

GAS FLAME AND COMBUSTION SPECIAL EFFECT REQUIREMENTS

Date of Issue: November 10, 2022

Directive No: D-GA-2022-02

This directive is being issued by a provincial safety manager pursuant to section 30 of the *Safety Standards Act*.

Scope

This directive details Technical Safety BC gas and pressure vessel safety requirements for temporary operation of flame and combustion special effect equipment used in the production of trade shows, exhibits, displays, festivals, conventions, stage, theatre, carnivals, travelling shows, movie, television locations, and film, video productions, or similar venues.

Definitions

The terms in this directive have the same definition as stated in the *Safety Standards Act* and associated regulations. Definitions for the following terms have been quoted for reference below.

Gas – means any natural gas, manufactured gas, liquefied petroleum gas, digester gas, landfill gas, biogas, or a mixture or dilution of any of them; and/or hydrogen.

Gas equipment – means anything used or designed to be used in connection with gas, including:

- piping;
- appliances;
- fuel containers; and
- vents.

Regulated work – means the assembly, manufacture, construction, installation, operation, testing, maintenance, or repair of a regulated product, and the alteration of a regulated product.

Details

The use of gas special effects (SPFX) involves regulated gas equipment and regulated work as defined under the *Safety Standards Act* and Gas Safety Regulation. Gas Safety Regulation 31(1)(a) requires that a person must not install or use a regulated gas product unless it has a certification mark, or an approval issued under section 10 of the *Safety Standards Act*.

1. Regulated gas equipment criteria

- (1) For all regulated gas equipment, a design registration application is required. Each SPFX model design registration application must include the specific information listed under Appendix A. Gas design registration applications must be submitted through Technical Safety BC's [design registration portal](#). A design registration letter will be generated once the design has been accepted and registered. Relevant assessments by Safety Officers will be completed as necessary.
- (2) For small or medium gas flame effect models, as per Appendix A:
 - a. To obtain approval for day-to-day use of regulated gas equipment, a Technical Safety BC certified special effects technician supervisor must submit a gas design registration application for each type of industry standard portable gas flame effect model(s) used.
 - b. Sites will be assessed by a Safety Officer to ensure compliance to applicable codes and standards as well as the registered design. A notice of approval for the purpose of SSA section 10 will be issued by a Provincial Safety Manager approving use of each approved model, and this approval must accompany the regulated gas equipment whenever in operation.
- (3) For effects outside the scope of small or medium models:
 - a. A licensed gas contractor with a Class A Gas fitter credential is to submit specific design registration applications for **each** separate site where the SPFX production will take place. Additional gas installation permit requirements may apply.
 - b. Requests for Gas Safety Officer site assessments must be made through: GasSupport@technicalsaftybc.ca at least **two business days prior** to when the effect is scheduled for operation.
- (4) Accumulator tanks (SPFX cannons) operating above 103 kPa are considered a regulated pressure vessel, requires design registration, and must be constructed by either an ASME certificate of authorization holder or local MA shop license holder. Accumulators must be designed, purpose built pressure vessels, and registered in accordance with [Regulatory Requirements for Registration of Pressure Vessels](#). Designs for Pressure Vessel Equipment can be registered through the [design registration website](#) and follow the [Pressure Vessel Design Registration Checklist](#). Once a design has been registered, the accumulator owner must arrange for assessment by a boiler pressure vessel Safety Officer and obtain a pressure vessel operating permit prior to use.

2. Regulated work criteria

- (1) Owners of registered small or medium gas flame effect models detailed under **s.1 (2)** of this Directive can apply for a Special Type Gas Operating Permit (SPT8). Registered SPFX model approval notices must be provided at time of application for attachment to the operating permit for future reference. Issuance of the

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operating permit allows for use of the listed gas equipment and regulated work to be undertaken by persons authorized under the SSA and associated regulations. Once issued, operating permit holders will receive annual notifications for renewal.

- (2) A special effects coordinator or supervising first assistant, that successfully completes a training program recognized by a provincial safety manager can apply to obtain a Special Purpose Certificate of Qualification (SPCQ). An SPCQ holder can perform specific regulated gas work under the permission of an operating permit in accordance with **s.2 (1)** of this directive.

3. Other agencies

- (1) WorkSafe BC, Municipalities, local fire departments, Transport Canada, Environment Canada, and other Ministries of both federal and provincial governments may have approval/permit requirements for events involving special effects.
- (2) Technical Safety BC approvals or permits **do not** constitute approval by any other regulatory body or agency.
- (3) Gas equipment approvals or authorizations from extra-provincial agencies are not recognized in BC.

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References:

Safety Standards Act
Gas Safety Regulation

Appendix A**Small special effect flame models – vapor service only**

This assembly must consist of:

- 1 x DOT TC propane cylinder ranging from 1lb –100lb;
- 1 x POL fitting;
- 1 x Certified ball valve shutoff;
- 1 x 0-60 PSI adjustable certified propane regulator;
- 1 x Certified hose assembly ranging from ¼” –½” diameter and 10’ –100’ length. Hose to be sized based on burner input requirements;
- 1 x Certified copper whip assembly for heat dissipation;
- 1 x Custom flame burner tool consisting of approved materials; and
- certified brass fittings and adapters as required.

Medium special effect flame models – vapor service only

This assembly must consist of:

- **For outdoor use**, multiple DOT TC approved cylinders ranging from 20 lb.-100 lb or one DOT TC 420 lb must be used;
- **For indoor use**, the total capacity of **cylinders** connected together is not to exceed 300lbs. of propane, and not more than one such manifold of **cylinders** to be located in the same floor area unless separated by a distance of at least 50 ft;
- certified copper whip assemblies for heat dissipation;
- certified fittings and adapters as required;
- certified shutoff valves;
- approved gas piping manifold;
- 0-60 PSI adjustable certified propane regulators;
- multiple custom flame burner tools consisting of approved materials;
- certified primary hose assembly ¼” to ¾” diameter. Hose to be sized based on total input of burners; and
- certified secondary hose assembly ¼” to ½” diameter. Hoses to be sized based on burner input requirements.

Any use of, or connection **to an ASME tank or container beyond the scope of above** must be performed by a licensed gas contractor and qualified gas fitter under an appropriate installation permit.

Additional requirements

Each small and medium model design registration application includes the following details:

- A. **Design** – assumptions considered during development of this design
- B. **Specifications (i.e., – technical data sheets)** – Type, sizes, make and model of fittings, valves, regulators, hose assemblies, and copper whip assemblies used in the design.
- C. **As-built drawings** – As-built drawings, photos for the SPFX model assembled, demonstrating how it would be typically built and used. Including all: sizing or sizes, lengths of hoses/assemblies, piping/hose layout, and all pressures involved associated to each zone of the package.
- D. **Flame tool pictures and specifications** – Drawings, photos, and material specifications for each type of flame tool that could be utilized in the specific SPFX model package.
- E. **Replacement in kind** – Statement indicating a “Replacement in Kind” procedure will be followed and documented. i.e.: if you replace a ball valve from one manufacturer, with a ball valve from another manufacturer, it must be able to be demonstrated that it meets the exact same certification and specifications as the one it replaced.
- F. **Operation and control plan** – Operation and control plan, i.e., who (which trained individual) will be doing what. Start, stop, and emergency procedures. Testing procedures: leak and system testing of package (when, how). How long the effect would typically be in continuous operation (a firing condition). How will required code clearances, protection of fuel containers, and equipment be demonstrated. Who is notified prior to use, i.e., the local fire department, studio OHS (Occupational Health and Safety) staff, Work Safe, etc.
- G. **Control of products of combustion** – Statement of control in relation to the venting of gas combustion products when a special effect is operated in a building (occupied space) with individuals or workers in this type of environment, and how the air quality will be managed to be kept safe and in compliance with applicable authority having jurisdiction regulations (Work Safe) i.e., building volume calculations vs. appliance input rating in conjunction with building fresh air supply/exhaust extraction system, procedures for the correct monitors and alarms to be in place, etc.
- H. **Site/event specific assessments** – Statement of how site/event specific assessments will be managed and performed prior to the set up and operation of the special effect. Demonstrate compliance to applicable sections of NFPA 140, NFPA 160 Standard: Use of Flame Effects Before an Audience or an equivalent applicable standard.