



CAMPUS FIRE SAFETY CODE TALK

Campus Fire Safety e-NewZone

Protecting those books!

Sprinkler protection requirements in libraries and other document storage areas.

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Libraries are a central feature of every university. They are a stop on the tour for prospective students and parents before heading to the bookstore to buy sweatshirts and bumper stickers. University libraries become a second home for some students, a late-night study retreat for those with loud roommates or those who need a change of scenery while studying.

Testudo, the mascot for my alma mater, is located proudly out front of the school's main library where passing students can rub his nose on their way to class for good luck. Rumor has it, the overall university student GPA dropped the year students could not get their lucky Testudo fix when the library was closed for renovations. I wonder if it was due to Testudo's inaccessibility or the fact that the library was closed. I have a feeling the latter had more to do with it.

Similar to other university libraries, this library contains student work areas, traditional library shelving, and library stacks on the upper floors. University libraries all house books, but the manner of doing so can alter the sprinkler protection requirements.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, provides sprinkler protection criteria based on the type of hazard found within a space. The higher the hazard, the more water necessary to control a fire within the space. There are lists in Annex A of the standard providing examples of the types of fuel loads found in light, ordinary, and extra hazard occupancies. The hazard level is not only determined by the commodity itself; it is also a matter of how it is arranged. The more densely packed the commodity, the higher the

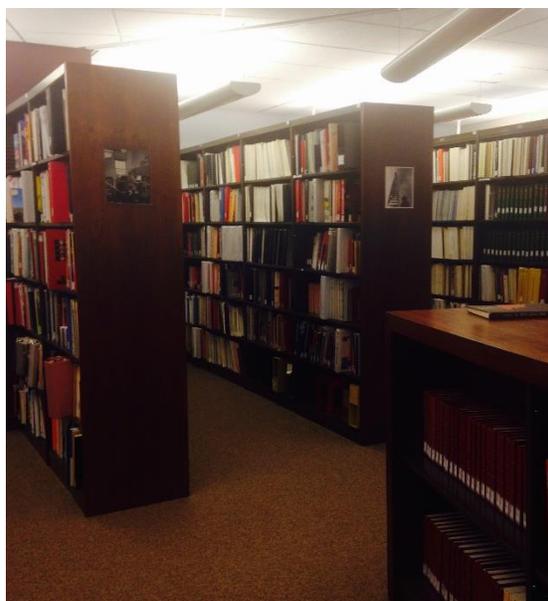


Figure 1 Typical library configuration with wide aisles and ample clearance to sprinklers.



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associated hazard commonly is. Accordingly, some book storage areas are considered higher hazards than others and require higher densities of water to protect the space. To ensure that the water is able to reach the hazard, additional sprinklers may be required when obstructions to the water discharge are present.

Libraries are considered to have a lower hazard classification than their stack areas or bookstores. Whereas traditional libraries commonly have aisles wider than 30 inches and only store up to 8 feet, library stack areas often have narrower aisles and taller shelves that may extend up to the ceiling. Because the shelves within the stack areas frequently do not maintain the minimum 18 inch clearance required by other portions of the standard, specific sprinkler placement criteria is provided for library stack areas.

Many universities and colleges boast libraries holding hundreds of thousands of books, and as one can imagine, space is at a premium for their ever-expanding collections. If the required 18 inch clearance from the sprinkler deflector to the top of storage is not maintained, sprinklers are required in every bookshelf aisle in most cases (with specific tier and shelf construction, the sprinklers can alternate aisles). This mandates additional sprinklers due to the reduced coverage area. Standard spray sprinklers in an ordinary hazard occupancy are each permitted to protect a maximum of 130 square feet. Sprinklers in a library stack area where storage is within 18 inches of the sprinklers may ultimately provide coverage to just over half that area because of the obstructing bookshelves.

Sprinklers can be located without regard to the aisle locations when the clearance meets the 18 inch minimum specified by NFPA 13. When the clearance is 18 inches or more, the sprinkler will be able to spray to adjacent aisles within the sprinkler's coverage area. This allowance to locate sprinklers without regard to the aisle locations acknowledges the importance of allowing the sprinkler distribution pattern to properly form in this critical clearance space. If it cannot form properly due to obstructions such as bookshelves, additional sprinklers are required.

The above rules for library stack areas also apply to record storage in cardboard boxes stored on shelves. If the records are stored in filing cabinets or mobile shelving, the requirements vary, however. It is not the intent of NFPA 13 to require sprinkler protection within furniture. The obstruction rules must be satisfied and adequate clearance to the sprinklers must be provided as specified in the standard, but sprinklers are not required within the cabinets themselves.



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Fire tests indicated that compact mobile shelving could be adequately protected with a light hazard sprinkler design. The storage configuration and area are limited to what was approved as a result of the fire tests, but with the specified transverse and longitudinal barriers, fire control was achieved with densities similar to what would be provided in a traditional library, including larger allowable protection areas of coverage per sprinkler.

Any time the space is reconfigured or modified, the sprinkler system should be evaluated. As mentioned above, the sprinkler location requirements vary based on the shelf storage configuration, so if areas are reconfigured, the sprinkler system must be assessed to ensure it is capable of protecting the new hazard, both in terms of adequate discharge densities and the obstruction rules.

Ray Bradbury posited that paper burns at 451F. Proper protection of the paper, regardless of its storage configuration or bindings, can ensure that any loss in a fire incident will be minimized, despite his “firefighters” best efforts to destroy the literature.



The Center for Campus Fire Safety

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