

Comparison of Selected Automatic Fire Sprinkler Systems and Suppression Systems for Museum Objects*

System Type	Description	Advantages	Disadvantages
Wet pipe sprinkler system	<p>Sprinkler pipes are constantly filled with water</p> <p>Installed in climate-controlled structures or in climates above 40°F</p> <p>Typically used in environments that are not susceptible to freezing</p>	<ul style="list-style-type: none"> - Extremely reliable - Faster response than dry pipe systems - Pipes less susceptible to corrosion than in dry pipe systems - Relatively easy and economical to install and maintain 	<ul style="list-style-type: none"> - Not for use in environments susceptible to freezing - Accidental discharge can result in water and mold damage - Objects not stored in closed cabinets are susceptible to water damage
Dry pipe sprinkler system	<p>Pipes are filled with pressurized air or nitrogen rather than water</p> <p>Used in climates below 40°F and in non-climate-controlled and unheated structures</p> <p>When sprinkler head is activated, compressed air is released so water can flow out of the pipes</p> <p><i>Pre-action systems</i> are a type of dry pipe system that have closed heads with no water in the piping; the fire detection system opens a valve that charges pipes with water</p>	<ul style="list-style-type: none"> - Can be used in environments susceptible to freezing, typically in northern climates - Minimal water leakage and accidental discharge of water - Less likely to cause water and mold damage to collections 	<ul style="list-style-type: none"> - Delay in initial response (code allows up to 60 seconds) - Requires more maintenance than a wet pipe system - Pipes susceptible to inline corrosion if not constantly filled with compressed air or nitrogen - Requires reliable power to maintain inline pressure - After operation, pipes can corrode if not thoroughly drained and dried - Objects not stored in closed cabinets are susceptible to water damage
Gaseous (Clean agent) suppression system	<p>Discharges a fire extinguishing gas instead of water for total flooding of the structure</p> <p>Must comply with NFPA 2001: <i>Standard on Clean Agent Fire Extinguishing Systems</i></p>	<ul style="list-style-type: none"> - Can be used in cold storage rooms and other areas subject to temperatures below 40°F and in sensitive areas - Eliminates the possibility of water damage to collections from fire suppression 	<ul style="list-style-type: none"> - If not properly maintained and pressurized the system will not discharge - Gas requires tightly sealed compartments for effective operation - Suppression agent levels must be maintained for several minutes after discharge to prevent re-ignition - Objects not stored in closed cabinets can sustain physical damage from gas pressure and potential chemical alterations
High-pressure water mist suppression system	<p>A higher pressure, low water system that discharges extremely small water particles</p>	<ul style="list-style-type: none"> - Reduces potential for water damage to collections and historic fabric - Uses less water used than a typical wet or dry pipe system - Can be used to protect structures lacking water and reliable utility service - Can be serviced with a water storage tank or cistern 	<ul style="list-style-type: none"> - Cost is higher than wet or dry pipe systems - Requires specialized design and installation expertise - Requires specialized inspection, testing, and maintenance expertise

*This table incorporates information from RM-58.7, Appendix A: Fire Protection System Comparisons.

Figure 9.7 Comparison of Selected Automatic Fire Sprinkler Systems and Suppression Systems for Museum Objects