FLAME EFFECTS

DEFINITION

Flame Effect is defined as “The combustion of solids, liquids, or gases to produce thermal, physical, visual, or audible phenomena before an audience”. This includes all flames that are automated, switched, pressurized or having any other action than simply being lit on fire; as well as projects using propane or other liquid or gaseous fuels. The Recipient must comply with the following guidelines:

GUIDELINES

The majority of Flame Effects utilize Liquefied Petroleum Gas (LP), more commonly referred to as propane. Most of the guidelines below deal with propane as a fuel. Regardless of fuel type or technological basis, all Flame Effects must be constructed in such a way as to meet or exceed applicable laws, codes, and industry standards. These standards can be found in the National Fire Protection Association (NFPA) documents, Sections 54 and 58, The LP Gas Codes, as well as Section 160 that deals with flame effects with a live audience. NFPA documents are available for viewing and purchase on the NFPA website and should be reviewed by all Flame Effects artists.

> **All LP-GAS CONTAINERS** shall be designed, fabricated, tested, and marked in accordance with the regulations of the US Department of Transportation (DOT) or the ASME Boiler and Pressure Vessel Code.
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> DOT cylinders shall not be overdue for periodic requalification and be in good working order. Tanks in poor condition or out of date are a danger to fill and may cause injury to the fuel team, the artists, and or participants.
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> **All LP-GAS Flame Effects must have 1/4-turn shut-off valves** at each fuel supply connection as a primary emergency fuel shut-off point. These valves must be exposed and visible at all times. When

closed, this valve must inhibit **ALL** fuel flow to the flame effect, regardless of how many LP-Gas cylinders are connected to the flame effect. This valve must be exposed and visible at all times, and must be clearly **MARKED** as the emergency fuel shut-off.

FUEL SUPPLY PIPE, TUBING, HOSES, AND FITTINGS - All fuel supply pipe, tubing, hoses, valves, and fittings shall be rated for the type of fuel being used and the maximum operating pressure of the effect.

All LP-Gas Hoses that will be operated in excess of 5 psi shall be designed for a working pressure of at least 350 psi and shall be continuously marked by the manufacturer to indicate its maximum operating pressure and compatibility with LP-Gas.

Air or pneumatic line are not acceptable as fuel hose. LP gas degrades rubber hose not specifically designed for use with that fuel. This results in the hose cracking from the inside out, potentially leading to a catastrophic failure.

HOSE CLAMPS are prohibited on LP-Gas hoses. All hose connections shall be factory made, or constructed with a crimped fitting specifically designed for that purpose.

All valves should be designed for use with LP-gas. Plumbing fixtures are prohibited from being used in a pressurized segment.

All LP-Gas metallic piping and fittings that will operate at a pressure greater than 125 psi shall be a minimum of schedule 80.

All metallic tubing joints shall be flared (soldered joints are prohibited).

FUEL ACCUMULATORS - Accumulator tanks for use with flammable or liquefied gas shall be designed, manufactured, and tested in accordance with the ASME Boiler Pressure Vessel Code or the Department of Transportation (DOT) for the pressure of the gas in use.

If the gas supply pressure exceeds the maximum allowable operating pressure (MAOP) of the accumulator, a regulator shall be

installed between the fuel supply and the accumulator to reduce the pressure below the accumulator's MAOP. A pressure relief valve shall also be installed in the accumulator with a start-to-leak setting at or below the MAOP and a rate of discharge that exceeds the flow rate of the supply container.

Flame Effects must never be left unattended. The winds and weather are highly variable, and may create havoc in a poorly monitored installation, including fires or explosions. Any Flame Effect found running unattended will be shut down. Egregious or repeat offenses will result in the confiscation or disabling of the effect.

SAFE CLEARANCE AND PERIMETER

For larger Flame Effects a safety perimeter and clearance from other art or flammables may be needed. Please read these Guidelines for Safety Perimeters on the Burning Man website.

I'd like to credit DaveX and others for their help with these guidelines.