

Ignite Pyrotechnics Method Statement

Professional Firework Displays

Ignite Pyrotechnics Limited takes all reasonable steps in complying with the Health & Safety at Work etc Act 1974 and all other surrounding legislation made under the Act to ensure the health, safety and welfare of its employees, spectators, property and to members of the general public.

This document must be read in conjunction with the company Health & Safety Policy.

Ignite Pyrotechnics Limited has a set procedure that is followed when planning, setting up and firing a professional firework display. This ensures that the risk of accidents, injury or incidents to persons and damage to property is kept at a minimum.

This procedure is prescribed here in this document and remains in force until superseded or amended from time to time as the company sees fit.

Firework Display Site

Prior to the event, a member of the display team will visit the proposed site and complete a full risk assessment and site survey.

This risk assessment is designed to cover the following:

- To ensure the site is suitable for firing Category 4 fireworks
- To ensure the site is suitable for the size and type of display
- To ensure that a safe distance between the firing area and the spectator area can be maintained
- To ensure a fall-out area can be established to the back and sides of the firing site, this zone must be free from vehicles, buildings and the general public.
- To ensure that the firing site is clear of overhead obstructions e.g. power cables, trees etc., as well as for other potential hazards such as fuel storage tanks.
- To ascertain the proximity of hospitals or nursing homes.
- To ascertain the proximity of neighbouring buildings (residential and/or commercial)
- To ascertain the proximity of airfields
- To ascertain the proximity of coastal areas
- To ascertain the proximity of main roads
- To ascertain the proximity of any livestock
- To ensure the adequate provision of firefighting equipment.
- To liaise and arrange with the Client/Organiser with regard to the provision of crowd barriers and stewarding of the display.

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The minimum safety distance required for fireworks and outdoor pyrotechnic devices is thirty metres.

Where shells of any calibre are to be used, **this minimum distance increases to fifty metres.**

Indoor and Stage pyrotechnics may be used in close proximity to the spectators, providing the minimum distance as specified by the manufacturer is multiplied by a factor of 1.5 to comply with Ignite Pyrotechnics Limited safety rules.

Calculation of Minimum Safety Distances for Mortar-launched fireworks (Shells, Mines):

Device Calibre (mm) x 1 Metre = Minimum Recommended Safety Distance (metres)

For example: 50mm Display Shell = $50 \times 1 = 50$ Metre minimum safety distance.

Wherever possible and if the layout of the site makes it practical and safe to do so, the minimum safety distance shall be exceeded. An increased multiplier by calibre of 1.5 metres is desirable.

For example: 50mm Display Shell = $50 \times 1.5 = 75$ Metre minimum safety distance.

The use of ShellCalc® is highly recommended to plot the trajectory, shell drift, burst height and burst diameter of aerial fireworks like Shells and comets. This data is valuable for risk assessments accounting for the elevation of the firing site and the prevailing wind conditions.

Transport

All goods will be transported to site by road vehicle. In the majority of cases the fireworks and set up equipment will be carried on the same vehicle. All vehicles will carry the relevant transport emergency markings, Emergency Instructions in Writing, suitable fire fighting equipment and first aid kits.

Only ADR trained drivers will be permitted to carry any fireworks on behalf of Ignite Pyrotechnics Limited where the load is in excess of 50kg NEQ. All drivers will adhere to ADR and UK legislation For the transportation of explosives by road. No smoking is permitted during the transportation of any quantity of fireworks.

Packaging

The fireworks will be packed in suitable fully sealed containers of either cardboard, timber, plastic or metal construction. The contents will not exceed the recommended NEQ for the relevant container. All fireworks will be transported in their approved UN packaging. Open boxes will be resealed with tape prior to transport. Unused fireworks must be returned to their original packaging and stowed away for re-transport.

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Fusing Operations

Prior to a display, it is common for quantities of fireworks to be picked and fused according to the requirements of each sequence in the display. For example shells are fused together in series with pyrotechnic delays to provide a sequential effect, or matched together for rapid simultaneous ignition.

No other modifications to the fireworks (for example splitting fireworks into their component parts, or changing the overall characteristics of the firework) are permitted.

All fusing operations are to be conducted in accordance with the allowances of the regulations and the recommendations of the subsector guidance (Explosives Regulations 2014). Risk assessments are in place for this work activity.

Site Set Up

No work will be carried out until an exclusion zone has been established around the set up and safety area. In the case of small single operator shows at least one steward will be in attendance throughout the display set up. Unless otherwise agreed in writing, the Client or Organiser is responsible for the provision of stewards and crowd control barriers.

A Wind Rocket or Flare may be fired to assess the wind speed and its direction. All racks will be angled to compensate for this. The show leader holds the overall responsibility of judging the safety of the display and if necessary, cancelling due to inclement weather.

Shells and Mines will be fired from either GRP, cardboard or polyethylene mortar tubes. The tubes will be secured in timber racks that are staked or pinned to the ground and secured with high tension loading straps and / or sandbags. Any shells with a diameter in excess of 150mm will be secured separately with a single pin (located on the far side of the mortar tube) and sandbags.

It is desirable for large single tubes to be staked or pinned front and back. It is recommended that cylinder shells are fired from HDPE mortar tubes and not GRP tubes.

Maroon shells shall always be fired from single staked tubes and **never** in racking configurations. If wooden stakes are used with maroon shells, they shall always be on the side facing away from the audience so any fragments are directed away in the event of a "detonation" (premature destructive failure).

Rockets will be fired from either metal or polyethylene tubes or from timber racks with eyelets. Rocket cones may be used for flights of rockets, but they shall **never** be used for maroon or signal rockets as there is a risk of mass explosion and considerable projection of fragments. Rockets will always be fired into the direction of the prevailing wind as they have a tendency to track because of their stick.

Roman Candles will be fired from either cardboard or polyethylene tubes. These will be secured in position by either steel road pins, tape, or plastic or wire ties. Alternatively they may be fired from a timber rack using the same securing method as for shell racks with steel road pins or wooden stakes.

Roman Candle Barrages (Cakes) will be placed on the ground and, if necessary, will be reinforced with cloth tape and secured with a metal pin or timber post. It is desirable and recommended to use stakes on each side, in particular for fan cakes. Special attention should be made to ensure no outer packaging or method of securing obstructs the path of any shot tube. It is not recommended to place cakes on uneven ground owing to potential for recoil movement. Where batons are used on hard standings to angle cakes, all cakes are to be sandbagged front and back or enclosed in a securing frame such that there is no possibility they will tilt or recoil during firing.

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Fountains and Gerbs will either be secured to a timber or metal post with tape or wire, or fired from a purpose built gerb holder. Large fountains will be buried to two thirds depth or sandbagged to the same depth or fixed to a wooden stake.

Bengal flares will be attached to wooden stakes, or elevated further on steel road pins or wooden sticks. Care should be taken with devices containing compressed compositions – cracks or voids from temperature cycling in storage or fusing / handling can result in these items exploding. The minimum safety distance should be applied to these items.

Set Pieces and Wheels will be affixed to either a timber post or scaffold structure by the fixing supplied with the firework or by other recommended means.

When a display is fired electrically by low voltage electric fuseheads (electric matches), all cables will be carefully positioned in a neat and tidy manner. During the ignition of a display, at least one senior technician will be on the firing site to observe the display for safety reasons.

All observers will be in direct communication with the person who is electrically firing the display. The only alteration made to fireworks will be in the form of fusing alterations for timing purposes or for the insertion of an electric fusehead.

Firing systems must never be armed or continuity checks performed while display crew are in immediate proximity to the fireworks.

Once the display is set up it will never be left unattended. Smoking in the firing area is strictly prohibited. Only authorised personnel will be allowed access to the firing area.

Firing

The display will only be fired once:

- The second Event Day risk assessment has been carried out.
- The site is free from members of the public; and
- The agreed numbers of stewards are in the required positions.

The display will be fired ensuring debris falls into the designated fall-out zone.

Only authorised and trained technicians will fire the display; by using portfires, gas safety torches and / or electric fuseheads.

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Safety

Safety will be the main priority in all circumstances. The show leader on site will at all times be responsible for the safety of the firing team and any authorised persons on the site. If there is, at any point, a dangerous occurrence the show leader will take action to restore a safe situation. In the event that the show leader is incapacitated the employee appointed second in command will take the responsibilities of the team leader.

Crowd spillage into any designated safety area during the display will result in the display being stopped.

All technicians will wear flame retardant clothing, ear protection and impact resistant headgear. Eye protection is always required. High impact polycarbonate visors or goggles are preferred, not just a mesh visor. Respirators are available if required.

If the technician in charge of the display is not completely satisfied with any safety issue in respect of the event e.g. crowd control, safety zones or inclement weather conditions, he or she has the complete backing of the company to take the following actions:

- Withhold any fireworks, which due to the safety concerns may put persons or property at risk.
- Stop, or refuse to fire the display, until such time as the safety issues have been resolved. In the event that a safety issue cannot be reasonably resolved to the senior pyrotechnist's satisfaction, the display will be cancelled and cleared away.

The crowd should be adequately controlled at an event. This is entirely the responsibility of the client/organiser. We recommend that the crowd line, stipulated by Ignite Pyrotechnics Limited, should be cordoned off by use of tape or some form of barrier.

The Client/Organiser is advised that the following organisations should be notified of the display:

- The local Fire Brigade
- The local Police
- Coast Guard (where the display is visible to shipping)
- Local aerodromes (where the site is within 3 miles)
- Air Traffic Control (if the site is within 7 miles of an Airport)
- Local Harbour Authority (if applicable)
- The local Council
- Neighbouring landowners, especially livestock owners.
- Nearby Hospitals, Nursing homes etc (if noise may cause concern)

Training

All staff are trained in house, and in some cases externally in the responsibilities, safety, set up, firing and emergency procedures involved in the safe completion of a firework display. All ADR, fire fighting and emergency first aid is provided by approved external trainers.

Ignite Pyrotechnics Limited are committed to the continued professional development of our staff and we ensure training is current, relevant, and up to date in accordance with best practices.

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Pollution

The use of fireworks, by their nature will produce toxic gases and solids. However, these are minimal and should further details be required, we will discuss this on an individual basis when the contents of the display have been finalised.

Noise pollution is also caused by fireworks, this can be reduced by non-inclusion of certain products from the display i.e. maroons, salutes and air bombs. If there is a requirement by the client, for a specified sound level, we will require, in writing, the maximum dBA sound level acceptable and at what distance. Care should be taken in situations where there is livestock in the vicinity i.e. cattle stampeding. Where practicable, attempts will be made to have the livestock moved to a different area.

Site Clearance

Once the display is over, the safety barriers and stewards must remain in place until the team leader gives the all clear.

Checks are made for any unfired or live material, and they will be disposed of in accordance with the manufacturer's guidelines. It should be noted that much of the material waste is biodegradable; however reasonable clearance of debris caused by the firing of the display will be disposed of where feasible.

Risk Assessment

The following items are possible risks to the public and pyrotechnics from the firing of a firework display:

- Loss of life - Due to poor manufacturing or catastrophic sequences of events
- Lung damage - From smoke inhalation
- Skin Damage - By fire, heat and / or explosion
- Hearing Damage - By noise
- Sight Damage - By flash or sparks

These risks are minimised as low as reasonably practicable due to the high level of training and expertise of our company and operators.

Additional risks to crew on site include other vehicles, on site scaffolding injuries, tripping, falling etc. As each site has its own aspect and potential risks, these will be outlined in the individual risk assessment for that site.

A further risk assessment will be carried out on arrival at any site on the event day and again 30 minutes prior to firing the display. It is the responsibility of the show leader to make any assessments deemed necessary and make any decisions and actions following that assessment with regard to changes or whether to commence with the event.