Mesa Fire and Medical Department
Fire Prevention Division
An Internationally Accredited Fire Department

MESA FIRE AND MEDICAL DEPARTMENT

FIRE PREVENTION DIVISION

Entertainment Special Effects and Fire Safety

The use of cold spark technology in pyrotechnic devices has become a popular entertainment effect that's used in various types of public events and gatherings, including weddings. The following provides information event organizers, hotel
convention services and those interested in using cold spark technology should know before considering the feasibility of using this effect at any event. All spark producing devices utilize powdered titanium or zirconium as the chemical which
produces the sparkler visual effect. (See attached SDS forms) A common misunderstanding is that the sparks are cold. While the heat released from cold sparks is a lower temperature than standard sparklers, the heat generated from cold sparks is still capable of igniting nearby materials.

We've seen social media depict a person with their hand inside the plume of cold sparks and they are unharmed. The surface area of the burning sparks bouncing off the hand (or another non-flammable surface) is happening so fast that the heat they
produce isn't being transmitted fully. However, if you do this same experiment with a piece of paper or a wedding dress, you could see a much different result!

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Cold Spark Fact Versus Fiction

Contrary to what product names may suggest (and what other companies may advertise), there is no such thing as “cold sparks” or pyrotechnic effects that are safer than others.

False Claim # 1

These Machines Produce Cold Sparks

All spark producing devices, mechanical (like these machines) or pyrotechnic (like Gerbs, fountains, etc.) utilize powdered titanium as the source for the sparks. Titanium burns at about 610 degrees Fahrenheit.

Titanium powder can also auto-ignite and SPONTANEOUSLY COMBUST at air temperatures as low as 482 F.

A common argument is that the sparks MUST be "cold" because the manufacturer shows a person with their hand in the plume of sparks, and they are unharmed. Though we certainly don't recommend doing this, the same effect can be recreated with any of the Silver* Gerbs we sell. How??? Have you ever flicked your finger through the flame of a candle? Did you get burned??? Probably not because of low heat transmission due to the speed in which your finger was passing through the flame. Go fast - don't get burned. Go slow... and you get burned! The same goes for silver sparks. The surface area of the burning sparks bouncing off the hand (or another non-flammable surface) is happening so fast that the heat they produce isn't being transmitted fully. Combustible material CAN be ignited with the same interface. Gold sparks burn hotter than Silver due to the use of powdered Iron or Lead required to generate that color... and those sparks create very hot slag.

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The American Pyrotechnic Association rendered an interpretation of cold spark use (see attached) and concluded that “The general consensus among stakeholders was that these devices, while arguably somewhat safer than conventional pyrotechnics, do still pose a hazard to life safety under certain circumstances and the potential at a minimum of false alarms.”

In the 2021 edition of NFPA 1126: Standard for the Use of Pyrotechnics Before a Proximate Audience, NFPA includes cold spark technology in the following official definitions:

3.3.40 Pyrotechnic Device.
Any device containing pyrotechnic materials or pyrotechnic effect simulation equipment, as described in the following definitions, and capable of producing a special effect as defined in this standard.

3.3.41 * Pyrotechnic Effect Simulation Equipment.
Equipment that uses a chemical mixture, heat source, and the introduction of oxygen to initiate or maintain combustion and is used to produce visible or audible effects by combustion, deflagration, or detonation

A.3.3.41 Pyrotechnic Effect Simulation Equipment.
When evaluating the potential risks presented by pyrotechnic effect simulation equipment, the AHJ should consider the level of hazard the device produces compared to similar pyrotechnics in the location where the device is to be used. The AHJ should also evaluate the level of operator training required in conjunction with the hazard presented.

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As a result of all this research and NFPA documentation, some states now require operator licensure and training documentation along with pre-event permits to use this technology, the same as traditional pyrotechnics. During Assembly occupancy special events like concerts, Mesa Fire Prevention does already require oversight of this use including a pre-event test and an onsite fire inspector to assure safety and compliance. Our challenge then is any special event venue, nightclub, or other location falling prey to the industry information that cold spark is “totally safe” and using it without our knowledge.

Results of a recent use of COLD SPARK in a Mesa Arizona venue!

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