NFSA NATIONAL FIRE SPRINKLER ASSOCIATION
The Voice of the Fire Sprinkler Industry

# TechNotes

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**TechNotes Issue #444**
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**Requirements for Interior Fire Pump Rooms**

This Edition of TechNotes is a summary of the 2018 *International Building Code* (IBC) and NFPA 20, *Standard for the Installation of Stationary Fire Pumps for Fire Protection*, 2019 edition requirements for new interior fire pump rooms prepared by Michael Joanis, PE.

NFPA 20 and the IBC provide several key requirements for the protection of fire pumps. The intent is to provide a relatively safe environment for the fire pump equipment, proper operation, and emergency access. While these items may not be part of the sprinkler contractor's scope of work, it is important to address them with the other trades on your projects to ensure compliance. This coordination is needed to fulfill your obligation to provide a complete and code complaint fire pump installation.

Let's start at the beginning. IBC section 913.1 requires new fire pump installations to be in accordance with NFPA 20. Both the IBC and NFPA 20 indicate that the general requirement is to protect the fire pump, driver, controller, water supply, and power supply against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism, and other adverse conditions. To that end, new fire pump rooms are generally required to be fire rated, have direct or rated access, be dedicated, heated, lighted, ventilated, and have drainage.

Fire Rated

Fire pump rooms in high-rise buildings are required to be two-hour fire rated construction. For other than high rise buildings, the fire pump room is still required to be two-hour rated, except if the building is fully protected with sprinklers. Then, the rating can be reduced to one-hour. It is important to make sure doors to the interior of the building are rated assemblies and all penetrations are fire stopped. It is always a good idea to review the architect's floor plan, wall types, floor/ceiling assemblies, and door schedule to ensure they have planned for a fire rated pump room enclosure.

## Upcoming Technical Tuesdays

**August 18, 2020**

### 11 Steps of Hydraulic Calculation Review

Presented by Jeff Hugo, Vice President of Codes, Standards and Public Fire Protection

## New EOD Process

Starting on July 15, 2020, the NFSA has a new EOD process where members can submit questions, track the progress, and view their EOD cases. The step by step process is detailed in **TechNotes #442**.

Included in this discussion is the need to protect the electrical circuits supplying power to the fire pump. The power supply circuits to the fire pump are required to be one-hour rated or within a one-hour rated enclosure or room. The use of fire rated circuits can be expensive, especially for long runs. This requirement can often be satisfied by locating the fire pump room adjacent to the main electric room. This will allow the circuits to travel from the fire rated electric room directly into the fire rated pump room. With many fire pump rooms located on the exterior wall of the building as required for access, it may work well to bring the power circuits directly into the fire pump room underground from the exterior. Ask the electrical engineer and/or electrician to explain how the power to the fire pump is being protected.


Approved Access

Access to the fire pump room is required to be preplanned and approved by the fire department. Fire pump rooms require direct access from the exterior or a fire rated enclosed passageway to the exterior. It has become quite common for fire pump rooms to be located at grade with a door directly to the exterior. This is not always an option. If fire rated access from the pump room to the exterior is required, the path must be rated the same as the pump room as noted above. Make sure you review access to the fire pump room during an emergency with the fire department and obtain their approval.

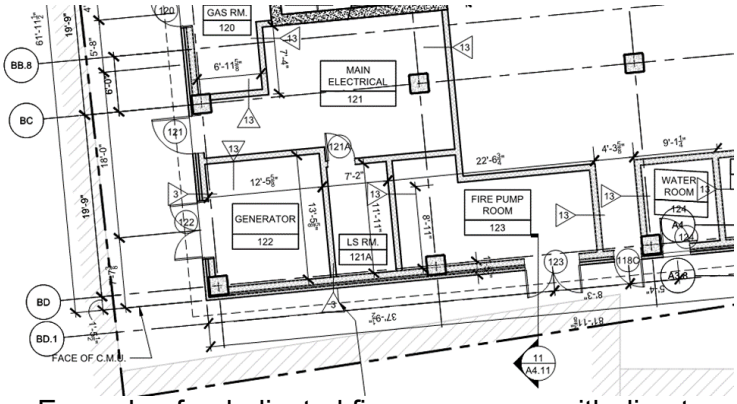
Dedicated

Storage, other equipment, and/or penetrations that are not essential to the operation of the fire pump are not permitted in the pump room. The only exception to this requirement is for domestic water distribution. It is common for the fire service and domestic service to enter the building at the same location. The domestic water service and associated water meter, control valve(s), and backflow preventor are the only exceptions noted as being allowed in the fire pump room.

The pump room must be sized to fit all of the components necessary for the operation of the fire pump. Clearance is needed between components and walls for installation and maintenance. Electrical equipment is required to be located in accordance with NFPA 70 and have the proper clearance. The orientation of the pump and associated clearance required on the suction side is essential to ensure proper suction pipe installation. Sufficient space and clearance is necessary to provide the straight runs of pipe needed between horizontal elbows and/or backflow preventions and the fire pump. It is good practice to locate the fire pump controller between the fire pump and the access door to the room. This will help ensure easy access to the controller when entering the room.

Diesel fire pump rooms shall be protected with an automatic sprinkler system in accordance with NFPA 13

as an Extra Hazard Group 2 occupancy. Electric fire pump rooms, located in buildings that are required to be sprinkler protected, shall be protected with an automatic sprinkler system in accordance with NFPA 13 as an Ordinary Hazard Group I occupancy.




Example of a dedicated fire pump room with direct access to the exterior

Heat

Heat for the fire pump room is required to be approved or listed and maintain the temperature above 40°F. The minimum temperature requirement shall be increased as needed to satisfy manufacturer's recommendations for internal combustion engines and oil heaters. With dedicated fire pump rooms, often with direct access to the exterior, it is common for fire pump rooms to go unoccupied for long periods of time. NFPA 25 requires weekly pump room inspection for adequate heat. In colder climates, a week is a long time to potentially go without heat. I suggest considering a low ambient temperature monitoring option built into the fire pump controller. This is a simple and cost effective option on fire pump controllers that can help prevent frozen fire pump rooms.

Lighting

Both artificial and emergency lighting are required. Lighting shall provide a minimum of 3.0 ft-candles (32.3 lux). Emergency lights are not permitted to be connected to an engine starting battery and must be capable of maintaining the lighting level for 2 hours. It can be quite common for emergency lighting to be omitted and for piping to obstruct adequate lighting levels in portions of the room. Coordinating the lighting layout with the overhead piping and large equipment can ensure improved lighting levels throughout the room.

Ventilation

The standard simply requires provisions for ventilation of a pump room. For electric fire pumps, I am not aware of any additional ventilation requirements and recommend you defer to the mechanical engineer to determine the standard for proper ventilation. However, for diesel fire pumps, NFPA 20 section 11.3.2 provides additional specific ventilation requirements for combustion air,

hazardous vapors, and to maintain a maximum room temperature that must be met.

Floor Drainage

Floors are required to be pitched to drain water away from critical equipment such as the pump, driver, and controller. A floor drain is required and shall discharge to a frost-free location. Typically, the fire pump packing will constantly drip and require drainage year round, including during freezing weather. Simply piping drains to spill to the exterior can cause freezing, backup, and flooding of the pump room. I also recommend coordinating the location of the floor drain with the layout of the fire pump and equipment. Typically, there is drain piping installed on the floor and piped to spill into the floor drain. This drain pipe on the floor becomes a tripping hazard. Properly locating the floor drain can mitigate this concern.

In summary, these requirements are intended to protect the fire pump and ensure proper operation. Make sure you consider the fire rating, access, clearance, heat, lighting, ventilation, and drainage. We certainly do not expect the sprinkler contractor will drywall the room, install the lighting, or pipe the floor drain. It is however expected that a code complaint fire pump installation is provided. This requires the items reviewed in this article to be addressed and satisfied.

For more information including the requirements referenced in this article, please review the *International Building Code* (2018 edition) section 913 and NFPA 20, *Standard for the Installation of Stationary Fire Pumps for Fire Protection* (2019 edition) section 4.13. Please feel free to contact me with any questions or comments at joanis@nfsa.org.

References

International Building Code. 2018. Country Club Hills, IL: International Code Council.

NFPA 20. 2019. Standard for the Installation of Stationary Fire Pumps for Fire Protection. Quincy, MA: National Fire Protection Association.



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