

SILANE GAS INSTALLATION SUPPLEMENT

For Use by Unidocs Member Agencies or where approved by your Local Jurisdiction
 Authority Cited: California Fire Code

I. General Information

This document applies to the storage, dispensing, and use of silane and its mixtures with a concentration of 2% or more silane by volume where the total quantity of pyrophoric gases within a control area exceeds CFC Table 2703.1.1(1) [i.e., 50 ft³ in storage (100 ft³ if stored in approved cabinets) or 10 ft³ closed usage (20 ft³ if stored in approved cabinets)]. It is intended to serve as a general overview of silane gas installation requirements and should not be considered all-inclusive. If this project involves new construction, plans must also include construction details for an “H-2” occupancy. **This document, if completed and submitted along with the project plans, installation permit application, and all required attachments, will expedite the plan review process.**

II. Project Information

Provide the following information:

Facility Name (Storage Site): _____ Bldg. No.: _____
 Site Address: _____ City: _____ Zip: _____
 Project Contact Name: _____ Phone No.: (____) _____ ext. _____
 Plan Check No.: _____ Date: _____ Bldg. Occupancy Classification: _____
 Quantity of Silane to be Stored (cubic feet): _____ Quantity of Silane Which Will be in Use (cubic feet): _____

This information is intended to expedite the plan review and approval process. Enter, on the line to the right of each item, the number of the page within your submitted plans on which the item asked for is described. Highlight the information in your plans. If an item is not applicable to this project, mark “N/A” on the “Submittal Page No.” line. Calculations, brochures and/or manufacturers’ cut sheets for all system components, and other required information shall be submitted as attachments to the plans.

A. General:

Agency Use Only	Code Section		Submittal Page No.
<input type="checkbox"/>	CFC § 4106.1.2	Containers, cylinders, and tanks are equipped with restrictive-flow orifices not exceeding 0.01 inch (0.254 mm) in diameter.	_____
<input type="checkbox"/>	CFC § 4106.1.2	The presence of a restrictive-flow orifice is indicated on each valve and on each container, cylinder, and tank by means of a label.	_____
<input type="checkbox"/>	CFC § 4106.1.3	Container, cylinder, and tank valves are constructed of stainless steel or other approved materials.	_____
<input type="checkbox"/>	CFC § 2703.2	Equipment (silane tools) and associated piping is listed by nationally-recognized organization(s).	_____
<input type="checkbox"/>	CFC § 2703.2.2.1	Piping is identified (i.e., labeled) “SILANE” and marked with the direction of flow.	_____
<input type="checkbox"/>	CFC § 2703.5	Visible hazard identification signs as specified in UFC Standard 79-3 (i.e., NFPA 704 signs) will be placed at entrances to locations where hazardous materials are stored, dispensed, used, or handled in quantities requiring a permit. Signs will be provided at specific entrances designated by the local agency. [Note: Silane hazard ratings are Health = 2, Fire = 4, and Reactivity = 3.] Rooms or cabinets containing compressed gases will be conspicuously labeled “COMPRESSED GAS”.	_____
<input type="checkbox"/>	CFC § 2703.9.1	Persons responsible for the operation of areas in which hazardous materials are stored are familiar with the chemical nature and the appropriate mitigating actions necessary in the event of a leak or fire.	_____

Agency Use Only	Code Section	Submittal Page No.
<input type="checkbox"/>	CFC § 2703.9.2	

Silane storage, dispensing, and use areas will be secured against unauthorized entry and safeguarded with such protective facilities as public safety requires.

B. Indoor Storage and Use, Outdoor Use:

Agency Use Only	Code Section	Submittal Page No.
<input type="checkbox"/>	CFC §§ 2703.8.2 4104.4.1.3	
<input type="checkbox"/>	CFC § 2703.9.4	
<input type="checkbox"/>	CFC § 4104.1.4	
<input type="checkbox"/>	CFC § 2704.12	
<input type="checkbox"/>	CFC §§ 2704.7 4106.4.3	
<input type="checkbox"/>	CFC § 4106.2.2	
<input type="checkbox"/>	CFC § 2704.3.1	
<input type="checkbox"/>	CFC §§ 2704.6 2705.2.1.2	
<input type="checkbox"/>	CFC § 2704.9	
<input type="checkbox"/>	CFC § 2704.10	
<input type="checkbox"/>	CFC § 4106.4.4.1	
<input type="checkbox"/>	CFC § 4106.4.4.3	
<input type="checkbox"/>	CFC § 2703.7.1	
<input type="checkbox"/>	CFC § 2703.2.8	

"Detached storage" is provided. [Note: Detached storage means a building used for no other purpose, which does not exceed one story in height and which has no basements, crawl spaces or other under-floor spaces. Detached storage is required when silane exceeds 2,000 cubic feet.]

Electrical wiring and equipment in storage areas complies with the California Electrical Code.

Silane is isolated from other incompatible hazardous materials by one-hour fire resistive walls (with openings protected in accordance with the Building Code) or hazardous materials storage cabinets.

Floors of areas where silane is dispensed are of non-combustible construction.

Emergency power is provided for ventilation systems, manual alarms, and leak detection monitoring equipment.

Gas cabinets/exhausted enclosures, when used, meet the following requirements:

- Internally sprinklered;
- Average ventilation velocity across the access port shall be not less than 200 linear feet per minute with a minimum velocity of 150 linear feet per minute;
- Connected to an exhaust system;
- Provided with self-closing doors;
- Constructed of not less than 12 gauge steel.

Exhaust ventilation will:

- Operate at a rate not less than 1 cubic foot per minute per square foot of floor area within the storage area;
- Operate continuously;
- Be provided with a manual shutoff outside of the storage room. The switch shall be of the break-glass type and be labeled "Ventilation System Emergency Shutoff;"
- Not be recirculated within the room or building.

Explosion control is provided.

Emergency alarms are provided outside of each interior exit door of the storage room or area which initiate local audible and visual alarms.

Emergency alarms, leak detection alarms, and fire-extinguishing systems will be supervised by an approved central, proprietary, or remote station service, or will initiate audible and visual signals at a constantly attended on-site location

Dedicated inert purge cylinders are located within the same gas cabinets as silane.

Purging will be performed by means ensuring complete purging of the piping and control system (i.e., through auto purge or other approved equivalent).

Signs prohibiting smoking are posted in dispensing areas and within 25 ft. of outdoor dispensing areas.

Machinery and equipment is seismically braced.

Agency Use Only	Code Section		Submittal Page No.
<input type="checkbox"/>	CFC § 4103.1.1	Systems are provided with emergency shutoffs at each silane source and at each tool.	_____
<input type="checkbox"/>	CFC §§ 2703.2.9.1.5 4103.1.1.1	Manually activated shutdown controls required by CFC §4103.1.1.1 for pyrophoric compressed gases will be tested during installation and periodically thereafter per CFC §2703.2.9 (i.e., annually, or in accordance with approved manufacturer’s requirements or industry standards).	_____
<input type="checkbox"/>	CFC §§ 2704.5 4106.2.1	Indoor storage areas and storage buildings are protected throughout by automatic sprinkler systems. (Ordinary Hazard Group 2 with minimum design area of 3,000 square feet).	_____
<input type="checkbox"/>	CFC § 2703.2.2.1	Emergency shutoffs are identified with clearly visible signs.	_____
<input type="checkbox"/>		Leak detection systems (e.g., heat or UV sensors or approved alternatives), if required by local code or ordinance, have been provided. <i>[Note: Contact your local agency for guidance.]</i>	_____

C. Outdoor Storage:

[Note: When overhead non-combustible construction is provided for sheltering outdoor cylinder storage areas, the storage areas shall be provided with approved automatic fire extinguishing system protection.] CFC §4104.2.2

Agency Use Only	Code Section		Submittal Page No.
<input type="checkbox"/>	CFC § 2703.7.1	Smoking is prohibited within 25 feet of outside storage areas.	_____
<input type="checkbox"/>	CFC § 2703.8.2	“Detached storage” is provided if aggregate quantity of silane exceeds 2,000 cubic feet. <i>[Note: Detached storage is defined as a building used for no other purpose, which does not exceed one story in height, and which has no basements, crawl spaces, or other under-floor spaces.]</i>	_____
<input type="checkbox"/>	CFC § 2705.3.8	The perimeter surrounding the storage area will remain clear of combustible materials and vegetation for a minimum distance of 30 feet.	_____
<input type="checkbox"/>	CFC § 2704.12	Floors of storage areas are of non-combustible construction.	_____
<input type="checkbox"/>	CFC § 4104.2	Outdoor storage of quantities of pyrophoric materials in amounts exceeding the maximum allowable quantities per control area is in accordance with CFC §§2702, 2704, and 4101.	_____
<input type="checkbox"/>	CFC § 4104.2.1	Location and maximum amount of pyrophoric gases per storage area is in accordance with CFC Table 4104.2.1. <i>[Note: See below.]</i>	_____

PYROPHORIC GASES — DISTANCE FROM STORAGE TO EXPOSURES (CFC Table 4104.2.1)

Maximum Amount Per Storage Area (cubic feet)	Minimum Distance Between Storage Areas (feet)	Minimum Distance To Lot Lines of Property That Can Be Built Upon (feet)	Minimum Distance To Streets, Alleys, or Public Ways (feet)	Minimum Distance To Buildings On The Same Property (feet)		
				Non-rated construction or openings within 25 feet	Two-hour construction and no openings within 25 feet	Four-hour construction and no openings within 25 feet
250	5	25	5	5	0	0
2,500	10	50	10	10	5	0
7,500	20	100	20	20	10	0