

Protecting Fire Sprinklers From the Human Element

Fire sprinkler systems are designed and installed to protect life and property. Actuation of sprinkler heads in the event of a fire is desired, but actuation from damage or other causes is not. So, what protects the sprinkler heads from us – the human element?

Each year, some automatic sprinklers are damaged or compromised through accidents, vandalism, or malicious mischief. This results in unintended discharge of as much as several hundreds of gallons of unwanted water that can damage property or could cause chaos for nearby occupants (ever been showered with cold dirty stale water?). Building operations can be shut down for extensive periods of time and when the business interruption or temporary moving and housing costs are added to the costs of the building repairs, the loss can be significant.

Although there have been improvements in recent years regarding protection of sprinklers during packaging, shipping, handling, and installation (e.g., the protective plastic guards on sprinkler heads in the shipping box), some sprinklers fail each year due to damage caused by people.

Currently, there are options to minimize the potential damage to sprinkler heads that have already been installed. The most common include the installation of the sprinkler at a location or height where damage will least likely occur, the use of the appropriate “Listed” head guard for the specific sprinkler, fully concealed sprinklers, and institutional style sprinklers. Each option has its pros and cons. However, regardless of the options considered, the human element always enters the equation.

- **Location & Height** – Many installations can be designed where the proximity of the sprinkler head is unlikely to be damaged. For example, sprinklers can be located in normally occupied and/or supervised areas (offices, retail sales, etc.) with ceiling heights exceeding eight feet high, and in areas where equipment, storage, or machinery are not an issue. Pendent, upright or horizontal sprinkler heads can be used if positioned correctly in areas where the potential for damage of any kind will be at a minimum.
 - In most applications sprinkler heads are installed in locations or at elevations where damage is unlikely. However, there are instances where protection of these devices must be considered and a few of these examples are as follows:
 - Warehouses & Mechanical/Service Rooms – Sprinklers installed below mechanical equipment or ductwork may be prone to accidental damage from occupants (“head-knockers”, if you will). Also, the use of forklifts or other equipment may subject sprinklers to damage. “Listed” sprinkler head guards are generally specified for these applications. A thorough review of building owner requirements and usage should be performed to determine where head guards should be recommended or installed.
- **Sprinkler Head Guards** – These devices are generally recommended where damage could occur to commercial sprinklers due to activities, operations, the use of equipment, (warehouse forklifts, etc.) or machinery, where objects are hit, thrown, kicked or batted (school locker rooms & gymnasiums), where sprinklers are installed below eight feet above the floor, or in areas with limited or no supervision or where malicious mischief or vandalism could occur. Sprinkler head guards must be “Listed” for use with the automatic sprinkler they are used on. In many cases generic head guards should not be used because they could void the warranty of the sprinkler with the sprinkler manufacturer.
- **Fully Concealed Sprinklers** – “Out of sight – out of mind” is what generally comes to mind when using these sprinkler heads. The sprinkler assembly is located behind a plate that is generally flush with the ceiling. Most building occupants don’t realize that there is a sprinkler head behind the finish

plate and won't give it a second thought. The low profile of the concealed sprinkler may help prevent damage to the assembly as opposed to an automatic sprinkler that is protruding several inches down from the ceiling.

- Schools, Bathrooms, Temporary Residential, and Minimum Security Areas – Although fully concealed sprinkler heads are generally installed for aesthetic reasons, utilizing this type of sprinkler does not draw the attention to itself that a recessed or pendent sprinkler head might. Plus, the lower, almost flush profile of the sprinkler does not lend itself to as much accidental damage. Also, most people are not aware of the automatic sprinkler assembly behind the cover plate so there is less chance for vandalism or malicious mischief.
- ***Institutional Sprinklers*** – These may be the most misunderstood automatic sprinklers when considered for protection from the human element. When these devices were first introduced, manufacturers referred to them as “vandal-proof”. It was discovered, however, that there may not be an automatic sprinkler that is completely vandal-proof. Subsequently the terminology “vandal resistant” was applied to these sprinklers. Certain models, such as the old Star PH series, were standard response sprinklers that were popular for their construction features. But, when the National Fire Protection Association Standard 13, *Standard for the Installation of Sprinkler Systems*, required quick response sprinklers in light hazard occupancies, manufacturers had to redesign their institutional sprinklers to meet quick response requirements. This resulted in a design change to the sprinklers that may not be as vandal resistant as their predecessors. Selection of these types of devices must take into account the usage of the building in each specific room or area and not the building as a whole.
 - Jails, Detention & Treatment Centers, and Maximum Security Areas – Although designated as vandal resistant and not vandal proof by the manufacturers, institutional style sprinklers are still the choice to consider where individuals could vandalize or consider doing harm to themselves with the assist of an automatic sprinkler. The installation of these devices must adhere strictly to the manufacturers' recommendations or they could fail. The suspended load (the link break-off weight) for the heat sensors must be taken into consideration, as it varies by manufacturer. A lower weight might be considered where juveniles are present. Also, the sprinkler assembly needs to be securely attached in a manner where there is no movement. A review of the wall or ceiling assembly should be performed for adequacy of the support system and, if necessary, additional supports may need to be provided to comply with the manufacturers' installation recommendations.

Part of the challenge for designers is to select the appropriate automatic sprinkler for the specific application. This also extends to the protection of these devices that are not fragile, but need to be treated as if they are, so they are functional and can operate when you need them - not when you don't. The building owner and/or occupants should be consulted when selecting the sprinklers and the proper method of protection prior to the design and installation of the sprinkler system.

This only touches on types of protection and instances where protection of the automatic sprinklers should be considered. Each room or area of the building should be reviewed to help determine where and what type of protection could be utilized. Input from the building owner, occupants, or users should be considered when evaluating how and where the human element will affect the sprinkler protection requirements. Although the final decisions may not be perfect (if someone really wants to damage a sprinkler head, they will), prudent choices will minimize accidental or intentional damage to these devices.