



Division of the State Architect

CALIFORNIA DEPARTMENT OF GENERAL SERVICES

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**To: Design Professionals
Division of the State Architect Regional Offices
Interested Parties**

**From: Division of the State Architect
Department of General Services
State of California**

**SUBJECT: Gas Piping Installation Requirements and Recommendations for Seismic
Damage Reduction**

Purpose: This document is intended to notify design professionals of recommended gas piping installation practices in areas of seismic concern.

Seismic and other natural events can cause gas pipe to fail and result in fires and explosions. Nonductile pipes (such as cast iron, glass and nonductile plastic) and pipe fittings (such as those made by bonding, compression couplings or grooved couplings) are susceptible to cracking and failure in earthquakes. According to the Seismic Safety Commission there are safety measures that may be taken to minimize gas pipe failure in a seismic event.

- Fuel gas lines should not be embedded within solid concrete floor/ceiling assemblies or concrete slabs, but should be located in channels within them and covered with metal plates or plating to facilitate repair or replacement.
- Cast iron should not be used for valves, fittings, or supports.
- Welded piping systems can withstand the cyclic, horizontal, vertical and rotational forces of an earthquake much better than threaded piping. Threaded couplings can be used when designed to ASCE 7 for higher forces.
- Minimum 1" clearance shall be provided where piping passes through foundations, walls, and floors. If one part of the piping is secured rigidly and the other is free to move, sway bracing should be provided. All pipe shall be designed so they do not strike other components.
- Hangers with shock absorbing devices should be provided for piping subjected to seismic forces imposed by other equipment. Tags should be attached to piping having springs so that the hangers can be reset to their proper tension periodically.

- Pipe bracing shall be designed in accordance with California Building Code Section 1615A.1.22 and ASCE 7-05 Section 13.6. OSHPD Pre-approved anchorage systems with OPA numbers may be used to satisfy these requirements. I_p shall equal 1.5 for all gas lines to increase the design forces by 50 percent.
- The structural engineer of record shall verify the adequacy of the structure to support the hanger and brace loads.

References and Further Study

Improving Natural Gas Safety in Earthquakes

http://www.seismic.ca.gov/pub/CSSC_2002-03_Natural%20Gas%20Safety.pdf

Task Committee on Earthquake Safety Issues for Gas Systems and the California Seismic Safety Commission

http://www.strandearthquake.com/pdfs/Papers/Strand_DraftMinorityReport_7-10-02.pdf

Blue Star Piping Requirements

<http://bluestargas.com/piping.html>

Earthquake Protection for Flammable Gas Piping

<http://www.risklogic.com/aug2007.html>