

Section 404 *Atriums*

This section was developed to fill a need for code provisions applicable to the trends in the architectural design of buildings where the designer makes use of an atrium. Prior to the early 1980s, building codes did not provide for atriums, and, moreover, atriums were prohibited because of the requirements for protection of vertical openings. They were, however, permitted on an individual basis, usually under the provisions in the administrative sections of the code permitting alternative designs and alternative methods of construction. The general concept of alternative protection is to provide for both the equivalence of an open court and at the same time provide protection somewhat equivalent to shaft protection to prevent products of combustion from being spread throughout the building via the atrium.

An atrium is considered “an opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall.” This section permits large unprotected vertical openings through floors without the need for a shaft enclosure or other means of vertical opening protection. The use of atriums is permitted in all buildings other than those classified as Group H occupancies.

Note that most cases where two floors are open to each other do not create atrium conditions. That is because Section 712.1.8 permits two stories to be open to each other where seven conditions are met. The atrium provisions are typically only utilized for open two-story spaces where they cannot fully comply with the conditions of Section 712.1.8 and are too large to qualify as a mezzanine as permitted by Section 712.1.10. Addressed in Section 712.1.6, the atrium provisions are provided only as one of many applications addressed in Section 712.1 for the protection of vertical openings.

404.3 Automatic sprinkler protection. One of the basic requirements for atriums is that the building be provided with an automatic sprinkler system throughout. See Figure 404-1. Two exceptions modify this general requirement. Those areas of the building adjacent to or above the atrium are not required to be sprinklered if appropriately separated from the atrium. This separation must consist of minimum 2-hour fire barriers, horizontal assemblies, or both. In addition, sprinkler protection is not required at an atrium ceiling located more than 55 feet (16,764 mm) above the atrium floor.

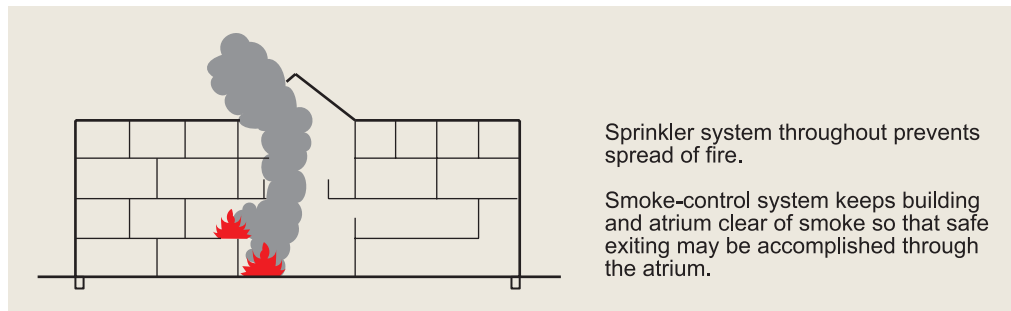


Figure 404-1
Atrium concept.

Smoke control. Another major component of the life-safety system for a building containing an atrium is the required smoke-control system. The design of the smoke-control system is to be in accordance with Section 909. Although the exhaust method is typically used as the means of accomplishing smoke control, the code would not prohibit the use of the airflow or pressurization methods where shown to be suitable. One of these methods is often used where the ceiling height makes it difficult to maintain the smoke layer at least 6 feet (1,829 mm) above the floor of the means of egress.

404.5

An exception eliminates the requirement for smoke control in those atriums that connect only two stories. However, as previously addressed, most situations where two floors are open to each other are not regulated under the provisions of Section 404. Typically, Section 712.1.8 is utilized to permit an opening between two floor levels without requiring compliance with any of the atrium provisions.

Enclosure of atriums. With some exceptions, an enclosure separation is required between the atrium and the remainder of the building. See Figure 404-2. The basic requirement is for a 1-hour fire-resistance-rated fire barrier with openings protected in accordance with Tables 716.5 and 716.6. This degree of enclosure, in addition to the other special conditions of Section 404, is intended to provide protection somewhat equivalent to the otherwise mandated shaft protection. Two alternative methods of atrium separation are described in the exception. The special sprinkler-wetted glass enclosure as depicted in Figure 404-3 provides a prescriptive method of achieving equivalency. In addition, the separation may consist of a 3/4-hour-rated glass-block wall assembly.

404.6

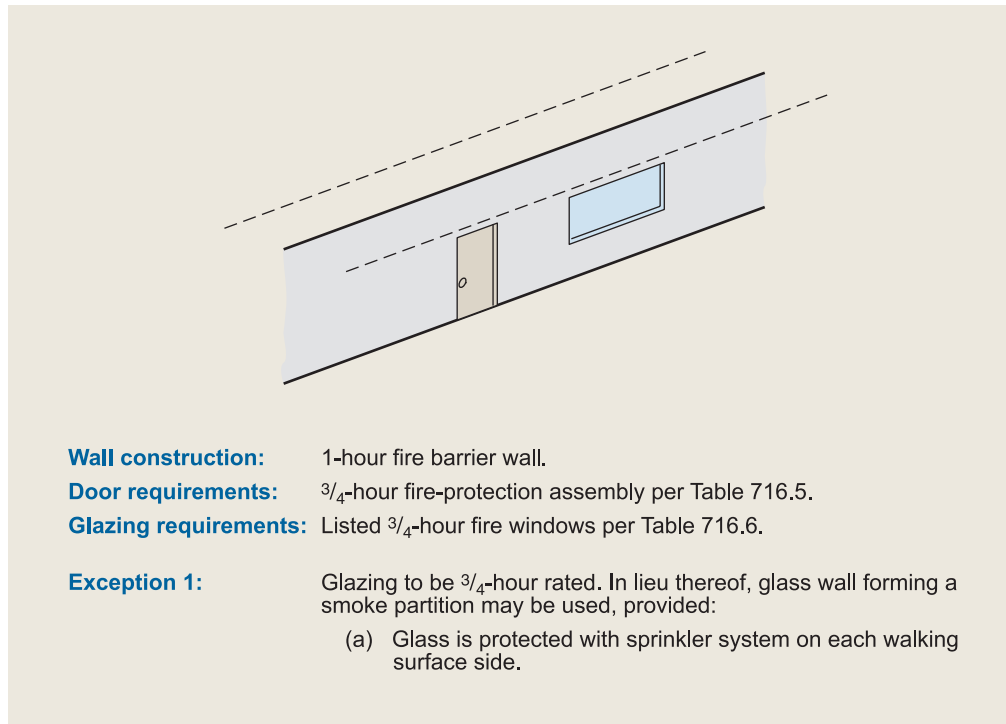


Figure 404-2
Atrium
enclosure.

The separation between adjacent spaces and the atrium may be omitted on a maximum of any three floor levels, provided the remaining floor levels are separated as provided in this section. In computing the atrium volume for the design of the smoke-control system, the volume of such open spaces shall be included.

Figure 404-3
Glass protection.

