.3 Chapter 3
5. Display Details	Note that if the event is licensed by the local authority, a copy of the licence should be included.	
6. Consignment Details	This should identify time/place and location of proposed importation	10.1
7. Road transport	Transport should be in accordance with Carriage of Dangerous Goods by Road Regs	10.2
8. Storage	Storage is not normally permitted overnight except in appropriately licensed locations	10.3
9. Certification of Pyrotechnics	This section is self certification by the applicant that all the pyrotechnics are listed, classified, conform to the safety requirements and will not be stored illegally.	

10. Declaration	<p>This section contains signed declarations by both the Organiser and PPO, regarding knowledge of the Guidance Document, Competence of operators and public liability insurance.</p> <p><u>Consultation</u>: The declaration also gives confirmation that the required consultation was undertaken as part of the process. The onus is on the organiser and operator to ensure that full and adequate consultation is undertaken with all interested parties in accordance with Para 3.5 of the Guidance Document. Records of such consultation (including dates, times and contact details of actual persons consulted should be retained for production to authorities, if required, in the event of an accident or dispute.</p> <p><u>Competence</u>: A competent person is defined in the Safety, Health and Welfare at Work Act 2005. Documentary evidence of CVs, experience, training and qualifications of all operators should be held by the organiser and PPO. This may be required by regulatory authorities as evidence of competence, in the event of an accident.</p>	<p>Chapter 2</p> <p>3.5</p> <p>5.2.12</p>
Schedule of pyrotechnics	<p>The Schedule to the form should be used to provide all technical details of the pyrotechnics.</p> <ol style="list-style-type: none"> a) Pyrotechnics must be classified for transport in accordance with the UN scheme (UN Number, Class and Proper Shipping Name). This is normally got from the relevant competent authority document (CAD) or in the case of the UK, the LOCEF database of the HSL. Note that for first importation of a particular pyrotechnic article, the application must be accompanied by either an NCA certification or a LOCEF printout. All certification must be current, relevant and legible. b) By agreement with DJE, it is sufficient to include the HSE Ref No for subsequent importations of the same articles, which are on the LOCEF database. c) Any NCA documentation involving multiple articles or large schedules of which only some entries apply, should be submitted with the Competent Authority cover sheets and relevant pages with the relevant individual items highlighted to facilitate checking and processing. d) Any LOCEF printouts should either have only one item per page or if using printouts with multiple articles per page then the relevant 	

	<p>individual items must be highlighted to facilitate checking and processing.</p> <p>e) Illegible submissions, such as poor quality faxes, will only delay processing of applications and may prevent timely issue of licenses for the planned event.</p> <p>f) <u>Model Rocket Displays</u> Full details must be included of performance parameters of both motors individually and motor/rocket combinations, including impulse generated and maximum height achieved. This should be supported by manufacturer supplied data.</p> <p>The basis for calculation of minimum launch site dimensions must be clearly shown by the operator as part of the risk assessment of the site, and included together with site plans etc used for consultation with all interested parties in accordance with Para 3.5 of the Guide.</p>	
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Note that current Government policy regarding pyrotechnics for organized display purposes is to grant import licenses to professional operators only

**For any further clarification or assistance in filling out the form please contact the Crime 4 Division of the Department of Justice and Equality
(01 6028388 or Fax +353 1 6028374)**