With The Joint Commission's Director of Engineering: George Mills

Testing Fire Pumps, Standpipe Water Flow, and Kitchen-Based Fire-Extinguishing Systems

Delving further into EC.02.03.05

Guest Columnist: James Woodson, PE, CHFM, engineer, The Joint Commission

An introduction from George Mills, MBA, FASHE, CEM, CHFM, CHSP, director, Department of Engineering, The Joint Commission: *A building properly equipped with sprinklers and extinguishing systems has been proven to be a much safer structure during a fire emergency. Health care facilities using a defend-in-place model, where patients aren't able to self-ambulate, depend on such equipment to provide a greater level of fire safety. Hence, it's extremely important to maintain and test these components and systems. I asked James Woodson, engineer in the Department of Engineering with The Joint Commission, to write this month's column and address more of the details and nuances associated with this topic.*

Over the past year and a half, this column has delved deeper into Standard EC.02.03.05, which covers how and with what frequency health care organizations need to maintain fire safety equipment and building features. The December 2013 "Clarifications and Expectations"column examined Elements of Performance (EPs) 1–4, including issues related to signal devices, valve tamper switches, notification devices, and visual and audible fire alarms. The March 2014 column explored EPs 5 and 6, which cover testing of notification devices and weekly churn tests for water-based fire protection systems. In June 2014, we tackled EPs 7–10, pertaining to high- and low-water level and temperature alarms on water storage tanks, auto sprinkler system main drain testing, and inspection of fire department water connections.

This time around, we will investigate and offer compliance tips related to EPs 11–13, which involve checking fire pumps under flow, water flow for standpipe systems, and auto fire-extinguishing systems in a cooking environment.

Note that these EPs do not require health care organizations to have the types of fire safety equipment and building features described. However, if these types of equipment or features exist within the building, then the maintenance, testing, and inspection requirements of these EPs apply, regardless of building ownership.

EP 11—Inspecting fire pumps under flow

For automatic sprinkler systems: Every 12 months, the organization tests fire pumps under flow. The completion date of the tests is documented. **Note:** *For additional guidance on performing tests, see NFPA 25, 1998 edition.*

EP at a glance

This test is designed to evaluate the fire pump, its prime mover (be it an electrical motor or a diesel engine), and its ability to deliver fire protection water under multiple conditions. It's important to compare this test's results to previous fire-pump-under-flow tests to look for any system degradation. This comparison is typically done using a performance (graphic) curve of pressure versus flow but can also be accomplished with written data.

The pump is required to be tested at three points: zero flow (minimum), 100% flow (100% of the pump's rating), and 150% flow (peak). First, the water has to be discharged. Look for a connector on the side of your building where the flow testing device can be attached to measure discharged water. An alternative method is to use a bypass flow meter, but remember to periodically calibrate this flow meter. Next, evaluate the flow from the pump and the pump's performance to include pump suction and discharge pressures and check for proper operation of installed alarms and installed relief valves.

At this point, testing and documentation differs depending on whether the pump is supported by an electric or a diesel motor. If the pump is driven by electric motor, be sure to document voltage, current, and speed. If the electric motor is connected to emergency power, also test the automatic transfer by a

(continued on page 6)

(continued from page 5)

simulated normal electrical power loss while the pump is delivering peak output. If it's driven by diesel engine, document speed and water, as well as oil temperature indicators and oil pressure to ensure that the prime mover is operating correctly. Make adjustments if you identify deficiencies.

Survey activity

Surveyors will assess EC.02.03.05, EP 11, during the document review session and confirm compliance during the building tour. They will examine the last annual fire pump test conducted and possibly review other tests dating back to the last full survey (approximately 36 months prior). Surveyors are required to visually check the condition of the fire pump assembly and configuration and compare it to what they reviewed in the test report.

Life Safety Code®* *background*

- NFPA 25-1998, Chapter 5

EP 12—Standpipe system water flow tests

Every 5 years, the organization conducts water-flow tests for standpipe systems. The completion date of the tests is documented. **Note:** *For additional guidance on performing tests, see NFPA 25, 1998 edition.*

EP at a glance

The purpose of this EP is to verify that the facility's water supply provides the design pressure and flow on the distribution side (pressure and flow to which the system was designed) so that the piping delivers the correct amount of fire protection water to the building. This EP is frequently a source of confusion, as it does not pertain to the fire sprinkler system but to the hose system installed, if you have one. In this case, you need to determine whether the system is a wet system (where water is always in the pipe) or a dry system (in which case water is not charged into the pipe until it's needed). The flow test for a wet system will need to verify that the water supply continues to provide adequate design pressure and flow; for a dry system, test the dry standpipe hydrostatically for leaks in addition to performing the flow test for design pressure and flow. Water discharge is to be from the hydraulically most remote point (which is typically on the rooftop) to properly validate design pressure and flow. Also, larger buildings will have multiple zones involving pressure-reducing valves that divide the zones, requiring separate water discharging at the hydraulically most remote point for each zone.

Survey activity

Surveyors will assess EC.02.03.05, EP 12, during the document review session and confirm compliance during the building tour. Surveyors will review the last five-year test conducted and examine the condition of the standpipes and hose connections. You should be well acquainted with your building design, including what's installed and how it is configured, as several variables can complicate this survey activity, such as wet versus dry systems and single versus multiple zones.

Life Safety Code *background*

- NFPA 25-1998, Chapter 3

EP 13—Inspecting auto fire-extinguishing systems in a kitchen

Every 6 months, the organization inspects any automatic fire-extinguishing systems in a kitchen. The completion dates of the inspections are documented. **Note:** *Discharge of the fire-extinguishing systems is not required; for additional guidance on performing inspections, see NFPA 96, 1998 edition.*

EP at a glance

If your organization has a cooking area or facility, it must have a commercial fire-extinguishing system that is either automatically triggered by fusible links or manually activated via a pull station if cooking equipment produces grease-laden vapors. Either of these types of systems can immediately put out a cooking surface fire. The system must be inspected twice a year, without discharging the single-use extinguishing media during the evaluation. This inspection confirms that, when activated, the system will shut off the natural gas or electric fuel source to the burner and trigger the building's fire alarm system. The test also validates that hood fans operate as designed to efficiently remove smoke and exhaust. Just be sure to validate that the overhead nozzles are properly pointed at the cook surface and any heavy grease buildup on the overhead hood is cleaned and removed. Also, at every other test (once a year), the hood inspector must replace the fusible links and document this change.

Survey activity

Surveyors review compliance with EP 13 during the document review session and building tour. They will check to see that proper inspection has occurred every six months and will trace the inspection history back at least two reports. The fire extinguishing hood will be thoroughly checked for nozzle position and grease buildup, and surveyors will ensure that the manual activation system is accessible and a manual K-type fire extinguisher (the special type of extinguisher capable of putting out grease fires) is within 30 feet of the cook surface. In addition, surveyors will ask random kitchen personnel how they would respond to a cook surface fire. This EP is closely connected to LS.02.01.35, EPs 9–13.

Life Safety Code *background*

- NFPA 96-1998, Chapters 7 and 8.

---

* *Life Safety Code*® is a registered trademark of the National Fire Protection Association, Quincy, MA.

Fire Safety Equipment and Building Features Documentation Checklist for Fire Sprinkler/Suppression Systems

This checklist can help you manage EC.02.03.05, although it is not considered evidence of standards compliance. (Note that the checklist includes more than just the EPs covered in this article.) Each component, device, or system identified by the element of performance must be inventoried with a unique identifier. There must be documentation of maintenance for each uniquely identified inventory item, as indicated by documentation of the result of the test. Identified deficiencies are to be corrected or mitigated in a timely manner.

Date of Review: _____

Documentation Reviewer: _____

Requirement	Frequency	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Comments
Fire pump—no flow	Weekly													
Storage tank temperature alarm	Monthly (Note: Cold-weather testing only)													
Fire department connections	Quarterly													
Storage tank high-/low-level alarm	Semi-annually													
Kitchen hoods	Semi-annually													
System (see also LS.02.01.35)	As defined by the organization													
Duct cleaning (NFPA 96)	As defined by the organization													
Fire suppression inspection	As defined by the organization													
Main drain test	Annually													
Fire pump—flow	Annually													
Carbon dioxide/ gaseous systems	Annually													
Standpipe flow	5 years													
Standpipe hoses	5 years/3 years													May replace every 5 years in lieu of running a 3-year hydrostatic test

Source: Joint Commission Resources, 2015.

Future plans

To maintain fire safety in the environment of care, it's crucial to have a good understanding and appreciation of the different requirements associated with standard EC.02.03.05. Future columns will explore EPs 14–25 so that your organization can recognize other areas of improvement and ensure full compliance with the standard.

Download an editable version of this checklist at https://www.jcrinc.com/assets/1/7/ECN0515_checklist.doc