

State of Illinois
Office of the State Fire Marshal
Fire Prevention Division - Licensing
Policy



Release Date: 04/1/19

Subject: Hybrid Pyrotechnic Effects /and Non-Listed Devices in Outdoor Professional Pyrotechnic Displays

A handwritten signature in black ink, appearing to read "Dale Simpson".

Division Manager

RESCINDS: N/A	REVISED: NA
RELATED DOCUMENTS: N/A	RELATED STANDARDS: NFPA 160, NFPA 1123

[Policy](#)

[Procedure](#)

[Directive](#)

PURPOSE:

This Policy provides guidance in the use of Hybrid Flame and other non-listed effects in Outdoor Professional Pyrotechnic Displays.

The Office of the State Fire Marshal has become aware that *Hybrid Flame Effects*, as defined in NFPA 160 (2016), have been incorporated into various Outdoor Professional displays. This Policy is intended to provide guidance regarding the use of *Hybrid Flame Effects* including “gasoline fireballs”, “cremoras” and similar effects utilizing a pyrotechnic charge to disperse and ignite a flammable liquid or special substance from a burner tube, mortar, or other container.

Hybrid Flame Effects are considered to be within the OSFM licensing definition of *Flame Effects* and require *Flame Effect* licensing for the Pyrotechnic Distributor and the Pyrotechnic Operator.

Hybrid Flame Effects are constructed from otherwise non-regulated products in a number of ways to produce a pyrotechnic effect. There is no standard methodology, regulated practice, or industry approval regarding these “homemade” and/or “ad hoc” devices.

The Office of the State Fire Marshal has become aware that other “homemade” and “ad-hoc” devices are incorporated into Outdoor Professional Displays from time to time. This Policy reinforces the notion that Outdoor Professional Displays are limited to the use of product recognized in the regulatory definition of *Outdoor Professional Displays* and *Consumer Displays*.

GENERAL:

The Office of the State Fire Marshal licenses Pyrotechnic Distributors and Operator under the Pyrotechnic Distributor and Operator Licensing Act (225 ILCS 227) and Ill. Admin. Rules Part 230. These Rules provide for three classifications of Pyrotechnic Displays and respective licensure: Outdoor Professional, Proximate Audience, and Flame Effects.

Rules Part 230.20 provide definitions for “Outdoor Professional” and “Flame Effects” as follows:

"Outdoor professional display" means an outdoor pyrotechnic display that uses 1.3G fireworks and is at least 75' from the audience in accordance with NFPA 1123.

"Outdoor professional license" means the license issued to a qualified lead pyrotechnic operator for 1.3G fireworks.

"Flame effect" means the detonation, ignition, or deflagration of flammable gases, liquids, or special materials to produce a thermal, physical, visual, or audible effect before the public, invitees, or licensees, regardless of whether admission is charged in accordance with NFPA 160. [225 ILCS 227/5]

"Flame effect license" means a license issued to a qualified lead pyrotechnic operator for flame effect displays. A license may be limited to a certain type of display, effect or location.

Hybrid Flame Effects are within the scope of NFPA 160 (2016) and the OSFM Flame Effects licensing portfolio, and require both the Pyrotechnic Operator and Pyrotechnic Distributor to be appropriately licensed with OSFM to engage in Flame Effects.

POLICY:

This Policy provides that Outdoor Professional Distributors and Outdoor Professional Operators may use only 1.3G Display Fireworks and 1.4G Consumer Fireworks that meet the statutory definitions as regards UN and USDOT classifications for all product and services.

The regulatory definition of Outdoor Professional Display does not contemplate or allow the use of any “homemade” or “ad-hoc” pyrotechnic effects, including *Hybrid Flame Effects* or any devices that do not have a valid USDOT EX number, for use in Outdoor Professional displays.

Outdoor Professional licensure provides that Outdoor Distributors and Operators may engage in the use and distribution of 1.3G fireworks. Administrative Rule Part 230.20 provides a definition of 1.3G fireworks:

"1.3G fireworks" means fireworks that are used for professional outdoor displays and classified as fireworks UN0333, UN0334 or UN0335 by the United States Department of Transportation (USDOT) under 49 CFR 172.101. [225 ILCS 227/5] USDOT assigns the following division numbers to the above-referenced fireworks identification numbers: UN0333 (1.1G), UN0334 (1.2G), and UN0335 (1.3G). (See 49 CFR 172.101.)

The use of 1.4G Consumer Fireworks may be incorporated into any Outdoor Professional display provided under an OSFM license and local permit. Administrative Rule Part 230.20 provides a definition of Consumer Fireworks:

"Consumer Fireworks" means fireworks that must comply with the construction, chemical composition, and labeling regulations of the U.S. Consumer Products Safety Commission, as set forth in 16 CFR 1500 and 1507, and classified as fireworks UN0336 or UN0337 by USDOT under 49 CFR 172.101. "Consumer fireworks" does not include a substance or article exempted under the Pyrotechnic Use Act. [225 ILCS 227/5] USDOT assigns the following division numbers to the above-referenced fireworks identification numbers: UN0336 (1.4G) and UN0337 (1.4S). (See 49 CFR 172.101.)

ADDITIONAL CONSIDERATIONS:

This policy initiative is also supported by recent developments in NFPA 160 (2016) Standard for Flame Effects Before an Audience.

NFPA 160: Standard for the Use of Flame Effects Before an Audience, 2016 Edition Defines Hybrid Flame Effect as: *A flame effect that is used in combination with a pyrotechnic material or device.*
(Chapter 3 Definitions 3.3.12.2 *)

Further explanation is provided by NFPA 160 (2016) Appendix 3.3.12.2 Hybrid Flame Effect:

Flame effects that use any of the fuels allowed by this standard but are initiated or directly ignited by means of a pyrotechnic device are common examples of a hybrid flame effect. One example of a hybrid flame effect is one that uses a pyrotechnic device or igniter to provide the initial flame to light a supervised pilot burner, which, when ignited, can be then proven by a conventional flame safeguard or other means. Often this hybrid configuration is used where the pilot burner is in and/or around water or spray, and conventional ignition means have been determined to be unreliable or to utilize voltages or currents that provide a risk of hazard to persons in and around the water. In other instances, this configuration might be used for added reliability, operational integration, or simply for convenience. In any of these instances, the pyrotechnic igniter is used under the requirements of NFPA 1126 and is installed, maintained, and operated to meet the requirements of both NFPA 1126 and the AHJ. The flame effect itself, regardless of the fuel it uses, is designed, installed, maintained, and operated to meet the requirements of both NFPA 160 and the AHJ.

A second example of a hybrid flame effect is one that utilizes a combustible dust, initially aerosolized and propelled out the end of the burner nozzle by a charge of compressed air and ignited as it passes through a field of burning metal sparks generated by yet another pyrotechnic device. Dust or powder fuel is an acceptable flame effect material under this standard. What causes this effect to be classified as a hybrid flame effect is that the pyrotechnic ignition device(s) falls under the purview of NFPA 1126. (Note that if a gas pilot burner or even a burning brand were used to ignite an aerosolized powder, this flame effect would not be considered hybrid and would fall entirely under the scope of NFPA 160.)

A third example is an often-used flame effect that is typically limited to outdoor use and utilizes flammable or combustible liquid as a fuel. This would be an acceptable flame effect material under this standard. The fuel is contained in a nonporous bag and placed inside a suitable open-topped container that serves as a "mortar" or burner nozzle. Upon firing, the liquid is freed from the bag, lifted from the barrel, and aerosolized by means of a substantial black powder lifting charge. A second pyrotechnic device might or might not be used to ensure ignition of the fuel at the mouth of the container. What causes this effect to be classified as a hybrid flame effect is that the aerosolizing and igniting charges fall under the purview of NFPA 1126, or, depending upon the particular composition and quantity of the charge in use, possibly NFPA 1123 or NFPA 495. Additionally, the storage and/or handling of the liquid fuel would be governed by the requirements of NFPA 30. (Note that if a compressed air charge was used to aerosolize the liquid and a gas fired pilot burner or even a burning brand was used to ignite the aerosol, this flame effect would not be considered hybrid and would fall entirely under the scope of NFPA 160.)

Additional relevant "OSFM" definitions and conditions

"Consumer fireworks" means fireworks that must comply with the construction, chemical composition, and labeling regulations of the U.S. Consumer Products Safety Commission, as set forth in 16 CFR 1500 and 1507, and classified as fireworks UN0336 or UN0337 by USDOT under 49 CFR 172.101. "Consumer fireworks" does not include a substance or article exempted under the Pyrotechnic Use Act. [225 ILCS 227/5] USDOT assigns the following division numbers to the above-referenced fireworks identification numbers: UN0336 (1.4G) and UN0337 (1.4S). (See 49 CFR 172.101.)

"Pyrotechnic service" means the detonation, ignition or deflagration of display fireworks, special effects or flame effects to produce a visual or audible effect. [225 ILCS 227/5]

"Pyrotechnic display" or "display" means the detonation, ignition, or deflagration of display fireworks or flame effects to produce a visual or audible effect of an exhibitional nature before the public, invitees, or licensees, regardless of whether admission is charged. [225 ILCS 227/5]

"Pyrotechnic distributor" or "distributor" means any person who distributes display fireworks for sale in the State of Illinois or provides them as part of a

pyrotechnic display service in the State of Illinois or provides only pyrotechnic services. [225 ILCS 227/5]

Part 230.50 Qualifications for Distributor License

d) At least one officer of a pyrotechnic distributor must be a licensed lead pyrotechnic operator for the type of display services provided.

Effective Date: 04/01/19