

# Plastics Alter the Effectiveness of Your Sprinkler System

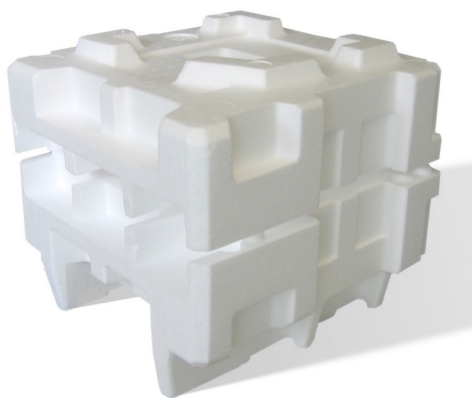
**HYDRAULIC-SYSTEM**

This system as shown on \_\_\_\_\_ company  
print no. \_\_\_\_\_ dated \_\_\_\_\_  
for \_\_\_\_\_  
at \_\_\_\_\_ contract no. \_\_\_\_\_  
is designed to discharge at a rate of \_\_\_\_\_ gpm/m<sup>2</sup>  
(L/min/m<sup>2</sup>) of floor area over a maximum area of \_\_\_\_\_  
ft<sup>2</sup>(m<sup>2</sup>) when supplied with water at a rate of \_\_\_\_\_  
gpm (L/min) at \_\_\_\_\_ psi (bar) at the base of the riser.  
Hose stream allowance of \_\_\_\_\_ gpm (L/min)  
is included in the above.  
Occupancy classification \_\_\_\_\_  
Commodity classification \_\_\_\_\_  
Maximum storage height \_\_\_\_\_

Sprinkler systems are designed and installed to provide adequate fire protection specifically for hazards that are inside the building. When determining the proper design, the occupancy classification and commodity type and configuration must be considered. The sprinkler system may not be able to control a fire if the sprinkler system isn't designed for the hazards within the building. For example, a sprinkler system in an office building would have a lower demand than a system needed for a furniture warehouse. Engineering sprinkler protection is a science, and National Fire Protection Association (NFPA) 13 is the standard used when designing a system. A fire protection engineer determines the design using information provided to them by the building owner. This information includes building height, operations, storage arrangements, materials stored, and many other factors.

Operations inside a building, however, can change. Whether it's a new tenant, a change in products, or even a change in packaging, these modifications can negate the effectiveness of a sprinkler system. One major factor is the use of plastics. Because plastics burn at a higher level of heat release, fire develops and spreads more rapidly. Therefore, a sprinkler system designed for the storage of plastics often requires more water and a higher hydraulic design to control a fire.

**Types of Plastics** – NFPA classifies plastics into categories A, B, and C. Group A plastics are the most common type of plastic used and have a higher heat release than other plastic categories. Common Group A plastics include PVC, polycarbonate, polypropylene, rubber, and many more. Group B and C plastics aren't as common. When looking at the sprinkler system design, raw material storage may require a different sprinkler design than the finished products.



**Plastics Packaging** – Packaging materials used inside a container must be considered in the proper sprinkler design. For example, a commodity could be considered Group A Plastic if 25% of volume of that product is plastic. This is significant because regardless of the actual product, if it's stored inside of plastic dunnage or Styrofoam, you could easily go over 25% of volume. For instance, if a noncombustible object, such as a mirror, is packaged inside Styrofoam for protection, the classification of the object is Group A plastic.

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**Plastic pallets** – When determining the proper hydraulic design for the commodity, you must also look at what the product is being stored on. Plastic pallets are becoming more common in facilities due to their durability. There are four commodity classifications in addition to Group A, B, and C plastics. These include Class I, Class II, Class III, and Class IV commodities. Class I is noncombustible and requires the least sprinkler demand. The classification increases based on combustibility of products and packaging. The higher the classification, the higher the demand of the sprinkler system. If plastic pallets are used to store products, the classification increases by one or two classes depending on whether you're using reinforced or unreinforced plastic pallets. Therefore, if a metal product (Class I commodity) is stored on plastic pallets, the sprinkler system must be sufficient enough to provide protection for a Class II or Class III commodity based on the type of plastic pallet.



**Plastic totes** – Plastic totes, crates, and molded pallets/dunnage made specifically for a product are becoming an increasing concern. These totes encase a product and, therefore, have the potential to completely change a commodity class. Using plastic totes can significantly change your sprinkler system needs and firefighting potential. For instance, a metal product that's stored in a plastic crate will require the sprinkler system to be designed for Group A Plastics instead of commodity Class I.

There's a common misconception that the fire protection company that performs the annual sprinkler inspection also verifies the design is adequate for the occupancy and commodity storage arrangements. Their main purpose, however, is only to ensure the system will operate when activated. According to NFPA 25, whenever there's a change in occupancy or materials used or stored, it's the responsibility of the owner to have the system evaluated to confirm it's adequate for the new occupancy, use, or materials. Another common misconception is that the local fire department will verify the adequacy of the design during their annual inspection, but this isn't the case either. Ultimately, it's up to the building owner to ensure the design is correct for the exposure.

There are many factors that must be considered when determining the effectiveness of a sprinkler system. When evaluating a system, one must think of how a product will burn and what will contribute to a fire. If there's been a change in operations, occupancy, storage, or packaging, please contact one of West Bend's loss control consultants to evaluate your sprinkler system.