# Safety Guidelines for the Live Entertainment and Events Industries

## Part 3. Hazard Guide 07 – Special Effects

Version 2: effective September 2024

LIVE PERFORMANCE AUSTRALIA

# Contents

## Disclaimer

In legislative terms, the requirements of the **Australian WHS/OHS Framework** are mandatory. In contrast, a guide is designed to assist obligation holders to comply with the requirements of an act or regulation.

Obligation holders still have a duty to assess the risks in each work situation and take all reasonable steps to eliminate or minimise the risks that are specific to each work activity, so far as reasonably practicable. These obligations are described in the *Occupational Health & Safety Act 2004* (Vic) (**Victorian OHS Act**) at section 21 and in the Work Health Safety Acts in all other states and territories at section 19.

The information contained in the LPA Safety Guidelines for the Live Entertainment and Events Industries (**LPA Safety Guidelines**) is of a general nature and may not apply in all work situations, it is not mandatory and should not be regarded as legal advice. In any important matter, you should seek appropriate independent professional advice in relation to your own circumstances. Live Performance Australia (**LPA**) accepts no responsibility or liability for any damage, loss or expense incurred as a result of the reliance on information contained in this guide.

## Definitions and Terms Used

***Australian WHS/OHS Framework*** means Model WHS Legislation and Victorian Legislation

***Employer*** means a person who employs one or more other persons under contracts of employment or contracts of training (Victorian OHS Act)

***Model WHS Act*** means *Work Health and Safety Act 2011* (Cth)

***Model WHS Regulations*** means *Work Health and Safety Regulations 2011* (Cth)

***WHS Legislation*** *Work Health and Safety Act 2020* (WA); *Work Health and Safety Regulations 2022* (WA); Work Health and Safety Act 2012 (Tas*); Work Health and Safety Regulations 2022* (Tas); *Work Health and Safety Act 2012* (SA); *Work Health and Safety Regulations 2012* (SA); *Work Health and Safety Act 2011* (NSW); *Work Health and Safety Regulations 2017* (NSW); *Work Health and Safety Act 2011 (*ACT); *Work Health and Safety Regulations 2011* (ACT) *Work Health and Safety Act 2011* (QLD); *Work Health and Safety Regulations 2011* (QLD); *Work Health and Safety Act 2011* (NT); *Work Health and Safety Regulations 2011* (NT)

***WHS Acts*** *means Work Health and Safety Act 2020* (WA); *Work Health and Safety Act 2012* (Tas); *Work Health and Safety Act 2012* (SA); *Work Health and Safety Act 2011* (NSW); *Work Health and Safety Act 2011* (ACT); *Work Health and Safety Act 2011* (QLD); *Work Health and Safety Act 2011* (NT)

***WHS Regulations*** means *Work Health and Safety Regulations 2022* (WA); *Work Health and Safety Regulations 2022* (Tas); *Work Health and Safety Regulations 2012* (SA); *Work Health and Safety Regulations 2017* (NSW); *Work Health and Safety Regulations 2011* (ACT); *Work Health and Safety Regulations 2011* (QLD); *Work Health and Safety Regulations 2011* (NT)

***PCBU*** means person conducting a business or undertaking (Model WHS Legislation)

***SDS*** means safety data sheet

***SWMS*** means safe work method statement

***Victorian OHS Act*** means *Occupational Health & Safety Act 2004* (Vic)

***Victorian OHS Regulations*** means *Occupational Health & Safety Regulations 2017* (Vic)

***Victorian Legislation*** means *Occupational Health & Safety Act 2004* (Vic)*; Occupational Health & Safety Regulations 2017* (Vic)

# Special Effects Hazard Guide

## 1. Overview

This guide provides information to assist in managing risks associated with working with **special effects** in live entertainment and events. Information in this guide is based on the Australian WHS/OHS Framework. See also part 5 – Legislation, Standards and Guidance.

It is recommended that this information is referenced during the planning and delivery of events to assist in identifying hazards, assessing risks and determining appropriate control measures to eliminate and or minimise these risks, so far as reasonably practicable. This guide does not replace the need to implement risk management strategies, undertake research or seek specialist advice.

Each person conducting a business or undertaking (**PCBU**), or Employer who manages or controls a workplace has a responsibility to understand their obligations under WHS Legislation. Workers and employees also have a responsibility to ensure they don't endanger themselves or others. Australian and International Standards provide approved guidance on how to meet work health and safety obligations. Codes of Practice and Compliance Codes are available from the state regulator e.g. SafeWork NSW, or the WHS regulator in your state or territory.

A Code of Practice, or Compliance Code is a refined version of a Standard, which also refers to Australian WHS/OHS framework legislation. They can be easily read and understood, with information on specific work tasks and procedures, to assist you to achieve compliance required under the WHS/OHS Acts and Regulations in each state or territory.

**Special effects hazards** can cause many types of injuries, and in extreme cases, death. Types of injuries can include burns, slips and falls, flash/eye injuries, hearing issues. Special effects hazards can also result in fire, water damage, explosions, hazardous leaks and spills. The risk of injury from special effects is strongly linked to where and how they are used. The risks are greater when working with portable equipment, custom made equipment/props, or with fragile equipment that can be damaged through repeated use and movement.

There will always be something new, something bigger, brighter and more 'special' to thrill and excite audiences. The desire to create a spectacular special effect that has never been seen before is both understandable and inevitable. This continual innovation and invention brings a special responsibility to the process of managing hazards associated with special effects. The sometimes unknown consequences of a newly-designed special effect require that extensive testing is undertaken within a controlled environment. This should occur before the introduction of all other elements, whether they are scenic elements, performers, technicians or audiences.

This Special Effects Hazard Guide provides practical information and suggested control measures for items such as:

- Naked Flame – flame effects
- Pyrotechnics
- Gases – CO2, LP Gas
- Projectiles – air propelled projectiles, drop effects, confetti, petals, balloons
- Atmospheric – smoke, hazers, dry ice (CO2)
- Noise
- Water
- Hazardous Props – breakaways, breakables, exploding, sharps

- Firearms – weapons, replicas
- Lighting – lasers, strobes, strobe like effects, UV lighting
- Cooking – on set/stage
- Practical household appliances – toasters, irons
- Wind – fans

Part 1. Safety Guidelines for Live Entertainment and Events – Commitment and Responsibilities, provides general information on duties, obligations and risk management.

## 2. Key Considerations

| The following questions must be considered during event design, planning and delivery. Use them to identify hazards and plan how risks will be managed. | Yes | No | Comments/Action |
|---|---|---|---|
| **2.1 Design and planning** | | | |
| *Has the scope of work been clearly defined (duration, equipment, scheduling, location)?* | ☐ | ☐ | |
| *Have other PCBUs/workers or Employers/employees who will be affected by this activity been identified?* | ☐ | ☐ | |
| *Have arrangements been made to consult with and coordinate activities with other PCBUs/Employers?* | ☐ | ☐ | |
| *Have site/venue specific safety requirements or procedures been considered?* | ☐ | ☐ | |
| *Has appropriate planning been undertaken for the transport of the special effects?* | ☐ | ☐ | |
| *Has appropriate planning been undertaken for the storage of the special effects?* | ☐ | ☐ | |
| *Have Safe Operating Procedures and Safe Work Method Statements (**SWMS**) been sought from the manufacturer/supplier of the special effects?* | ☐ | ☐ | |
| *Does the venue need to sign off/approve the special effect prior to use?* | ☐ | ☐ | |
| *Has this special effect been used before?* | ☐ | ☐ | |
| *Have all pieces of electrical equipment relating to the special effect been visually inspected, tested and tagged?* | ☐ | ☐ | |
| *Will there be a requirement for an ongoing special effects equipment maintenance program?* | ☐ | ☐ | |
| *Have appropriate Safety Data Sheets (**SDS**) been obtained?* | ☐ | ☐ | |
| *Where required, have appropriate approvals been sought and granted?* | ☐ | ☐ | |

| 2.2 Event delivery | | | |
|---|---|---|---|
| *Have the people working with the special effects been given information, instruction and training?* | ☐ | ☐ | |
| *Have all people within proximity of the special effect during its operation been briefed and rehearsed?* | ☐ | ☐ | |
| *Are appropriate emergency procedures in place?* | ☐ | ☐ | |
| *Have all safety checks and risk management procedures been undertaken?* | ☐ | ☐ | |
| *Have there been visual and other inspections of special effect sites, including those remote to the operator?* | ☐ | ☐ | |
| *Are safety officers, crowd controllers, ushers, spotters briefed and in place?* | ☐ | ☐ | |
| *Are appropriate audience warnings in place?* | ☐ | ☐ | |
| *Have all pieces of electrical equipment relating to the special effect been visually inspected, tested and tagged?* | ☐ | ☐ | |
| *Has the possibility that additional hazards may be introduced by a combination or sequence of effects been considered? (Have the various special effects been risk-assessed in a holistic as well as individual effect manner?)* | ☐ | ☐ | |

# 3. General Guide – Special Effects

## 3.1 Responsibilities

WHS and OHS Regulations in all states and territories specific requirements on PCBU/Employers concerning work that involves noise and hazardous chemicals both a part of the special effects industry, including:

- Exposure of workers to noise at the workplace requiring PCBUs/Employers to carry out audiometric testing where a worker is frequently required to use PPE to guard against excessive noise (LPA Hazard Guide 06 – Performer Hazards).
- Health monitoring in respect of workers carrying out specific work for the business in relation to hazardous chemicals (see LPA Hazard Guide 05 – Hazardous Chemicals).

Duty holders may also have additional responsibilities under state regulations.

## 3.2 Training and competence

Different licensing and competency requirements apply across Australian states and territories. Across the myriad special effects utilised in the entertainment industry there are regulated, non-regulated and legislated requirements for many of the effects. Responsible persons should check with their state authorities to clarify what type of licence/s are required in the relevant jurisdiction.

The rehearsal of special effects under show conditions is imperative to the ongoing and repeated safe delivery of special effects. In circumstances where multiple special effects are designed to run sequentially or concurrently, it is important to structure rehearsals in a manner that progressively builds to the full effect. For example – start under work light with limited other distractions. Once competence and familiarity builds, introduce other elements, effects and hazards such as stage lighting, sound, pyrotechnics, hazers, methodically and systematically, until the full array of effects is operating safely and predictably within the performance environment.

## 3.3 Consultation, cooperation and coordination

The WHS Acts and the Victorian OHS Act make consultation with workers a legal requirement. Consultation, cooperation and coordination between PCBU/Employers is a requirement where they share a duty for the safety of a worker/employee or for work to be done.

PCBUs/Employers should use the information in this guide to consult, cooperate and coordinate with workers including event staff, to determine the hazards and risks associated with planned special effects and how to best eliminate or minimise these risks using the hierarchy of controls.

Consultation should start as early as possible, before decisions are made, and continue through the duration of the event.

Consider the other parties who will need to be involved in the consultation process in the planning stages of the event and determine what information needs to be shared and discussed as part of your risk assessment.

During an event, PCBUs/Employers are required to consult, cooperate and coordinate with other parties such as the venue or site management, unions, production companies, designers*, event organisers or promoters, catering providers, security, subject matter experts such as licensed pyro technicians or safety officers, local authorities or governments, rigging companies, performers, suppliers of plant or equipment.

If workers/employees are represented by health and safety representatives the consultation must involve those representatives.

Areas to address during consultation may include induction, schedules, floor plans, set elements, lighting and sound designs, site specific requirements, risk assessments, SWMS, SDS, hazards and control measures, legislative requirements, licences, plant movement, traffic management, exclusion zones, key contacts, emergency procedures, permits to work. Opportunities for consultation include toolbox talks, event briefings, site inspections, stakeholder meetings, post event reviews, working groups or forums.

***NOTE** – Designers have an additional responsibility to prepare a risk assessment on how items they have designed can be used safely. PCBUs/Employers have a responsibility to request this risk assessment from designers to ensure they are fully informed as to all aspects of the design.

### 3.4 Design and planning

In the early stages of design and planning for an event, the following criteria should be addressed when planning to work with special effects:

- Consultation with relevant PCBUs/workers and Employer/employees
- Consultation with all departments that will be affected by the use of the special effect
- Determining whether a specialist is required for the realisation of the special effect
- Development of separate risk assessments and SWMS, including controls agreed to during consultation, for each individual special effect (Each special effect should have its inherent risk assessment and any combinations of effects should be considered holistically)
- Selection of equipment needed to realise the special effect
- Agreed scheduling and allocation of resources to minimise impact on others
- Access to site and delivery logistics
- Appropriate storage facilities for special effects equipment and consumables
- Specific maintenance checklists for special effects equipment should be included in SWMS. Evidence of gear being in good order.
- Emergency procedures in the event the special effect fails at cue time or occurs adversely pre or post cue
- Identification of any residual hazards that may exist after special effect has finished, e.g. unexploded pyrotechnics
- Development and documentation of a clear hierarchy of command, that is, a series of ‘go’ or ‘no go’ protocols that is followed prior to each special effect or series of special effects being cued to ‘go’

### 3.5 Event delivery

In the delivery stages of an event (bump-in, rehearsal, show, performance, bump-out) the following criteria should be addressed when undertaking work with special effects:

- Consultation with relevant PCBUs/workers and Employers/employees
- Site-specific inductions
- Equipment inspections and/or maintenance (provision of equipment in good order)
- Work permits or engineering certificate requirements
- Equipment and environment checks – daily, weekly and pre and post show
- Post show analysis and checks for residual unexpected risks

- Implementation and monitoring of controls identified in risk assessments or SWMS
- Compliance to legislative requirements
- Review, consultation and adjustment control measures as required on site
- Incident reporting, management and communication procedures
- Sign-off and handover procedures

### 3.6 Review

After an event, the following criteria should be reviewed in consultation with relevant parties:

- Incident reports and outcomes including any near-misses
- Effectiveness of the control measures
- Scheduling
- Areas for improvement
- Incidents of non-compliance
- Any new hazards or risks identified

### 3.7 Documentation and records

The following documents and records should be created, maintained and kept on site when working with special effects during an event:

- Risk assessments and SWMS
- Training records, certificates of competency and licences
- Induction records
- Toolbox talk topics and attendance
- Evidence of consultation
- Incident reports, including near-misses
- Maintenance records (evidence of equipment in good order)
- Engineering certification, work permits and sign-off records.

Any of the above documents could be requested to be sighted by other PCBUs for verification or clarification and should be available at all times.

Some WHS/OHS documents and records need to be retained for a specific period of time – see relevant WHS/OHS legislation in your state or territory for details.

# 4. Suggested Control Measures

## 4.1 General special effects

Events/Performances often contain one or more special effect(s). Each special effect is often unique in its effect, it is therefore important that each special effect is carefully and systematically risk assessed and managed due to the serious consequences that may result from an uncontrolled effect going wrong. In addition, once each effect is individually risk assessed, a combination or sequence of effects should also be risk assessed as a whole.

All equipment must be well maintained and must not be used if it appears faulty. Workers must be trained in conducting routine inspections and clearly understand how to report worn, faulty or damaged equipment.

Unsafe equipment must be disconnected or isolated and 'out of service' ('lockout') tagging procedures must be understood. 'Return to service' procedures should be understood and include testing of equipment prior to use.

## 4.2 Naked flame – flame effects

Often inspection and approval of a proposed naked flame and naked flame special effect must be carried out by a suitably qualified person – someone who has acquired the knowledge and skills to carry out the task through training, a qualification or experience.

In some jurisdictions only the local fire brigade can carry out this inspection. In some states there is a requirement that a qualified person is present for the entire performance where a naked flame or flame effect is being used.

In addition to any special firefighting staff, equipment and procedures identified by the risk assessment, control measures could include:

- Removing combustible materials from the proximity of the flame
- Ensuring that all scenic elements and costumes are appropriately fireproofed
- Consider the height of flames (e.g. Venue roof is 10 metres high, Truss with equipment is suspended at 8 metres, maximum height of flames would be 4 metres)

## 4.3 Pyrotechnics

Pyrotechnics are high-risk special effects. Each pyrotechnic special effect requires a thorough risk assessment with a range of controls.

In almost all circumstances pyrotechnics (or fireworks) can only be used by a licensed pyrotechnician or people under their direct supervision.

There are specific storage, permit, licence and record keeping requirements for pyrotechnics and pyrotechnicians. Each state and territory has their own specific legislation and regulations governing the use of pyrotechnics.

**Permits and licensing, storage and use of fireworks and explosives:**

- New South Wales:
  - Fireworks Licences
  - Firework display notifications

  - Operational conditions for pyrotechnicians and single use fireworks licences
- South Australia:
  - Fireworks and special effects licences; permits
  - Fireworks use and user competence Technical Note
- Western Australia:
  - Fireworks Permit
  - Applying for a pyrotechnics (special use) licence
  - DGS_GN_StorageOfExplosives.pdf
- Queensland:
  - Fireworks licensing and Handling
  - Fireworks operator licences
  - Planning a fireworks display
  - Notification
  - Reporting
  - Storing
- Tasmania:
  - Apply for a pyrotechnician permit
  - Fireworks Permits
- Northern Territory:
  - Fireworks Licencing and Registration
  - Fireworks
- Australian Capital Territory:
  - Fireworks Permits
  - Fireworks and explosives licensing
- Victoria:
  - Pyrotechnician licences
  - Using fireworks and permits
  - Explosives | WorkSafe Victoria
  - Code of practice: The storage and handling of dangerous goods
  - Security plan for storing explosives

**New and Additional Requirements for Victoria**

- **Licences –** WorkSafe Victoria no longer provides licences that allow for the discharge of theatrical fireworks, display fireworks or Chinese crackers on a single occasion.
- **Notification –** For Indoor and/or theatrical displays WorkSafe, the relevant local council and the fire authority must be given seven days' notice.
- **Storage –** Pyrotechnicians can temporarily store fireworks for seven days (in line with the notification period). The temporary storage must also meet the requirements for medium-scale storage and is limited by quantity. A medium-scale storage licence is not required.

The seven day storage period is generally acceptable, especially for theatrical pyrotechnics. However, outdoor fireworks are only limited to quantities and not by time. Based on the regulations for outdoor fireworks the storage allowed is a very small amount. This applies to the pyrotechnics at home or in a workplace. For example, you cannot store 100 kg of fireworks at a venue.

There is a practical storage situation where Worksafe Victoria acknowledges that a larger amount of fireworks may be sitting at a venue ready to be set up. For example, the product is placed in the pyro storage room and locked up at the venue. However, this does apply for 7 days. It only applies for a

period that is reasonably expected to be at the venue. Overnight may be acceptable or the fireworks could arrive at the venue on the same day of the show and used that same day.

Also see part 5 of this guide - Legislation, Standards and Guidance for State and Territory Legislation.

**NOTE:** New units referred to as "Sparkulars" burn metal powder generating a fountain like effect and are currently not requiring a licence to operate. The burn temperature on Sparkulars is high and can be dangerous. They require constant cleaning and removal of residual powder and accumulation has caused ignition within the device. **Saprkulars can be dangerous (there have been incidents involving Sparkulars causing injury to operators) and MUST be operated by experienced and competent persons.**

### 4.4 Gases – $CO^2$, LP Gas

Gas based special effects do not require a pyrotechnic license but do require competency and skill to set up, operate and dismantle.

In some states (Queensland and Western Australia), there are requirements to have a qualified plumber or gas fitter to fit and test lines and connections. This applies in the initial design and build of a system.

Storage and handling of $CO^2$ and LP Gas are set out in LPA Guidelines - Dangerous Goods Regulations. It is advisable to get assistance in selection and operation of devices like flame units, $CO^2$ units and check regulations in each state.

Consider the height of gas jets and LP Gas flames (see Part 4.2 above). Gas levels and nozzle size need to be considered.

**State Gas requirements:**

- Safework Australia: Storing Hazardous Chemicals
- New South Wales: Flammable Substances
- Northern Territory: Gas Appliance
- Queesnland:
    - Petroleum and Gas Health and Safety
    - Petroleum and Gas Safety Regulations 2018
- Sout Australia : SA Gas Regulations 2012
- Victoria: Code of Practice – storage and handling dangerous goods
- Western Australia: Dangerous-Goods What is required for the safe handling

### 4.5 Projectiles – air propelled projectiles, drop effects, confetti, petal drops, balloons

Ensure that the discharge of projectiles is not toward performers, technicians or audience members.

Contents of effects such as confetti cannons need to be made of soft materials with the aim of eliminating the chance of strike injuries.

Any pressure settings have to be thoroughly checked and refined for each deployment of the effect, especially in touring situations where the size of the effect may need to change when the venue size varies.

Effects such as confetti and petal drops require setting and operating procedures that eliminate the introduction of foreign and potentially dangerous particles into the drop. Dust and other particulates or projectiles could lead to injury or health problems.

### 4.6 Atmospherics – smoke, hazers, dry ice ($CO_2$)

Only approved substances can be used in the production of atmospheric effects such as smoke, haze and dry ice. SWMS, SDSs and risk assessments are all essential to assist in eliminating risks associated with atmospheric effects such as slips, falls, asphyxia and disorientation.

Control measures could include:

- Ensuring appropriate ventilation to guard against oxygen depletion
- Monitoring $CO_2$ and $O_2$ levels
- Placing smoke machines and hazers in trays or containers to capture excess residue or spills
- Safe storage of fluids
- Using the correct fluid

### 4.7 Noise

Part 4.1 of the WHS Regulations in all states and territories except Victoria, and Part 3.2 Division 2 of the Victorian OHS Regulations in Victoria, impose specific duties and obligations on PCBUs/Employers regarding the exposure of workers to noise at the workplace and should be consulted.

In the context of the entertainment and event industry, noise can be generated from a number of sources beyond plant and equipment. Sound systems and aural sound effects can be classified as a noise risk within the workplace and must be treated as a potential risk to the health and wellbeing of everyone exposed to loud and prolonged sound levels.

### 4.8 Water

Use of large quantities of water for a special effect can bring with it many types of hazards, including electrical shocks or electrocution, flooding (water damage), water borne contaminants, disease and parasites. Each of these risks needs to be assessed and appropriate control measures put in place.

Control measures include:

- Use of appropriately designed and engineered holding tanks and transfer equipment that remove the potential for leaks or bursts
- Appropriate water filtration and treatment to ensure that the water used in the special effect remains free of contaminants, disease and parasites

## 4.9 Hazardous props – breakaways, breakables, exploding materials

Specialist props can be a source of risks particularly when they are breakaways, sugar glass, exploding or other breakable materials. Special care should be taken when designing and constructing these special effects, and the execution of them should be undertaken in a controlled manner. Extensive trials and rehearsals will be required in order to mitigate risks and unintended outcomes that could endanger the health and safety of crew, performers, audience members or the public.

## 4.10 Firearms – blank firing, replicas and imitations

All firearms, whether a replica or an imitation, regardless of the construction or workings, are considered a "real firearm" and therefore require a special permit from the Australian Firearms Registry. This also includes realistic-looking plastic toys.

The use of any form of replica or imitation firearm in an event/performance environment will require the oversight of a specialist armourer or ordinance supplier. The armourer will train all performers and non-performers in the safe handling, use, care and storage use of the firearms. Each state and territory has prescriptive legislation that controls the supply and use of such items. This legislation should be consulted prior to any use of firearms within a production or event.

Repeated rehearsals in a safe and controlled environment are essential to the safe use of firearms in an event/performance environment. Special facilities such as appropriate lockable storage facilities and a rigorous key handling system will be required for all imitation and replica firearms.

## 4.11 Weapons – replicas and imitations

A weapon is characterised as anything that can be used, or usable for inflicting bodily harm. In an event/performance environment, a 'weapon' could be, for example, a phone book, walking stick, a necklace or a replica sword or imitation spear, anything which could be used, or usable to portray an act of harm.

It is advisable not to refer to these 'weapons/proxy weapons' as props, because props are usually static/rigid or remain in one place in a theatrical/event setting, and are not choreographed into physical movements of artists.

Repeated rehearsals in a safe and controlled environment are essential to the safe use of all weapons in an event/performance environment.

## 4.12 Prohibited weapons

Each state and territory has legislation that controls the supply, possession and use of 'prohibited weapons'. Prohibited weapons lists are available from each of the state and territory police websites. These particular weapons fall into the same category as theatrical firearms and require the same protocols for securing permits for the supply, use, storage and handling of such weapons.

It is the PCBU/Employer's responsibility to ensure all permits and the correct paperwork are completed and filed with the relevant authorities before obtaining and using these types of weapons.

## 4.13 Specialist lighting – lasers, strobes, strobe like effects, UV lighting

***NOTE – Some forms of specialist lighting, particularly strobe effects can have detrimental health implications for some individuals. A competent and suitably trained operator should supervise their use and appropriate audience warnings should be given.***

Use of lasers in an event environment may require special permission and depending on the laser deployed. A licensed operator may also be required. Further information can be found within the AS/NZS 2211 and http://www.arpansa.gov.au/radiationprotection/basics/laser.cfm

Lasers are classified according to the hazard associated with their emissions, as defined in the Australian/New Zealand Standard AS/NZS IEC 60825.1:2011 *Safety of Laser Products Part 1: Equipment classification and requirements*, AS/NZS IEC 60825.14:2011 *Safety of Laser Products Part 14: A User's guide*.

- Class 1 and 1M lasers are safe under reasonably foreseeable conditions of operation. Class 1M can be hazardous if the beam is viewed with magnifying optical instruments (hence the letter 'M' is added).
- Class 2 and 2M lasers emit visible light at higher levels than Class 1, but eye protection is provided by aversion responses such as the human blink reflex. Class 2M lasers can be hazardous if the beam is viewed directly with magnifying optical instruments.
- Class 3R lasers produce visible and invisible light that is hazardous under direct viewing conditions. There is low risk for eye injury provided the exposure time is short. There is no risk for skin injury.
- Class 3B lasers produce visible or invisible light that is hazardous under direct viewing conditions; either they are powerful enough to cause eye damage in a time shorter than the human blink reflex (0.25 seconds) or the blink reflex is by-passed due to the invisibility of the beam. Laser products with power output near the upper range of Class 3B may also cause skin burns.
- Class 4 lasers are high power devices capable of causing both eye and skin burns, their diffuse reflections may also be hazardous and the beam may constitute a fire hazard.

## 4.14 Cooking – on set/stage

Cooking on stage as part of an event or performance carries a number of risks such as electric shock, electrocution, burns, scalds. Minimising the amount of actual cooking and designing less hazardous cooking methods are ways to eliminate or minimise the risks.

Where it is possible, the use of experienced operators coupled with careful planning and rehearsal of any cooking effects, are other control measures that should be considered as part of the risk assessment.

## 4.15 Practical household appliances – toasters, irons

Appliances on stage are required to meet the Australian WHS/OHS Framework in each state and territory in relation to electrical safety. These requirements are outlined in the LPA Hazard Guide 02 Electricity Hazard Guide. Care should be taken to ensure that the appliance does not create unintended hazards such as fire and/or smoke. On stage appliances must have a mechanism to isolate the power supply that can be activated remotely to the stage.

### 4.16 Wind – fans

Wind machines vary in size from small hand held devices that produce small flows of air to large wind machines that can produce pressures that can blow people and scenery over.

Apart from the standard electrical test and tag, special care must be taken in assessing the action of blades, control positions, surrounding scenery and travel of performers in front of the wind stream. If the fan is used to dissipate haze or smoke, the accumulation of liquid on the blades, in the motor or even the handles should be monitored.

Special care must also be paid to the intake of the fan. If placed in a position that is not clean and clear of debris, the fan can pick up particles of dust and dirt and fire them along the wind path. An example of this was a fan next to a ballet rosin tray and as the rosin was scuffed up by the shoes, the particles were thrown on stage.

Another consideration should be the guards on the blades.  The guards must be suitable to protect the fingers of the operators who may have to move the fans. The passage ways around the fans must be a suitable distance to ensure costumes and other soft materials cannot be sucked into the mechanism.

# 5. Legislation, Standards and Guidance

## Australian WHS/OHS legislative framework

### Duty of Care

**WHS Acts**
**(NSW, QLD, ACT, NT, SA, TAS and WA)**

Part 2 Health and safety duties

- Division 2 – Primary duty of care, s 19
- Division 3 – Further duties of PCBU, s 20, 21, 26
- Division 4 - Duty of Officers, s 27; Duty of Workers s 28, Duty of other persons at the workplace s 29

**OHS Act 2004 (VIC)**

Part 3 General duties relating to health and safety
- Division 2, Main duties of employers, s 21, 22, 23, 24, 25, 26, 31

### General Risk and Workplace Management

**WHS Regulations**
**(NSW, QLD, ACT, NT, SA, TAS and WA)**

Part 3.1 Managing risks to health and safety 33 - 55, Part 4.2—Hazardous Manual Tasks, Section 60 (1) Part 4.3—Confined Spaces Section, 66(1) Part 4.4—Falls Section 78, 79, 80 Part 4.5—High Risk Work, Section 81, 82, 84, 85 Part 4.7—General Electrical Safety in Workplaces and Energised Electrical Work Section 147,163, 166 Division 7—General duties of persons conducting a business or undertaking involving the management or control of plant Section 203, 204; Construction - 297, 315

**OHS Regulations 2017** (VIC)

- Chapter 2—General duties and issue resolution 18 (1)
- Chapter 3 Physical Hazards 26, 27, 28, 34, 36, 44 >49, 56 >62 Chapter 4—Hazardous substances and materials 155 >164 Chapter 5—Hazardous industries, Part 5.1—Construction - 325, 326, 328, 329

### Consultation

**WHS Acts**
**(NSW, QLD, ACT, NT, SA, TAS and WA)**

Part 5 - Consultation, representation and participation
- Division 1 - Consultation, co-operation and co-ordination between duty holders, Section 46
- Division 2 - Consultation with workers, Section 47, 48, 49

**OHS Act (Vic)**

Part 4 - Duties of Employers to consult
- Duty of employers to consult with employees, s 35
- Duty to consult with other employers in relations to duties relating to labour hire, s 35A

### Hazardous Chemicals & Substances:

**WHS Regulations**
**(NSW, QLD, ACT, NT, SA, TAS and WA)**

Chapter 7 Hazardous Chemicals
- Part 7.1, Sub Division 3, Obligations of PCBU, 341 to 350
- Division 5, Control of Risk, Obligations of PCBU, 351 to 391

**Victorian OHS Regulations**

Chapter 4 Hazardous Substances & materials –
- Division 3, Duties of employers and self employed persons, 153 to 176

## State Fireworks Regulations

- South Australia - Explosives (Fireworks) Regulations 2016
- New South Wales - Explosives Regulation 2013
- Queensland - Explosives Regulation 2017
- Victoria - Dangerous Goods (Explosives) Regulations 2022
- Western Australia - Dangerous Goods Explosives 2007
- Tasmania - Explosives Regulations 2022
- ACT - Dangerous Substances (Explosives) Regulation 2004
- NT - Dangerous Goods Regulations NT 1985 (current)

## Safe Work Australia Codes of Practice

- Safe Work Australia (2020) Managing noise and preventing hearing loss at work
  model code of practice managing noise and preventing hearing loss at work.pdf

- Safe Work Australia (2023) Preparation of safety data sheets for hazardous chemicals
  model code of practice preparation safety data sheets for hazardous chemicals.pdf

- Safe Work Australia (2018) Managing electrical risks in the workplace
  Model Code of Practice: Managing electrical risks in the workplace

- Safe Work Australia (2018) How to manage work health and safety risks
  Model Code of Practice: How to manage work health and safety risks

## Worksafe Victoria Compliance Code

- Worksafe Facilities and the Working Environment 2023
  Compliance code: Workplace facilities and the working environment (worksafe.vic.gov.au)
- Hazardous Substances 2019
  - Compliance-code-hazardous-substances-2022-11.pdf (worksafe.vic.gov.au)
  - Compliance code: Hazardous substances - Key changes | WorkSafe Victoria
- Dangerous Goods
  Dangerous goods | WorkSafe Victoria

## Australian and New Zealand Standards – available to purchase

- AS 2187.2-2006 Explosives – Storage and use – Use of explosives
- AS 2187.3-1999 Explosives – Storage, transport and use – Pyrotechnics – Shop goods fireworks – Design, performance and testing
- AS/NZS 2211.3:2002 Safety of laser products – Guidance for laser displays and shows

- AS/NZS 4249: 2022 Electrical installations and safety practices
- AS 2030.1 – 1999: Cylinders for Compressed Gases other than Acetylene
- The following links are potential sources of information that may assist in the assessing of risk where special effects are being considered for use during an event:

**The following links are sources of information that may assist in the assessing of risk where special effects are being considered for use during an event:**

### Safe Work Australia Guidelines:

Safe Work Australia Fact Sheet: Electrical Risks at the Workplace

Worksafe Victoria OHS Guidelines Search: WorkSafe Victoria - Search Search Results: Guidelines OHS

**Regulator information:**

Worksafe Victoria: Using fireworks | WorkSafe Victoria

Safework NSW: Fireworks | SafeWork NSW

QLD Gov: Fireworks | Emergency services and safety | Queensland Government

Western Australia Gov: What is required for the safe use of fireworks? (dmp.wa.gov.au)

Safework SA: Links to relevant Firework information

Worksafe NT: Fireworks | NT WorkSafe

Worksafe ACT: Links to relevant Fireworks information

**The Following lists are samples only of what guidance is available if required – There are many others that you can find to help assess the risks:**

National Code of Practice for the Storage and Handling of Workplace Dangerous Goods [NOHSC: 2017 (2001)]
https://www.safeworkaustralia.gov.au/system/files/documents/1702/codeofpracticestorageandhandingdangerousgoodsnohsc2017-2001_pdf.pdf

Australian Code for the Transport of Explosives by Road and Rail
https://www.safeworkaustralia.gov.au/system/files/documents/1702/australian_code_transport_explosives_road_rail_3rd_edition.pdf

Work - related eye injuries in Australia
https://www.safeworkaustralia.gov.au/system/files/documents/1702/workrelatedeyeinjuriesaustralia_2008_pdf.pdf

**Armoury references:**

Theatrical Armourer - NSW Police Public Site
High Risk Production Activities - Armourer Details

## Relevant Legislation

Australian states and territories control the regulation of the sale, purchase, possession, and storage of firearms and ammunition, including imitation firearms. The following legislation applies:

**Australian Capital Territory:** Firearms Act 1996, Firearms Regulation 2008:
**https://www.legislation.act.gov.au/a/1996-74/**

**New South Wales:** Firearms Act 1996, Firearms Regulation 2006:
**https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1996-046**

See also: Weapons Prohibition Act 1998 and Weapons Prohibition Regulations 2017

**Northern Territory:** Firearms Act 1997, Firearms Act Regulations 1997:
**https://legislation.nt.gov.au/en/Legislation/FIREARMS-ACT-1997**

**Queensland:** Weapons Act 1990, Weapons Regulations 1996**:**
**https://www.legislation.qld.gov.au/view/pdf/inforce/2014-05-21/sl-1996-0440**

**South Australia**: Firearms Act 1977, Firearms Regulations 2008:
https://www.legislation.sa.gov.au/LZ/C/R/Firearms%20Regulations%202008.aspx

**Tasmania**: Firearms Act 1996, Firearms Regulations 2006:
https://www.legislation.tas.gov.au/view/html/inforce/current/act-1996-023

**Victoria**: Firearms Act 1996, Firearms Regulations 2008: https://www.legislation.vic.gov.au/in-force/acts/firearms-act-1996/096

**Western Australia** Firearms Act 1973, Firearms Regulations 1974:
https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_1453_homepage.html

**SPECIAL NOTE**: Productions in New South Wales and Queensland must take professional advice about the ability to use operable firearms. NSW and Queensland laws prohibit the use of firearms that have not been modified to prevent the chambering or discharge of a live round.

National Firearms Agreement Feb 2017 defines in 6c ii - film and theatrical armourers are defined as able to hold a license https://www.ag.gov.au/sites/default/files/2022-09/crime-national-firearms-agreement.pdf

**Queensland** - Armourers, theatrical ordnance, and the use of firearms and blank-firing ammunition on a set or in a theatrical production in Queensland is governed by the Weapons Act 1990, the Weapons Regulation 2016 and the Explosives Act 1999.

**Victoria** - FIREARMS REGULATIONS 2018 (SR NO 114 OF 2018) - SCHEDULE 4 Permit for display or theatrical armourers for licensed firearms dealer issued under section 92A of the Act.

**New South Wales** - FIREARMS REGULATION 2017 - REG 40 Theatrical Armourer

**South Australia** - Firearms Regulations 2017(under the Firearms Act 2015) Part 3 Division 2 Permits s46

| Version Control | |
|---|---|
| Title: Special Effects Hazard Guide | Version: V 2.0 |
| Owner: Live Performance Australia | Date amended: |
| Date of release: September 2024 | Date of review: September 2026 |

**Version 2 note:** Version 1 of the LPA Safety Guidelines were written when the Model WHS was believed to be rolled out in all Australian states and territories. This did not occur, and Victoria maintains its OHS Act and Regulations. The key differences include the use of the terms 'Employers' (as opposed to PCBU) and 'employees' (as opposed to workers). This version of the Guidelines has been modified to include this difference.