

## **New Fire Station Design Standards Updated June 10, 2021**

A fire station is part of the critical infrastructure for a community, so one should give careful thought to the use of the station and design. Tennessee has no minimum laws, rules, or regulations on the construction of a fire station except that the building must meet the minimum building code adopted by the local jurisdiction. If there are no locally adopted codes, the current State minimum code applies, which is the 2012 International Building Code.

If there are no sleeping facilities within the structure, the building must meet Group S (Storage) standards for construction. If sleeping areas, or a meeting area for over 100 people, is contained in the building, the station must meet the Standard for Mixed Occupancy construction.

The building should provide “gender friendly” separate hygiene and sleeping facilities for men and women. For new construction, Tennessee Code Annotated § 4-24-301, Separate facilities in new construction for men and women, states:

With respect to any fire station constructed after June 26, 2007, each municipal or county fire department, and each volunteer fire department or company is encouraged to have separate restroom facilities, showers and locker rooms for men and women.

Tennessee Code Annotated § 4-24-302, Gender friendly conditions in existing facilities, states:

- (a) Each municipal or county fire department, and each volunteer fire department or company, are urged to develop plans that, to the greatest extent possible, will create gender friendly conditions in existing facilities.
- (b) The purpose of the plans is to identify which stations could be upgraded to accomplish a gender-friendly facility and identify which stations cannot be made gender-friendly due to space constraints, historical significance of the station, or other documented reasons why this could not be accomplished.
- (c) The plans, once developed, shall be made available upon request by the commission on firefighting personnel standards and education and from interested persons in the community.

Gender friendly or gender-neutral restroom facilities can be provided by labeling restrooms as simply “restroom” without a gender label and placing a lock on the door.

For a building to meet ISO's definition of a fire station, it must be capable of being heated to a minimum temperature of 45 degrees (F), year round, and be secured from unauthorized entry.

The station should have a safe room where occupants can go to take shelter during severe weather and tornado warnings.

The jurisdiction should consider including sustainable design and energy efficient features in the building. Some communities are building stations to meet Leadership in Energy and Environmental Design (LEED) criteria and to receive certification as a LEED facility. Energy efficient design saves money on operating costs and demonstrates the jurisdictions commitment to being good stewards of the environment.

Fire stations are part of a community's critical infrastructure. As such, they should have security features against unauthorized entry and designed to isolate public access areas from the private areas of the fire station, including the locker room, bed hall, and restroom/shower facilities for the firefighters. Security cameras should monitor the exterior of the station, including the apron, all entrance doors, and the employee parking area. The exterior areas should be well lighted for safety and to discourage vandalism. A fire station must have an emergency power generator capable of running the entire building during an extended power outage or disaster.

MTAS recommends that the fire department fully sprinkler the facility: set the example and exceed the minimum building code requirements for fire and life safety.

The station should include features to separate contaminated tools, equipment, and personal protective equipment from the living spaces. Design the station with hot, warm, cold, and transition zones. Hot zones, such as decon rooms and chemical storage areas, should be separated from the warm and cold zones. Warm zones include the apparatus bay and storage areas for clean personal protective equipment. Cold zones include the kitchen, lounge, bed hall, training room, offices, and restroom/shower facilities. The station should have transition zones where a firefighter can remove contaminated clothing, shower, and change into a clean uniform before entering a cold zone.

Provide adequate space for both a gear washer/extractor for cleaning personal protective equipment and a regular washer and dryer for cleaning uniforms, towels, and other uniform and clothing items as NFPA recommends that only personal protective equipment be washed in the washer/extractor to prevent cross-contamination.

Apparatus bays should have vehicle exhaust systems for the removal of carbon monoxide and other contaminants produced by running apparatus and other vehicles indoors. Provide ceiling mounted cord reels for power to keep apparatus plugged in while sitting in the bay, and for compressed air to make it easier for firefighters to keep the proper air pressure in the tires. Such reels eliminate trip hazards. The bay should have at least one hot water hose bib faucet to assist with cleaning. Floor drains should be centered under the apparatus to keep water out of the walking space around the apparatus. The bay should have ceiling fans to circulate air both for comfort and to help dry apparatus to prevent spotting of the paint.

Only incandescent or LED lights should be used in the apparatus bay and in rooms where personal protective equipment is cleaned and/or stored. Fluorescent lights produce UV rays, which will damage the fabric that personal protective equipment is made from.

If a department performs its own maintenance and repair of tools and equipment, add a maintenance and repair room. This will provide security for the tools and equipment needed, a safe workspace to perform the work, and prevent cross-contamination of tools and equipment. Include good lighting, plenty of electrical outlets, a compressed air outlet, and adequate shelf space.

Do not skimp on storage space. I have never met a firefighter or fire chief who said their fire station had too much storage space, but I have been in many fire stations where there was a lack of storage space and the apparatus bay and other areas were used for storage.

Use materials that are durable and easy to clean. For example, painted concrete block walls, while more expensive than sheetrock, are easy to scrub down and do not absorb contaminants. Polished concrete or tile floors are easy to clean and do not absorb contaminants. Carpet should be avoided because carpet will absorb contaminants and is difficult to clean. Apparatus bay floors should have a non-slip surface for safety.

A fire station has a typical life of at least 50 years, so plan for the future. Will your city grow? Will you need to add apparatus? Might an ambulance one day run out of the station? Do you have room to park your reserve apparatus indoors? If you have trailers for special teams, such as hazmat or technical rescue, can you park those in the fire station for security of the gear and to prolong the life of the trailer? If you are a volunteer or combination fire department, will you add, or increase, 24-hour staff and need kitchen, sleeping, and restroom facilities? If you are a paid department, will you have enough kitchen, sleeping, and restroom facilities to accommodate additional staff in the future if you add another company? If your budget does not allow adding that space now, design the building so it can be expanded in the future, if needed.

A fire station is a complicated building, especially if it will be occupied 24/7. People will be working, living, and sleeping in a building housing hazardous chemicals and motor fuels, so care should be taken in its layout and design, giving thought to workflow and how the different spaces relates to each other. For example, where to put the bed hall to provide the fastest route to the fire trucks, and a decontamination area with a shower off the apparatus bay for cleaning of contaminated gear and equipment, are two design considerations. All appliances should be commercial grade, as they will receive more frequent use than those in a residential setting. Most station have an ice machine, but it should not be in the bay, as the ice will absorb airborne contaminants. Here are some resources to provide more information on fire station design.

The National Institute of Building Sciences has a WBDG (Whole Building Design Guide) for fire stations. Access the guide at <http://www.wbdg.org/design/firestation.php>

The US Green Building Council (USGBC) has information on LEED design at their website <http://www.usgbc.org>.

FEMA has information on building a safe room at <https://www.fema.gov/safe-rooms>.

The US Fire Administration has a publication (FA168) titled *Safety and Health Considerations for the Design of Fire and Emergency Medical Services Stations* that can be downloaded at <http://www.usfa.fema.gov/downloads/pdf/publications/fa-168.pdf>

Though not available on-line, the NFPA Fire Protection Handbook has a chapter (Chapter 14 in the twentieth edition of the handbook) on fire station design.

NFPA does not have a design standard for fire stations, but the fire department should consider various NFPA standards when designing a station.

If you have questions about designing and building fire stations please contact MTAS for assistance.

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