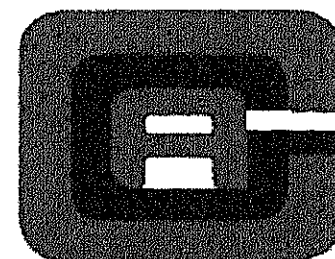


**CGA P-57—2007
(EIGA Doc 95/07)**

**AVOIDANCE OF FAILURE OF
CARBON MONOXIDE AND OF
CARBON MONOXIDE/
CARBON DIOXIDE
MIXTURES CYLINDERS**

FIRST EDITION



**COMPRESSED GAS ASSOCIATION, INC.
4221 Walney Road, 5th Floor
Chantilly, VA 20151
Phone: 703-788-2700
Fax: 703-961-1831
E-mail: cga@cganet.com**

7 Protection of piping, valves, and fittings

7.1 General

All pressure relief devices and their inlet piping and all valves, fittings, and other accessories that are in communication with the liquid container without intervening shutoff valves or check valves shall be installed within the motor vehicle framework or within a suitable collision resistant guard or housing, and appropriate ventilation shall be provided. Pressure relief devices shall be protected so in the event of the upset of the vehicle onto a hard surface they are not prevented from opening and their discharge is not restricted. Every part of the loaded cargo tank and any associated valve or pipe, enclosure, or protective device or structure (exclusive of the wheel assemblies) shall be at least 12 in (305 mm) above level ground.

7.2 Mid-tank piping protective housing

Piping and valves subject to liquid container pressure during transportation that are not located at the rear of and within the protection of the cargo tank's circumference and the vehicle frame or that do not have intervening shutoff valves or check valves that are located within the motor vehicle framework shall be protected by a device or housing.

Each protective device or housing and its attachment to the vehicle structure shall be designed to withstand static loading in any direction that it may be loaded as the result of a front, rear, side or sideswipe collision, or the overturn of the vehicle. The static loading shall equal twice the loaded weight of the tank and the attachments. A safety factor of four based on the ultimate strength of the material shall be used. The protective device or housing shall be made of steel at least 3/16 in (5 mm) thick or other material of equivalent strength.

7.3 Rear bumper

Each cargo tank vehicle shall be provided with at least one rear bumper designed to protect the outer vessel and piping in the event of a rear end collision. The bumper design shall transmit the force of the collision directly to the chassis of the vehicle. The rear bumper and its attachments to the chassis shall be designed to withstand a load equal to twice the weight of the loaded cargo tank and attachments based on a safety factor of four on the minimum ultimate strength of the material used. The load shall be applied horizontally and parallel to the major axis of the cargo tank. The rear bumper dimensions shall meet the requirements of 49 CFR 393.86, and it shall be designed, constructed, labeled, and maintained in accordance with 49 CFR 571.223 and 571.224 [2]. The bumper or a vertical post attached to the bumper shall extend vertically to a height adequate to protect all valves and fittings forward of the bumper if damage can cause loss of lading.

8 Supports and anchoring

8.1 Cargo tank with frame

Each cargo tank with a frame not made integral with the outer jacket by welding shall be provided with positive restraining devices for drawing the cargo tank down tight on the frame without introducing undue concentrations of stresses. In addition, suitable stops or anchors shall be attached either to the frame or to the outer jacket to prevent relative motion between them from occurring as a result of starting, stopping, and turning the vehicle. The stops and anchors shall be installed so they are readily accessible for inspection and maintenance. The stops and anchors and their attachments to the frame and outer jacket shall be capable of withstanding the minimum static loadings required by 9.2.

8.2 Frameless cargo tank

A cargo tank constructed so the outer jacket constitutes, in whole or in part, the structural members used in place of a structural frame shall have the cargo tank supported by external cradles or other suitable supporting devices such as load rings. Cradles used without other stiffening means shall subtend at least 120 degrees of the circumference to which they are attached. The supports and their attachments to the cargo tank shall be designed to withstand the following minimum static loadings times the weight of the cargo tank and its attachments when filled to the design weight of lading:

- vertically downward of 2;

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