

Basic Primer for Suspended Piping

Failures in piping systems resulting from earthquakes have historically resulted in large quantities of water or other materials being dumped into occupied spaces of the building structure. The resulting dollar damage to the building and its contents is often considerably more than the costs of damage to the building structure itself. In addition, failure of the building's mechanical systems can render the structure unoccupiable until the damage is corrected, and result in major problems for the tenants and/or owners.

Because of the impact that failures of these systems have had in the past, design requirements for piping systems have become much more stringent.

Within a building structure, there are multitudes of different kinds of piping systems, each with its own function and requirements. These include potable water, sanitary, HVAC, fire piping, fuel, gas, medical gases, and process systems to name a few. Requirements for the systems vary based on the criticality or hazardous nature of the transported fluid. Code mandated requirements for the restraint of piping systems are addressed in Chapter D2 of this manual (Seismic Building Code Review).

Prior to applying this section of the manual, it is assumed that the reader has reviewed Chapter D2 and has determined that there is indeed a requirement for the restraint of piping. This chapter of the manual is a "how to" guide and will deal only with the proper installation and orientation of restraints and not whether or not they are required by code or by specification.

This chapter also does not address the sizing of restraint hardware. Chapter D4 includes sections on sizing componentry based on the design seismic force and the weight of the system being restrained.

Process piping is not directly associated with building operating systems and often has its own set of requirements. If there are no applicable special requirements, these systems should be restrained in a similar fashion to the building mechanical systems. This manual will not address any special requirements for process piping systems.

Building mechanical systems (potable water, HVAC, sanitary) can normally be grouped together and have similar design requirements. In many cases, requirements for fuel, gas, and medical gasses are more stringent. Refer to the code review chapter (D2) of the manual for applicable design requirements.

Fire piping restraint is normally addressed in the applicable fire code. There is always some requirement for restraint, as triggering a nozzle generates thrust in the piping and must be countered. This thrust may be uni-directional, unlike the loads generated by an earthquake, and can sometimes be countered by unsymmetrical restraint arrangements.

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These types of non-seismic restraints are not addressed in this chapter. To determine the design requirements for seismic applications, refer again back to the code review Chapter D2.

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