

**Safety Guidelines
of the PGI
Official Fireworks Safety Guidelines
in effect at PGI Conventions
Pyrotechnics Guild International, Inc.
2019**

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1. AUTHORITY AND SCOPE

1. These guidelines shall be known as the *Official Fireworks Safety Guidelines* and be cited as such. They shall be referred to herein as “The Guidelines.”

2. *Authority:* These guidelines were adopted by the Pyrotechnics Guild International, Inc. (PGI) in July 1983; revised July 1987, revised July 1990 [to incorporate changes to NFPA 1123 (1990)], revised June 1994 [to cover the rapid growth of PGI membership]; revised in April 2000 ; revised in May 2001; revised in November of 2008; and revised again in the spring of 2019 and shall remain an official document of the PGI until amended or discontinued. As NFPA codes are continually revised, NFPA-1123, NFPA-1126, and NFPA-160 in their current editions should serve to guide future revisions of these Safety Guidelines.

3. *Scope:* These Guidelines apply to the handling, storage, sale, discharge or other use of all kinds of fireworks and pyrotechnic or explosive devices during any official PGI convention. These Guidelines apply, without exception, to all PGI members, to friends, relatives, nonmembers and to all other persons attending a convention or on site during a convention.

2. SAFETY TEAM/SAFETY COMMITTEE (These two terms are synonymous and are used interchangeably in this document. Our Bylaws refer to “committees” while our colloquial terminology refers to “teams”.)

1. The need for safe conduct before, during, and after the discharge of fireworks cannot be over-emphasized. In order to ensure that fundamental requirements for safe conduct during the handling and discharge of fireworks are being observed, the Board of Directors of the PGI shall appoint, before each convention, a Safety Chairman and a Safety Team, having complete authority over all safety matters, subject only to the discretion of the Safety Director and the Board. The Safety Director shall be that member of the Board of Directors to whom the Safety Chairman directly reports and shall be elected by the Board from among its current members.

2. Members of the Safety Team shall be present before, during, and after the discharge of all fireworks.

3. If the Safety Chairman is unable to attend the convention, the officers of the PGI shall appoint a new chairperson for that convention.

4. The discharge of fireworks shall not begin until members of the Safety Team have surveyed the overall situation and are satisfied it is safe to proceed. Whenever adverse conditions arise that significantly affect safety, such as crowd control or weather, a member of the Safety Team, a member of Fire and Medical or a member of Security shall halt or postpone any or all pyrotechnic activities as they deem necessary. The resumption of those activities shall only take place upon approval of the Safety Team chairperson or his designate.

5. All safety personnel shall be provided with identifying insignia, such as shirts, vests, hats or other markings that are clearly identifiable.

6. At all important crowd control points, security shall be provided by members of the PGI security team, local law enforcement personnel, or privately contracted security personnel as determined by the Security Chairman in consultation with the Safety Director and the Board of Directors.

7. The Safety Team chairperson or his designate shall investigate any instances of unsafe behavior or conditions, whether observed directly or reported by others, and take appropriate action.

8. Any requirement in these Guidelines may be waived or modified by the Safety Chairman or Safety Director, at their discretion, or upon approval of a petition made to the Safety Chairman or Safety Director. Petitions must be in writing and received before the display, contain details of the specific request and the rationale for the modification of a specific requirement. Petitions that are approved apply only to the specific instance described in the Petition. However, when appropriate, the modification may be interpreted by the Safety Chairperson or his Designate to apply equally to all participants.

9. In the event of an accidental fire, explosion and/or similar emergency, the PGI Safety Team and Fire and Medical Team shall respond to the emergency situation and attempt to resolve the problem using all available resources. As soon as possible, the Chief(s) of the PGI Fire Medical Team shall coordinate this emergency response with the PGI Safety Director, and/or PGI Safety Chairman, his assistant or designate. Safety shall assume responsibility for management of explosive materials hazards in the area while working with Fire-Medical to allow them to render emergency medical and fire suppression services. PGI Members shall be prohibited from entering the problem area until the situation is resolved to the satisfaction of the PGI Safety Director and/or PGI Safety Chairman, his assistant or designate, the chief(s) of the PGI Fire Medical, and the authority having any jurisdiction in this matter. Priority shall always be given to saving life and minimizing hazardous risks to which the responding personnel are exposed. If all ranking persons are present, the hierarchy of PGI command with overall responsibility for managing the area of the accident or emergency shall be: PGI Fire-Medical Chairperson, PGI Safety Director, PGI Safety Chairperson, in that order.

3. GENERAL REQUIREMENTS

1. All safety personnel shall be qualified as determined by the Safety Chairperson and may be required to attend a safety class given by the safety director and key personnel of the safety team. They shall carry and keep as a reference, a copy of these Guidelines, and they shall be familiar with its contents.

2. No person who is acting in an irresponsible manner or appears to be under the influence of alcohol or other drugs shall be allowed to handle or discharge any fireworks.

3. Only PGI members or persons escorted by PGI members shall be permitted in any of the firing areas. Any persons under the age of 18 shall be accompanied by a responsible adult. Persons under

the age of 18 may discharge fireworks at open or other shooting sites as determined by the safety team member in charge of the firing area.

4. Smoking or open flames, other than devices used to ignite fireworks, shall not be permitted within fifty feet of any firing areas. Smoking may be allowed in areas specifically designated by the Safety Team.

5. Only flashlights, electric lights or approved means of illumination (some chemical devices may be approved such as Cyalume™ Light Sticks) shall be used at firing sites. Fusees, propane torches, or other approved means of ignition may be used by the pyrotechnist at a mortar line.

6. A first aid kit or means of contacting the Fire-Medical Team personnel shall be present at all times in areas where fireworks are present.

7. A portable water supply and/or fire extinguishers shall be available at firing sites, as specified by the safety chairperson, to be used for flooding mortars, extinguishing fires, etc.

8. Mortar cleaning tools shall be provided and shall only used to remove debris from mortars.

9. After delivery to the firing sites, fireworks shall not be left unattended and shall not be allowed to become wet.

10. The inside diameter of the mortar rather than the circumference shall be used when describing shell and mortar sizes.

11. Persons bringing boxes, bags or containers into the 1.3 G display fireworks firing line, hereinafter referred to as the “B line”, rocket, ground salute, or Class C/1.4G areas shall also remove the containers. Shooters shall leave no garbage. Dumpsters will be provided at various locations for trash disposal. No live material shall be placed in any trash container.

12. Salutes, Mortars:

a) All aerial salutes, of dimensions within those allowed by NFPA-1123 (current edition) shall be fired from paper, fiberglass, or HDPE (High-Density Polyethylene) mortars.

b) Multi-break shells containing large salutes shall be fired from mortars approved by the Safety Team. The Safety Team may allow or require special traditional multi-break shells to be fired from steel, heavy HDPE, or fiberglass mortars.

c) Salute shells of dimensions exceeding those of NFPA-1123 (current edition) require heavier than usual lifting charges and may require firing from steel, thick-walled fiberglass, or other special mortar types. Upon approval by the Safety Chairman or his designate, such large single salute shells may be fired from steel or other types of as noted above. Appropriate safety measures shall be determined by the Safety Chairman or his designate for firing such large salute shells and shall be effected.

d) PVC or ABS plastic mortars shall not be used unless specifically approved for such use, on site, by the Safety Chairman or his designate. PVC or ABS plastic tubes may be used to make whistle effects. The Safety Chairman or his designate shall make all final determinations regarding the use of PVC or ABS plastic devices. These brittle plastics are NOT NFPA approved for use as display

mortars, but, at the discretion of the Safety Chairman or his designate, may be occasionally used for firing small devices such as comets.

13. Salute restrictions (which do not require safety team approval): Aerial size – 5” O.D., 5” length. Ground Size – 3”O.D., 3” length. Ground salutes shall be suspended by string, wire, or other safety-approved means, at least 2 ft. above the ground, using frames assembled and approved by PGI personnel. Salutes exceeding these dimensions must be approved by the Safety Chairperson or safety personnel responsible for the area where such devices are displayed.

14. Ground salutes shall not be thrown.

15. All steel mortars and any mortars to be used for repeated hand firing shall be buried at least three quarters of their length in earth or sand free of rocks and any other hazardous debris.

16. No torpedoes shall be allowed. Exceptions to this rule, for demonstration purposes, may be granted by the Safety Chairperson.

17. Dry grass or combustible materials located beneath ground display pieces shall be wet down or removed, if possible, prior to the display if they are a potential fire hazard.

18. Poles and other bracing used for ground pieces shall be firmly placed, guyed or otherwise secured to prevent accidental displacement prior to or during the functioning of the ground piece.

19. Guy wires and stakes used to support ground pieces shall be marked with colored tape or ribbons to prevent personnel from being injured.

20. All personnel engaged in discharging fireworks shall wear protective clothing and utilize any safety equipment deemed appropriate by the safety committee. Examples of such clothing and equipment include, but are not limited to, safety glasses, ear plugs, and hard hats (optional). All personnel at the firing lines, whether actually discharging fireworks, assisting, or observing the discharge of fireworks MUST wear safety glasses. The Safety Team member in charge of the particular site shall determine the distances within which safety glasses must be worn.

21. At the shooting sites, Safety Team members shall closely observe the firing in order to detect and maintain an accurate count and location of misfires and duds.

22. After the completion of shooting for the night, all firing lines and fallout areas shall be inspected by Safety Team members in order to locate and retrieve hazardous materials which may be repurposed for training, ground displays, or other uses.

23. After securing the grounds for the night, members of the Safety Team or Security Team or others so delegated, shall again inspect the firing sites and fallout areas very early the following morning for any remaining materials.

24. Multi-break shells of up to three-breaks for 3" mortar ID and two-break for 4" mortar ID may be fired from above ground racks.

25. Plastic strip ties (zip ties) shall not be used to stabilize individual mortars or roman candles 2.5 inches in diameter or larger.

26. Cutting of fuse, using any type of cutting device (single blade, guillotine, double blade, etc.), including quick match, shall be prohibited when an electric match is known to be present in the fuse or quick match being cut.

27. At the display site- or elsewhere- assembly or repair of fireworks (including but not limited to attaching/removing electric matches or fuses/leaders) shall not be performed within 50 feet of any location where bulk fireworks, assemblages of fireworks, or boxes of display fireworks have been placed, even if only temporarily, during or pending the set up of the fireworks for a display or for discharge outside of a display.

28. Additional means of securing or stabilizing shall not be required if the fireworks device (such as a cake) is stable by means of an adequate base to height ratio or inherent weight while functioning.

4. 1.3G/Class B TESTING AND OPEN SHOOTING AREAS

1. This section provides Guidelines for the safe testing of Class B/1.3G fireworks in order to determine aspects of their performance.

2. The safety practices provided under article 3 shall apply to all instances of Class B/1.3G testing.

3. Clearly marked firing lines and firing direction shall be established by the Safety Team and observed by all participants. Class B/1.3G testing and open shooting shall be conducted only at these designated firing sites and only during times designated for this purpose. Exception: Small amounts of pyrotechnic compositions, stars, inserts, fuses, etc., MAY be tested at other locations and at other times as **explicitly** permitted by the Safety Team member in charge of the particular site.

4. All shooters may provide an assistant at the B-line for shells. Together they shall be responsible for spotting and retrieving duds or other hazardous materials that may result from their testing. All duds and hazardous materials shall be turned over to and utilized by the Safety Committee in an approved manner or returned to the shooter as approved by Safety. (See 3. 22.)

5. No shells over 6 inches in diameter shall be hand fired. Only qualified personnel shall install electric matches. The member of the Safety Team present shall determine a safe firing distance. Exceptions to this, such as use of visco delays, must be individually approved by safety personnel.

6. The member of the Safety Team present prior to use shall approve equipment such as mortars or rocket launchers provided by a participant.

7. Rockets shall be launched from guide tubes or racks constructed for the PGI or brought to the PGI convention by members and approved for use by the Safety Team.

8. Smoking is strictly prohibited within fifty feet of all Class B/1.3G firing sites.
9. All shells not loaded into mortars shall be in ready boxes, with ready box lids closed, at the time shells are fired from mortars. Cardboard boxes may be used only for transporting shells to the firing line. Upon arrival at the firing site, the shells must be placed in the ready box.
10. Shells with short leaders shall not be fired. For Class B/1.3G testing or open shooting and competition, a length of leader as determined by safety personnel to be adequate shall be exposed from the mouth of the mortar. All black match shall be fully covered with a safety cap until the moment of firing.
11. Both shooter and assistant shall leave the "B" line (the 1.3 G display fireworks firing line) area immediately after shooting. Safety personnel shall allow only two sets of shooters on the "B" line at any one time. When the number of available mortars and the distance between them allow it, the safety person in charge of a given area may make exceptions to this guideline.
12. Only single shells shall be tested or fired in open shooting. No multiple simultaneous firings of individual devices by multiple shooters shall be allowed. Class B/1.3G cakes, properly designed and engineered, with a maximum tube inside diameter of 4" mounted on a firm base and attached so as not to tip over when fired, shall be allowed at the discretion of the Safety Team member in charge of the area. Shells or reports fired from commercially made flare guns shall also be allowed if approved by the shoot line boss. Flights of shells may be allowed if connected to one fuse and approved by the Safety Team member in charge of the area.
13. Safety personnel shall have the right to inspect any and all material brought to the shoot line for firing. Defective material, bad leaders, under-lifted shells and any items not consistent with PGI guidelines shall be disallowed. Any unauthorized person possessing or attempting to use transportation classification 1.1, 1.5, 1.6 material (high explosives/blasting materials) shall be escorted from the shoot site, the material confiscated and a recommendation shall be made to the officers that the person shall be removed from the Convention pending a board review of possible expulsion from the Guild. Use of this material is not generally to be approved or endorsed at PGI conventions. Special effect demonstrations, other uses of such materials, and other exceptions, such as use by the safety team to destroy defective material, must be individually approved in each and every instance by the Safety Chairperson.
14. The Safety Team shall handle all misfires. No shooter shall attempt to remove any misfired shell from a mortar.

5. COMPETITION

1. Only those pyrotechnic devices meeting the specifications cited in the PGI Competition Rules shall be permitted in any competition.
2. All competitors are required to provide at least one competent assistant. Persons under the age of 18 may shoot their entries in competition as determined by the safety team member in charge of the firing area.

3. Individuals entering any competition are required to make all their pyrotechnic devices available for inspection and approval by a member of the Safety Team. Devices shall meet these requirements:

- a. Shells shall be of overall firm and adequate construction.
- b. Finished outside dimensions shall fit properly into the appropriate sized mortar.
- c. Leaders on shells to be hand fired shall have at least 6 or more inches or more protruding from the mortar after the shell has been properly loaded. Leaders shall have a safety cap installed over the end of the leader, and at least 3" (3-6 seconds burn time) of bare match available for igniting the shell to allow sufficient time for the pyrotechnist to retreat to a safe position.
- d. Additional lift charge shall not be added to the mortars prior to discharge of the shell or device.
- e. Shells shall be labeled with the type of shell and the name of the shell maker. If the shell contains one or more salutes, the shell shall be conspicuously labeled as such. The weight of all "bottom shots" must be disclosed and the shell label must include this information.
- f. It is recommended that shells be labeled as to size and have a warning label.
- g. Rockets and devices containing rocket motors such as girandolas must be evaluated and approved by the Safety Team prior to display in competition.
- h. Equipment used, such as rocket racks and mortars, shall be approved by the Safety Team.

3. Safety and other requirements as stated in the PGI Competition Rules shall be followed.

4. If an electric match fails to ignite the device, the competitor will be put on hold, the device will be re-matched and allowed to be shot at the end of that class of competition.

6. GUIDELINES FOR DISPLAY AREAS

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A. Preface

These are provisional safety guidelines for events taking place in the areas where displays are set up. Nothing here is intended to reflect in any way on the knowledge or abilities of the Chairpersons, Lead Shooters/Operators, Display Designers, Planners or others involved with those events. These Guidelines are intended only to address safety considerations. Because of the increasingly large numbers of attendees at conventions and the growing amount of pyrotechnic materials that may be present and used, careful consideration for safety is essential.

B. General

1. The Safety Team

- a. The Safety Chairperson and the Safety Team shall have the authority to administer these Guidelines.

2. Planning

- a. A Production Chairman, who is a member of the safety team, and who is appointed by the Board, will have the authority, in conjunction with the Safety Director and Chairman, to determine what displays are fired, when the displays are fired, where the displays are fired, the duration of the displays, and the evenings assigned for the displays.
- b. Before any work starts, all persons in charge of displays, product demonstrations, and other events in the display area shall meet with the Production Chairman to present a plan that must be approved by the Production Chairman working in conjunction with the Safety Director and the Safety Chairman.

3. Supervision

- a. For each event in the public display area, a qualified pyrotechnician in charge or his designate shall always be present while work is in progress.
- b. All persons who are in charge of an event or those who supervise others doing any work in the public display area, shall have passed the PGII Display Operators Certification or provide proof of other training and or licensure acceptable to the Safety Team prior to the commencement of work.
- c. Exceptions to this Guideline shall be made for those setting up their own Class C/1.4G competition items, provided all other safety provisions are followed.

4. Controlled access

a. In the interest of safety, access to the public display areas shall be controlled. Except for authorized PGI safety team staff, officers and officials, and AHJ staff, access shall be restricted to those members and crew wearing a wristband issued by PGI Safety for that specific day. However, provisions may be made for escorted or supervised tours upon request, as coordinated/permitted by the Production Chairman or his **or her** designee.

5. Storage

a. BATFE rules shall apply to magazines and storage.

6. Spectator protection

a. The minimum distances stated in Article 14 of the Official Fireworks Safety Guidelines shall apply for all events in the display area. Exceptions may be granted if equivalent protection to that of distance (such as physical barriers, etc.) is provided.

b. All pyrotechnic items shall, wherever possible, be vertical or directed away from the spectators. Angling or fanning of racks or mortars or other devices to create a performance effect may be permitted as determined by the safety Team. All reasonable care shall be taken to prevent items from inadvertently entering the spectator areas.

7. Precautions against fire

a. An adequate number and type of fire extinguishers, as required by the Fire-Medical Team, shall be available in the display area during the setup and firing of any pyrotechnic items.

b. Smoking or open flames shall not be permitted closer than 50 feet from any pyrotechnic items and then only in designated smoking areas.

8. Firing

a. Provisions shall be made for a secure and safe position for those who must be present to fire the display.

b. All persons in the public display discharge area **MUST** wear eye protection. Hard hats and ear protection are strongly recommended but remain optional.

c. In case of an emergency or accident, provisions shall have been made in advance for a signal or radio call to the personnel firing the display or demo that will result in immediate cessation of all firing. Personnel firing a display or demo must be in communication with the Safety Team and Production Chairman during the discharge of the display or demo.

9. Incidents

a. (See Article 2, Section 9) In the event of a fire, explosion, or other catastrophic event, safety and security shall establish a perimeter. Until an evaluation of the site is made by the Safety Director or Chairman and Fire-Medical Director or Chairman no persons other than as specified in Article 2, Section 9 shall enter the site.

C. Mortars

1. Size definition

a. Mortar size shall be stated as the measurement of the inside diameter.

2. Materials

a. Mortars shall be constructed of steel, HDPE, epoxy reinforced fiberglass or paper.

b. All mortar material shall be of sufficient thickness and strength to withstand the forces generated by the lift charges.

i. Mortars larger than 12 inches in diameter shall be constructed of steel with a steel bottom plate, HDPE plastic with adequate cross bolting or equivalent or epoxy reinforced fiberglass with an adequately plugged bottom so as to withstand the forces produced.

ii. Paper mortars shall be inspected before each use to insure they have not been weakened by loose and unwinding inside layers.

3. Plugs

a. All mortars shall be securely plugged at the bottom or molded as a one-piece assembly that is approved by the Safety Team..

b. Steel mortars may have a steel plate welded in/on the bottom, provided the weld is of good quality and forms a continuous water tight seal. The Safety Team may inspect mortars to ensure their integrity.

c. HDPE plastic mortars up to and including 4 inches in diameter may be of one-piece construction.

4. Length

a. Mortars used to fire very long or multi-break shells shall be approved by the Safety Team.

5. Defects

- a. Mortars with cracks, splits, bulges, excessive corrosion, loose or split plugs, delaminated paper tubes, or gaps between the plug and inside wall shall not be used.
- b. Mortars with dents, bends or restrictions along their length or at the muzzle shall not be used.

6. *Burial*

a. Mortars not in racks shall have a minimum of 3/4 of their length buried in the ground. All mortars to be used above ground shall be constructed of HDPE plastic, paper or epoxy reinforced fiberglass. Any above-ground use of steel mortars (for liquid fuel effects, in mortar boxes/troughs, etc.) MUST be explicitly approved by the Safety Chairman or Director or their designee OR by the Production Chair or by his or her designee. Single mortars may be secured in sand boxes or troughs and shall be buried at least one-half of their length in rock- and gravel-free sand. Drums may be used only if they are constructed of HDPE plastic and they contain only one mortar of 12 inch maximum inside diameter and have been inspected by the Safety Team for possible tip-over hazards. Free-standing or staked and tied mortars are not generally used in displays but may be allowed if each and every such use/instance is EXPLICITLY approved by the Safety Chairman or his designate. NO such use of free-standing, staked and/or tied mortars, without the requisite EXPLICIT permission, is allowed. Mortar separation in troughs or mortar boxes shall be a minimum of 1/2 the diameter of the larger mortar and mortars shall be placed a minimum of 1/2 the mortar diameter from box, drum, or trough walls. All steel mortars MUST be buried except as noted above. At the discretion of the Safety Chairman, steel mortars used for firing large, multi-break shells may be required to utilize an additional barrier to protect the audience.

7. *Racks*

- a. Racks for mortars shall hold the mortars securely and be well constructed. The maximum size mortars to be used in racks shall be 6 inch inside diameter. Pairs of eight-inch mortars may be allowed if approved by the Safety Chairman.
- b. Mortar racks shall be adequately braced to prevent tip-over and shall be placed perpendicularly to the spectators, whenever possible.
- c. Multi-break shells up to 3" in diameter of up to 3 breaks and up to 4" in diameter of up to two breaks may be fired from racks.
- d. Racks or boxed devices (cakes) containing mortars 3 in. (76 mm) or less in diameter to a maximum of 25 mortars per unit and racks or boxed devices (cakes) containing mortars 4 in. (102 mm) in diameter to a maximum of 16 mortars per unit are allowed.

8. *Protection*

a. All loaded mortars shall be sealed with taped down foil, cap plugs or other equivalent means of protection when the following conditions occur:

- i. Mortars will be left in the field overnight.
- ii. Other display material could drop sparks into the mortars and cause pre-ignition.
- iii. Rain or other precipitation is forecast or present.

b. Paper mortars shall be protected from excessive moisture and if buried in sand or earth, shall be wrapped in plastic.

9. Zip Ties

Plastic “Zip Ties” are felt to have insufficient capacity to remain intact when dynamic loading is applied and may not be used for securing or stabilizing mortar racks, roman candles, or other large (2.5 inches in diameter or larger) devices and may only be used to secure fuses, bundles of wires, proximate pyrotechnics, etc.

D. Shells

1. *Size definition*

a. The size of shells shall be stated as the inside diameter of the mortar from which they are to be fired.

2. *Transportation and handling*

a. All boxes of shells and other pyrotechnic materials entering the display area shall be organized and clearly labeled.

b. Shells being transported in vehicles onsite shall be in containers or boxes, and shall be so secured as to prevent damage from such movement.

c. To avoid possible hazards generated by friction or static, boxes or other containers of shells shall not be pushed or pulled around on the floor of magazines or transporting vehicles. They shall be lifted and carried.

d. The lids of all boxes and shell containers shall remain closed except when removing contents.

e. Whenever handled, individual shells shall be carried by their bodies, not by their leaders or lowering ropes.

f. Shells 10 inches in diameter or larger shall be carried either in unopened factory packages or one at a time.

g. Shells 16 inches in diameter or larger shall be transported in such a manner that the danger of dropping or otherwise damaging the shell is minimized.

h. Shells shall never be allowed to be dropped.

3. *Repair*

a. Shells found to be damaged, or that have been damaged in handling, shall not be used unless repaired by a person trained and competent in that type of repair.

b. Shells requiring more than minor repairs shall be inspected by the Safety Team after repairs have been made.

4. *Loading*

a. The “pyrotechnician in charge” shall instruct inexperienced crewmembers on the correct method of handling and loading of shells.

b. No part of the body should be placed over the mouth of the mortar during loading, matching or hook-up to the electronic ignition source.

c. All shells, especially large caliber ones (8 inch and larger) shall be lowered gently to the bottom of the mortar during loading. Shells shall not be dropped into mortars during loading.

d. Shells larger than 6 inches in diameter shall be lowered into their mortar with a lowering cord or rope and not by the shell leader.

e. The “pyrotechnician in charge” or an experienced supervisor, and a member of the Safety Team shall be present when mortars larger than 12 inches in diameter are being loaded.

5. *Firing*

a. All shells 7 inches in diameter or larger shall be fired electrically or with a visco delay.

b. Multiple-break shells, or unusually heavy shells requiring heavy lift charges, shall be fired out of steel mortars or other mortar types (e.g. heavy walled epoxy reinforced fiberglass) as specifically approved by safety.

E. Quick Match and Time Fuse

1. *Quick Match*

a. Pyrotechnicians are cautioned that quick match may be ignited by the heat of friction generated by abrasion. They should use care and take their time when working with quick match.

i. Do not use scissors or other two-bladed cutters to cut quick match.

ii. Recommended tools for cutting quick match are knives, side/end cutters, or Teflon coated blade/anvil type pruners.

iii. No cutting is permitted when an electric match is present in the fuse to be cut.

b. Quick match splices shall be secured against separation either from the weather or from handling.

c. Open ends on all quick match shall be covered with tape or safety caps.

d. Pyrotechnic items shall not be carried by their leaders. (Exception: chained finales).

e. All time fuses shall be secured against separation and sealed with tape against the weather and stray sparks.

2. *Thermalite*

a. Thermalite may be used for ignition sequence or timing, however, such assembly work shall take place only in areas as approved by safety and at least fifty feet away from other pyrotechnic items to prevent accidental ignition. Anvil type cutters with a plastic or brass anvil platform will be used to cut Thermalite. No metal on metal, shearing action cutters, such as scissors may be used for this purpose.

b. To the extent possible, thermalite shall be protected from sparks and other display items that might cause premature ignition.

c. Thermalite is “live, exposed pyrotechnic composition” and caution must be exercised in its use. Accordingly, all use of “exposed” thermalite shall be reviewed by the Safety Team.

3. *Visco*

a. Visco or green “safety fuse” may be used when factory-installed or where deemed necessary by the “pyrotechnician in charge” of an event. To the extent possible, visco shall be protected against accidental ignition.

F. Electric Firing

1. *Briefing*

a. Persons handling any pyrotechnic items with the electric igniters installed, or those installing electric igniters, must be aware of the sensitivity of such devices to electrostatic discharge, impact and friction.

2. Precautions

a. The installation of electric igniters and/or the storage and/or set-up of pyrotechnic items with their igniters attached shall not take place within 200 feet of “high tension” power lines.

b. A member of the Safety Team and the “pyrotechnician in charge” shall assess any such possible power line problems before set-up begins.

c. The installation of electric igniters and/or the set-up of pyrotechnic items with electric igniters shall not take place when electrical storms or lightning are present.

d. The following is recommended to the extent possible: No radio transmitter is to be operated within 10 feet of electric igniters. Transmitters with power greater than 5 watts should, wherever possible, be kept a minimum of 25 feet away.

e. Shrouded electric matches shall be used to prevent the match heads from coming in contact with pyrotechnic materials. The shroud must remain in place, protecting the electric match head, after installation is completed.

3. Hookups

a. No hook-up to the firing system shall be allowed until all work on that item is complete.

b. Before continuity checks are made, the immediate area shall be cleared of all personnel and the Safety Team shall be notified.

c. All electric igniter leg wires shall be kept securely shunted until hook-up.

d. All firing circuit wires shall be momentarily shunted together before attaching igniter leg wires.

e. Firing wire (scab) connections shall only be made with shunted circuits.

f. During final hook-up, only persons directly involved in the discharge of the display will be present in the discharge area.

G. Low Level Items

1. Ground Salutes

- a. Ground salutes shall be suspended from string or kept above the ground by other means approved by the safety Chairman or his designate and kept far enough away from any wood or steel to prevent flying splinters or shrapnel.

2. Gerbs or Fountains

- a. Gerbs or fountains shall be securely anchored to prevent their breaking loose when fired.

3. Lancework

- a. Lancework items shall be secured against falling over and/or burning through their braces.

4. Rockets

- a. Any rockets used in the display area shall be launched in such a manner as to minimize flight toward spectator area, as determined and approved by the Safety Team.
- b. Line rockets shall not travel in the direction of the spectators. The Safety Chairman or Safety Director, ONLY, may grant exceptions to this requirement where other, equivalent or superior safety measures have been established.

5. Candles

- a. Roman candles shall be secured against toppling and displayed in a manner approved by the Safety Team so as to minimize errant projectiles from flying towards the crowd.

6. Wheels

- a. Stands or supports for wheels shall be secured against toppling. Wheels shall be displayed in a manner approved by the Safety Team so as to minimize the risks of malfunction.
- b. Drivers, gerbs, and other components on wheels shall be securely fastened to minimize the risk of “flying off.”
- c. Petards, salutes, ground bombs or other explosive devices used on wheels shall be suspended or mounted securely and in such a manner as to prevent the production of splinters and/or shrapnel.

7. Flame Effects. Gas or Solid Fuel Flame effects shall be treated like Ground Display Pieces and fired according to 1123-2018 5.1.3.5

H. Special Effects

1. General

- a. All special effect items shall be cleared by the Safety Team prior to set-up and firing.
- b. Special Circumstances:
 - i. Flammable liquid ground effects must be specifically approved by the Safety Chairman or Director or their designee OR by the Production Chair or by his or her designee.
 - ii. Any devices utilizing DOT Transportation Class 1.1, 1.5, 1.6 or other high explosives must be specifically approved by the Safety Director.
 - iii. Special effects involving humans or animals in close proximity to the effect, *i.e.* body burns, bullet hits, coffin acts, pyrotechnics attached to the body, car stunts, etc., must be specifically approved by the Safety Director.

I. Duds and Misfires

1. Notification

- a. The Safety Team shall be notified immediately of all duds and misfires.

2. Deliberate action

- a. No recovery of duds or misfires shall be attempted until after inspection by a member of the Safety Team.
- b. In all cases, the “pyrotechnician in charge” and a member of the Safety Team shall agree on the method of recovery before recovery is attempted.

3. Misfires

- a. If the item is a shell in a mortar without an electric igniter, the mortar shall be doused with water and let stand a minimum of 30 minutes unless alternate means are approved by the safety team. In lieu of dousing the shell with water, an additional waiting period of 45 minutes (total time 75 minutes) prior to shell retrieval will be allowed.
- b. If the item is a shell in a mortar with an electric igniter:
 - i. Isolate and shunt the leg wires.
 - ii. If there is enough leader outside of the mortar to permit safe removal of the igniter without placing any part of the body over the mouth of the mortar, the shell shall remain in the mortar. The igniter may be removed by withdrawing it slowly and carefully from the leader match after untying/unwinding any string or wire securing it in place. Cutting off the leader when the electric match remains present is

NOT permitted. The shell may then be removed from the mortar in a manner agreed upon by the “pyrotechnician in charge” and one or more members of the Safety Team.

iii. If removal of the igniter is not possible without exposing body parts over the mouth of the mortar, the shell shall be removed from the mortar in a manner agreed to by the “pyrotechnician in charge” and one or more members of the Safety Team. When the shell has been moved to a safe distance and has been placed on the ground with the lift charge at right angles to the pyrotechnician, the igniter shall be removed as described above.

4. *Duds*

a. If the item is a shell, it shall be flagged and left undisturbed for a minimum of 30 minutes. Then it shall be turned over to the Safety Team for use in training exercises conducted after the convention ends or otherwise repurposed for use in ground displays, etc., as approved by the Safety Chairman or Safety Director or their designee. Return of duds to the display company at the discretion of the Safety Chairman/Safety Director/designee is permissible under these guidelines.

b. If the item is a large exploding device, such as a “Gabe Mort,” the Safety Team may require that it be exploded in place after the area has been cleared.

c. Roman candles, gerbs, lance work or ground salute misfires with quick match attached should be doused with water and left undisturbed a minimum of 30 minutes or not doused with water and left undisturbed for the following times: 30 minutes (lancework); 45 minutes (candles, gerbs); or 60 minutes (ground salutes): prior to removal for repurposing and/ or re-use as described in I.4.a or I.4.b above.

d. If any of the above dud items has an electric igniter installed, the item may be recovered for later use after the wires have been isolated, shunted and the igniter removed as described above.

7. Consumer Fireworks/1.4G/Class C/Articles Pyrotechnic/"Pro-Grade" or "Pro-Line" fireworks Sales:

1. Sales shall be made only to PGI members. It is the responsibility of each vendor and/or his/her assistants to inspect and verify the PGI credentials of each and every customer. Unescorted non-PGI members shall not be allowed in the Class C/1.4G sales areas

2. Sales shall be made only to those persons who are at least 16 years of age or who are otherwise accompanied by a PGI member of this required age. PGI identification cards shall be required to prove membership. "Pro-Grade" and Articles Pyrotechnic items may only be sold to those members who are 18 years of age or older.

3. A sale, gift, or other means of distribution shall not be made to any one who appears to be under the influence of alcohol, drugs or acting in an irresponsible manner.

4. All vendors are obligated to challenge anyone suspected of not meeting the eligibility requirements in items 1 through 3.

5. Sales shall be conducted only by those PGI members in good standing who have previously registered with the Class C/1.4G sales coordinator. No sales may be made outside of approved vending areas unless and as explicitly approved by the Board of Directors for purposes such as wholesale transfers.

6. Only Class C/1.4G items shall be offered for sale. The Safety Director or Chairman may inspect and approve or disapprove questionable items. Items deemed questionable, "Pro-Grade" items, and Articles Pyrotechnic may be discharged in areas reserved for display fireworks or in other areas as approved by the Safety Chairman or Director.

7. Sales shall be conducted only in buildings approved and designated for this purpose by the Safety Team.

8. Sales shall be conducted only during the times designated for this purpose.

9. Vendors and/or members of the Safety Team, Fire and Medical or Security have full authority to require anyone causing a safety hazard to leave the sales area.

10. Any building or structure used for conducting sales shall meet the following requirements:

a. There shall be at least two clearly marked exits. No sales may be conducted and no persons allowed to congregate in areas that would impede egress from the building or structure.

b. If merchandise is to remain on the premises during hours of non-sales, all doors and windows must be capable of and securely locked or alternate means of security must be provided.

c. It shall be the responsibility of vendors to assure that all windows and doors are securely locked during periods of non-occupancy of the building.

d. Two functioning 2-1/2 gallon (or larger) water type (or equivalent) fire extinguishers shall be available at all times at each Class C/1.4G or other hazardous material vending site.

e. Smoking shall be prohibited in and around all portions of the structure or areas where Class C/1.4G or hazardous merchandise is stored or sold. In general, this shall be interpreted to mean smoking is not permitted within 50 feet of any entrance to a building and not within 50 feet of any portion of any canvas tent or awning.

f. NO SMOKING signs with letters at least 2” high and 1/2” wide stroke on a contrasting background shall be posted at the entrance of each doorway as well as the number of occupants allowed in the building at any one time.

8. Consumer Fireworks/CLASS C/1.4G SHOOTING

1. Specific times and locations shall be designated for the discharge of Class C/1.4G consumer fireworks.

2. Separate areas for distinct types of Class C/1.4G shooting shall be provided. Each area shall be separated from any adjacent area as determined by the safety team:

Area I - for the discharge of firecrackers, including celebration rolls.

Area II - for the discharge of fountains, gerbs, self-propelled ground devices, ground spinners, wheels and sparklers.

Area III - for the discharge of roman candles and similar devices.

Area IV - for the discharge of rockets and other ascending devices.

Area V - for the discharge of cakes.

Area VI - for the discharge of other items approved by the Safety Team, such as large cakes, cakes with salutes, "Pro-Grade" or "Pro-Line" fireworks, Articles Pyrotechnic, materials made in PGI seminars/classes/manufacturing such as tourbillions that are deemed appropriate for discharge in the Consumer Fireworks discharge area(s).

3. Within an area, multiple shooting stations shall be provided. Because there are multiple, adjacent areas where members are discharging fireworks in close proximity to each other, PGI imposes specific requirements for device stabilization that exceed the requirements of warning labels. PGI in no manner intends to state or imply that the restrictions we impose where multiple fireworks discharge locations adjacent to each other are employed are required for persons who wish to discharge consumer fireworks outside of the convention, such as when they return to their homes. Users of consumer fireworks, "Pro-Grade" fireworks, and Articles Pyrotechnic are encouraged to follow the warning label instructions on the devices or provided with the fireworks at time of purchase. Recommended minimum separations are:

Area I - 15 feet

Area II - 15 feet between wheels, 8 feet between other devices (*i.e.*, 2 shooters on one sheet of 4x8 plywood shall be allowed).

Area III - 20 feet

Area IV - 12 feet

Area V - 15 feet

Area VI - Discharge site shall be approved by the Safety Chairperson.

4. All shooting locations shall be a minimum distance of 200 feet from fireworks assembly areas, magazines, Class C/1.4G vending and supply sales.
5. In a case of significant wind shift, shoot shall be stopped and the site rearranged as necessary.
6. Items shall be displayed **only** in approved areas.
7. Fountains, gerbs, cakes and candles shall be embedded in sand or otherwise supported to prevent toppling when fired. This requirement is imposed due to the increased number of persons and shooting stations in the immediate vicinity, applies ONLY to the consumer fireworks discharge area at PGI conventions, and is not intended to serve as a general guideline for use of these devices elsewhere or other under circumstances, such as for private use or in displays or competition at the convention. No roman candle or any other device except sparklers shall be held in the hand when firing.
8. Any person who appears to be under the influence of alcohol or drugs, who is acting in an irresponsible manner or who is under the age of 16 years and not accompanied by an adult shall not be permitted in any of the shooting locations. Minors under age 16 may be also be accompanied by PGI officers or staff or, if permission is granted by the PGI Safety Chairman or the Safety Team member in charge of the consumer fireworks discharge area, may be allowed to discharge consumer fireworks IN THE DESIGNATED AREA without direct adult supervision.
9. Members of the Safety Team shall be present at all times during Class C/1.4G shooting to ensure enforcement of these safety regulations and practices.
10. All unauthorized persons shall be prevented from entering any of the shooting locations by Security personnel or by fencing or other barriers.
11. All Class C/1.4G fireworks/Consumer Fireworks/"Pro-Grade"/"Pro-Line" Fireworks and Articles Pyrotechnic brought to a shooting location shall be kept in closed containers and maintained behind any established firing lines.
12. Fire extinguishers and a first aid kit shall be on site during shooting of Class C/1.4G devices.
13. Safety glasses and other appropriate safety gear, as determined by the PGI Safety Chairman or designee, shall be required for all those participating in Class C/1.4G open shooting or upon entering the discharge area for any reason.
14. Rockets shall be launched to minimize flight toward spectators and from racks or launch tubes approved by safety.

15. The Security personnel, barriers and other means used to prevent unauthorized persons from entering the shooting locations shall remain in effect until the locations have been policed and all live materials removed.

9. AUCTION

1. NO SMOKING signs shall be posted around the auction tables and immediate area.
2. SMOKING IS PROHIBITED any time live items are present in the auction area.
3. The Safety Team shall inspect donations and remove any items which are deemed inappropriate for auction.
4. Only items appropriate for the site of the auction may be present. Other items will be represented by written descriptive submissions.

10. ASSEMBLY OF PYROTECHNIC DEVICES (SEE 16. MANUFACTURING FOR FURTHER GUIDELINES)

1. Assembly of pyrotechnic devices in the field/at the display site shall be limited to:
 - a. The attachment of lance, drivers, gerbs, match and other components to wheels and set pieces.
 - b. The fusing of Class C/1.4G devices.
 - c. The lifting and leadering of aerial shells.
 - d. The attachment of sticks, fins and headers to rockets.
 - e. The wet priming of devices.
2. Manufacturing of individual components, such as drivers, gerbs, lances, rockets, shells, salutes and stars is specifically permitted as described in the Manufacturing section (16) of these guidelines.
3. All allowed assembly activities shall be conducted in designated areas. A building designated to be used as a location for assembling fireworks shall not be used for any other activities during the convention unless approved by the Safety Chairperson. Buildings or designated areas shall be located at a distance approved by the Safety Chairperson from any shooting site, Class C/1.4G vendors, magazines or spectators.
4. Open-air assembly of set pieces and other competition entries shall be permitted in specifically designated areas which shall be ideally located a minimum of 500 feet from any display fireworks discharge location and a minimum of 300 feet from Class C/1.4G vending or magazines. Lesser distances may be approved by the Safety Chairman or Safety Director ONLY.

5. Occupancy of the assembly building shall be limited to PGI members or other persons with prior approval from the Safety Team.

6. Hazardous materials such as flammable powder, fuse, match and similar combustibles shall be stored in closed containers.

7. Completed devices shall be promptly transported to a magazine or storage area which is secured against fire and theft.

8. All bare match and ends of completed devices shall be covered with safety caps or by equivalent means of protection from accidental ignition.

11. EDUCATIONAL WORKSHOPS AND DEMONSTRATIONS

1. All demonstrations, workshops, and other comparable activities shall be conducted in appropriate locations depending upon the nature of the materials used. Presentations using pyrotechnic compositions, black powder, stars, live fireworks and components shall be conducted in designated areas approved by the Safety Chairperson.

2. Smoking shall not be permitted within fifty feet of any pyrotechnic materials during any workshop or demonstration where hazardous materials are present. NO SMOKING signs and fire extinguishers shall be prominently displayed.

3. Proper safety equipment shall be present and used, where appropriate (as determined by safety) during demonstrations and workshops to emphasize safety technique. This includes, but is not limited to: respirators, rawhide mallets, face shields, gloves, anti-static products and devices, safety glasses, etc.

4. Hazardous materials shall be brought to workshops and demonstrations in closed containers.

5. Excess or unused hazardous materials shall be returned to their respective containers and not be allowed to accumulate in work areas.

6. Only enough hazardous materials necessary (as determined by the Safety Chairperson) to conduct the demonstration or workshop shall be permitted at the work area. Bulk (as defined by the Safety Chairperson) containers of black powder, stars, inserts or components shall require specific approval by the Safety Chairperson.

7. All work areas shall be thoroughly cleaned as soon as the demonstration or workshop is completed.

12. TRADE SHOW SALES

1. Trade show sales shall be divided into two categories, those with materials of a hazardous nature and those with a non-hazardous nature. The Safety Team is responsible for making specific decisions whether a material is considered hazardous or non-hazardous.
2. Items of a hazardous nature such as stars, flammable components and most chemicals shall be sold in the supply vending area where “no smoking” restrictions can be enforced and the area has been approved by the Safety Committee.
3. Items of a non-hazardous nature such as some chemicals, casings, tools, literature, etc. may be sold anywhere designated by the convention organizers.
4. All hazardous materials shall be in closed containers. Sealed plastic bags shall not be used for materials capable of deflagrating (i.e. stars, match, etc.) except for samples, as approved by the Safety Chairperson or a member of the Safety team assigned to this duty by the Safety Chairperson
5. Realgar, sodium, potassium and/or other specific chemicals (as determined by the Safety Chairperson) may be sold, but may not be on open display in the supply vending area. Delivery of these materials shall take place outside of the vending areas but all payment transactions shall take place in the vending area.
6. Quantities of materials capable of rapid deflagration (i.e., stars, match and inserts) shall be displayed in limited amounts only. Maximum quantities shall be determined by the Safety Team in respect to each particular item.

13. STORAGE

1. Explosive storage facilities (magazines) used during a PGI convention shall meet Federal requirements and be approved by the Safety Team.
2. All class B/DOT Transportation Classification 1.3G fireworks shall be stored overnight in an approved magazine during PGI conventions unless otherwise approved as for display companies requiring multi-day set up times and who provide overnight security personnel.
3. Minimum distances from storage of Class C/DOT Transportation Classification 1.4G/Consumer Fireworks/Articles Pyrotechnic/"Pro-Line" fireworks (all fireworks NOT classified as regulated explosives by ATF and therefore NOT requiring storage in an approved magazine) to all display fireworks discharge sites, shall be 500 feet or greater. 200 feet of separation distance shall be established from discharge locations for the Consumer Fireworks/Non-ATF Regulated Explosives discharge areas to storage areas and to vending areas for these devices and 300 feet with respect to Articles Pyrotechnic/Pro Line devices. Class B/DOT Transportation Classification 1.3G fireworks storage magazines shall be remote from public access and at a minimum of 500 feet from all fireworks (of any type) discharge sites. Whenever possible, the Class B/1.3G magazines shall have their openings facing away from any and all discharge sites. Class C/1.4G shooting sites shall be at least 200 feet from Class C/1.4G storage and 300 feet from the more powerful "Pro-Line/Professional Grade" materials. Lesser distances from Non-Display Fireworks discharge sites to temporary storage by vendors of non-ATF regulated materials/devices, using vehicles and/or

trailers to transport these devices to the PGI convention, may be approved by the Safety Chairman/Safety Director/designee.

4. Persons appearing to be under the influence of alcohol, drugs or acting in an irresponsible manner shall not be allowed in or near any storage magazine.

5. Smoking is prohibited within 50 feet of any magazine or fireworks storage area. NO SMOKING signs with lettering at least 2” high with 1/2” wide stroke on a contrasting background shall be posted in all areas where smoking is prohibited.

6. Any explosive storage facility shall remain locked at all times when unattended.

7. Possession and storage of any fireworks in hotel/motel rooms is strictly prohibited.

14. MINIMUM SEPARATION DISTANCES FROM AUDIENCES

1. All devices (both Class C/DOT Transportation Classification 1.4G/Consumer Fireworks/Articles Pyrotechnic/Professional Grade Consumer Fireworks and Class B/ DOT Transportation Classification 1.3G/Display Fireworks) when ignited, shall be separated from the audience by a safe distance which is determined solely by these guidelines and which guidelines have taken NFPA-1123-2018 distances into consideration. The “audience” is defined as all public, non-PGI member spectators AND PGI members in the specifically designated display viewing area(s). It is recognized that PGI members attending a convention, having signed appropriate waivers, have access to almost all convention site areas, including “live-fire” areas. Separation distances apply only to audiences (PGI members OR public) in designated viewing areas for displays, demos, competition, and other firing of pyrotechnic materials. **As the PGI displays experimental, non-commercial, complex, and other unique devices and assemblies of devices, the Safety Chairman or his designate may require increased separation distances for any device at any time at his discretion.**

Item	Minimum Distance
1. All metal mortars . . . . .	.300 feet
2. Individually fired shells (vertical mortars) . . . . .	.70 feet per inch of mortar diameter
3. Individually fired shells (angled mortars).....	.70 feet per inch of mortar diameter
4. Chain fused shells from racks. . . . .	.70 feet per inch of mortar diameter
5. Mines (containing stars or non-splitting/non-bursting comets only)..	.35 feet per inch of device diameter.
6. Mines (containing other effects) . . . . .	.70 feet per inch of device diameter
7. Roman candles and cakes (Class C/1.4G) . . . . .	.150 feet*
8. Roman candles and cakes (Class B/1.3G w/stars only) . . . . .	.200 feet
9. Roman candles and cakes (Class B/1.3G w/inserts, shells, whistles, salutes, etc.)	300 feet
10. Suspended salutes (1” x 2”) . . . . .	.100 feet
11. Suspended salutes (2” x 4”) . . . . .	.200 feet
12. Suspended salutes (3” x 6”) . . . . .	.300 feet
13. Suspended salutes (Larger than 3” x 6”) . . . . .	.Subject to Safety Team approval

14. Non-bursting/non-splitting comets.....35 feet per inch of device diameter
15. All other comets.....70 feet per inch of device diameter
16. Wheels150 feet
17. Saxons or Merry Go Rounds100 feet
18. Line rockets150 feet
19. Buzz Bombs and Helicopters200 feet
20. Fountains, gerbs & whistles (1" I.D. and smaller)75 feet
21. Fountains, gerbs & whistles (Above 1" and small than 2" I.D.)100 feet
22. Fountains, gerbs & whistles (2" I.D. and larger)150 feet
23. Waterfalls (without reports)75 feet
24. Waterfalls (with reports) See above ground salute distances
25. Bottle rockets (1/4" diameter max.)200 feet
26. Rockets300 feet min. Large rockets subject to Safety Team approval
27. Lance work (No pyrotechnically driven parts)75 feet
28. Lancework (Pyrotechnically driven parts)150 feet
29. SuperStrings and MegaStrings (Firecrackers only)150 feet
30. Concussion mortars.....Subject to Safety Team approval
31. "Creamora" effectsSubject to Safety Team approval
- 32 .Professionally manufactured proximate effects.....per NFPA-1126-2011 or its successor current editions
33. Bowling balls, pumpkins, and other solid, inert projectiles fired from mortars...only upon specific approval by and at distances established by the Safety Chairman or Safety Director.
34. Special effects and all other items not listedSubject to Safety Chairman approval**

* The distance required for audience separation from Class C/DOT Transportation Classification 1.4G/Consumer Fireworks/Articles Pyrotechnic/"Professional Grade" and "Pro-Line" fireworks devices, including cakes, are increased to 150 feet which is significantly greater than the National Council on Fireworks Safety (NCFS) guidelines that recommend 20 feet distance for the operator and 40 feet of distance from the audience because of the unique nature of the PGI convention event as described below. These guidelines should in no way be construed nor are they intended to be applicable to use of consumer fireworks of any type by the individual member of the general public. The increase in distance at PGI is required because:

- a) Our display operators almost always chain and/or discharge multiple devices together. (NCFS states: "Only ignite one device at a time.)
- b) Our display operators often modify and alter the firing patterns of these devices. (Doing so breaches any warranties implied for consumer fireworks.)
- c) The operators may include "professional grade/pro-line" materials that exceed the CPSC limits on consumer fireworks devices.

** For black powder/gasoline fireball effects:

- 50 feet for up to 1 gallon of fuel
- 1 to 5 gallons- 75 feet
- 5 to 25 gallons- 150 feet
- 25 to 50 gallons- 200 feet
- 50 to 100 gallons- 250 feet
- 100 to 200 gallons- 300 feet

> 200 gallons- 350 feet

> 400 gallons- 600 feet

If multiple devices are clustered together to create a single fireball effect, add the volume of all of those devices together to determine separation distance.

If multiple devices are lined up as a "wall of fire" effect (usually 10 or more), 350 feet is advised as a separation distance for total fuel up to 300 gallons. A 50% increase in separation distances for any of the above fuel amounts is added if a strong wind is blowing towards the audience or is predicted to be blowing toward the audience at the time of the display.

2. The Safety Team may increase these separation distances at any time. The Safety Team will consider wind direction and velocity; shoot site peculiarities, and any other relevant factors. Lesser distances shall be utilized only upon approval of the Safety Director.

3. The discharge areas shall be located so that the trajectory of shells and other aerial effects shall not come within 25 feet of any overhead object.

15. ANVIL FIRING - Unless exceptions are specifically approved by the Safety Chairman, the following guidelines apply.

1. Propellant: Only black powder is to be used. 3Fg or 4Fg is recommended. No additional accelerants or oxidizers, Meal "D," or propellant mixtures are to be used.

2. A maximum of 1 ounce of propellant, per six pounds of "flyer" weight, to a maximum total propellant weight of eight ounces may be used.

3. Spectator distance: seven feet per ounce of black powder for those wearing safety glasses. For those not wearing safety glasses, a minimum separation of eighty feet from the anvil firing is required.

4. Anvil firing after dark must be specifically approved by Safety and conducted in areas deemed by safety to have lighting sufficient to ensure a safe display.

5. "Flyer" weights: The weight of the flyer should not exceed 112 pounds and should weigh a maximum of 14 pounds per ounce of propellant and a minimum of 6 pounds per ounce of propellant used.

6. All anvils to be fired shall be free from cracks, loose sleeves and other defects and are subject to Safety Team inspection and approval.

16. MANUFACTURING:

1. A copy of these guidelines shall be conspicuously posted at each entrance to the Manufacturing Area (the Area).

2. Any of these guidelines may be waived, modified, or enhanced by the Manufacturing Chairperson(s).
3. The Area and/or facilities used must be approved by the Manufacturing Chairperson(s). There are to be no more than fifty individual work stations in any single manufacturing building or tent. If necessary to accommodate demand and feasible to do so, additional tents and or buildings will be provided for manufacturing.
4. The Manufacturing Chairperson(s) shall inspect the Area twice daily.
5. Access to the Area shall be restricted to members using the Area and their guests. Members using the Area are responsible for their guests. Members using the Area shall assist in monitoring each entrance to prevent unauthorized access to the Area. Manufacturing safety team members shall monitor each entrance to prevent unauthorized access to the Area and control the flow of persons in this Area at all times. All persons who enter the Manufacturing Area, including guests, must have a safety briefing. A written record of safety briefings will be kept and a wristband will be issued to each person completing the safety briefing. Those admitted to the Manufacturing Area must obey PGI safety guidelines for this area at all times.
6. When unattended, the Area must be secured.
7. Finished materials not being worked upon further must be placed in the magazines at the earliest opportunity. Completed items shall not be left open in the work area. A day box shall be used for temporary storage. In no case will completed items be stored in the day box overnight.
8. At the end of each day, all live material must be placed in the magazines.
9. The Manufacturing Chairperson(s) or his/her designate shall approve each individual work area setup. An egress path of at minimum two feet in width must be maintained on all sides of each manufacturing area, excepting only sides placed against walls or other outside perimeters, and the egress paths must, at all times be kept free of any objects or impediments to egress.
10. The Manufacturing Chairperson(s) or his/her designate may refuse to approve member-provided day boxes and working containers and such unapproved containers and day boxes shall not be used.
11. Each work area shall have a working container(s) for composition(s) being used, a composition day box, and a completed effects day box. These containers shall be closed and sealed after each removal from or addition of any items to the container.
12. Only one working container with less than 500 grams of composition, stars, or components shall be out of the day box in any one working area at any time, except as approved by the Manufacturing Chairperson(s). Except as and unless explicitly approved by the Manufacturing Chairperson(s) or his/her designate, no more than ten pounds, total, of pyrotechnic compositions may be at any individual work station. This provision does not apply to high hazard areas as described in clause 27 below.

13. When a work area is unattended, all live materials shall be placed into sealed or securely closed day boxes. Whenever the manufacturer leaves the Manufacturing Area, except as specifically permitted by the Manufacturing Chairperson(s) for brief absences, ALL live material must be removed from the Area and placed in the temporary/day magazine outside the area or in the approved storage magazines. If the Manufacturing Chairperson(s) has to clear live material from the building, the member in violation shall be given a warning and, upon further such violations, may be refused further access to and use of the Manufacturing Area.

14. Blast shields for hydraulic presses are recommended for use whenever possible. When groups of people wish to gather to observe the pressing of rockets, the Manufacturing Safety team members shall determine how many may observe and where they may observe from. While unshielded presses may be used to make rockets, depending upon the type and size of rocket being pressed, observers may be kept away from unshielded presses at the discretion of the Manufacturing Safety team. PGI recognizes that certain activities are less hazardous and that individual members may not have installed blast shields on their presses. We will not absolutely forbid unshielded presses and cannot guarantee that all presses will be fitted with blast shields, but, activities using unshielded presses may be constrained by the Manufacturing Chairperson(s) to reduce attendant risks.

15. The Manufacturing Chairperson(s) or his/her designate shall authorize and supervise all whistle composition manufacture. Unless authorized by the Chairperson(s), no batch of whistle composition shall exceed 500 grams. Each batch shall be completed and properly stored before starting another batch. No unauthorized or unsupervised manufacture of whistle composition is permitted.

16. Bulk quantities of all live materials shall be stored in the Manufacturing Area Day Box. See 12. above.

17. Except as provided for in paragraph 21 below, all flash-containing devices and components (e.g., salute or report headings, bottom shots, "bumps," lambetti, shell inserts, etc.) must be pre-made, prior to the event, and brought to the convention and manufacturing area in closed, finished, assembled form.

18. Possession or manufacture of flash composition - in any quantity - other than by exception as provided for in paragraph 21 below is strictly prohibited.

19. Storage of flash composition - in any quantity - other than in completed devices is strictly prohibited.

20. Manufacture of flash-containing devices or components, other than as provided for in paragraph 21 below, is strictly prohibited.

21. At the discretion of the Manufacturing Chairperson(s), an "A" and "B" mixing method for flash - whereby oxidizer and fuel are separately introduced into a device, the device is then permanently

sealed, and mixing later occurs by routine handling of the assembled device - may be permitted on a case by case basis.

22. Steel mixing bowls are to be avoided where possible and, if used, must be kept out of and away from direct sunlight.

23. No smoking or open flames are allowed in the Manufacturing Area or within 50 feet of the perimeter of the designated Manufacturing Area(s).

24. Except as approved by the Manufacturing Chairperson(s) or his/her designate, no flash photography is allowed in the manufacturing area(s).

25. Ball milling is permitted upon the following conditions being met:

a) The site used for ball milling must be approved by the Manufacturing Chairperson(s).

b) The material to be ball milled, either a single chemical or mixture, must be specifically approved by the Manufacturing Chairperson(s).

26. Unless unpowered, no electrical devices of any kind (drills, glue guns, etc.) may be on the same table containing any exposed compositions or open containers of pyrotechnic compositions. A separate table will be provided for use of glue guns.

27. For specific high hazard manufacturing activities, the Manufacturing Chairperson(s) may approve such activities by a member or members to be done at a remote site or sites, separate from the main manufacturing area. Unless exempted by the Manufacturing Chairperson(s), all manufacturing safety guidelines must be adhered to at the permitted remote site. A clearly demarcated perimeter must be established. Only persons approved by the Manufacturing Chairperson(s) may be at the remote site. Persons being granted permission to use such a remote site must acknowledge by signing an additional indemnification waiver that high hazard activities may result in lethal injuries and must sign as noted below that they expressly indemnify the PGI against any claims related to their activities or their presence in an area where the activities of others may expose them to risk of lethal injuries. No persons under 18 years of age are allowed in these areas.

The "PGI All Stars" and the "Large* Device Manufacturing Area" shall be separate from the Small Manufacturing area described in this section of the PGI safety guidelines. The three manufacturing areas shall function autonomously as permitted by the Safety Chairperson and/or Safety Director. Admission shall be strictly controlled by each manufacturing group (Large Device and All Stars) and limited to only those persons necessary for operations and limited opportunities for guest members to observe the activities or to gain experience in large manufacturing. Special wristbands for each of these areas will be issued. Persons entering this area must sign in, acknowledging that this is a high hazard area. The Safety Chairman or his designee must be kept informed at all times as to which members are present. No rocket motor manufacturing is allowed in the Large Device or All Star manufacturing areas, but, if members wish to manufacture rocket motors of a size greater

than permitted in Small Manufacturing (up to 2.0 inches in inside diameter), a separate site may be provided for that manufacturing activity .

Waiver for All Stars and for the Large Device Manufacturing Areas:

The "PGI All Stars" and the "Large Device Manufacturing Area" shall be separate from the manufacturing area described in this section of the PGI safety guidelines. They shall function autonomously as permitted by the Safety Chairperson and/or Safety Director. Admission shall be strictly controlled by the large manufacturing and All Star teams and limited to only those persons necessary for operations and limited opportunities for guest members to observe the activities or to gain experience in large manufacturing. Special wristbands for each area will be issued. All persons entering this area must sign in, acknowledging that this is an extremely high hazard area. The Safety Chairman or his designee must be kept informed at all times as to which members are present. Those entering acknowledge that any accidental ignition of materials in this area is very likely to result in fatal injuries and expressly indemnify the PGI against any claims related to their activities or their presence in this area where the activities of themselves or of others may expose them to risk of lethal injuries.

Signed:_____ Witnessed:_____ Date:_____

* "Large Device" is defined as any aerial device greater than:

- a) six inches in size in any dimension or
- b) greater than four pounds in weight or
- c) rocket motors greater than 2.0 inches in inside diameter.

28. Personal protective gear is encouraged. At MINIMUM, eye protection MUST be worn when in the manufacturing area.

29. No motorized vehicles of any type are allowed in the Manufacturing Area. Motorized vehicles must be parked at least fifty feet away from the Manufacturing Area except to pick up or drop off material. Charging of batteries by using jumpers from a vehicle is not allowed within the Manufacturing area. Bicycles must be parked outside the Manufacturing Area.

30. No alcohol, illicit drugs, or intoxicants are allowed in the Manufacturing Area. Any intoxicated persons will be evicted from the Manufacturing Area.

31. Minors under 18 years of age, registered to attend the PGI convention are allowed to participate in PGI approved manufacturing activities during the convention. All PGI policies regarding the presence of minors in the Manufacturing Area must be complied with. Please request a copy of the appropriate policy/policies forms from the Manufacturing Area Chairperson if you wish to have minors participate with you in manufacturing activities. Parental or guardian release forms for minors are required.

32. Unless waived by the Safety Chair, construction of shells or other aerial devices (such as mines) larger than six inches in any dimension, or greater than four pounds in weight, or rocket motors greater than 2.0 inches in inside diameter, must be done in a separate area (Large Device, All Stars,

or separate isolated site) designated for these activities and not in the Small Manufacturing area and subject to the restrictions specified in section 27 above. Each manufacturing area, Small, Large, and All Stars shall have a Safety person assigned and present at all times manufacturing is done and that person or his/her designee must be present at all times manufacturing activities are being conducted.

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