



Deficient Fire Flows

Dear Reader:

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We hope this information will be useful to you; reference to it will assist you with many of the questions that will arise in your tenure with municipal government. However, the *Tennessee Code Annotated* and other relevant laws or regulations should always be consulted before any action is taken based upon the contents of this document.

Please feel free to contact us if you have questions or comments regarding this information or any other MTAS website material.

Sincerely,

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Table of Contents

Deficient Fire Flows	3
Correcting Deficient Fire Flows.....	3
Identifying and Marking Deficient Fire Hydrants	4

Deficient Fire Flows

Reference Number: MTAS-1897

Why Communities Have Deficient Fire Flows

A community that discovers it has areas with deficient fire flows may wonder how that happened, and wonder why the water system and fire hydrants were installed while being inadequate for the community's fire protection needs. The reasons are many, but the most common reason a community has deficient fire flows is poor planning.

Water mains of four inches in diameter are adequate for supplying water for domestic use, such as for drinking, cooking, bathing, etc. In many rural areas, four-inch mains were installed to allow for the development of homes. However, a four-inch water main is incapable of supplying enough water to fight a fire. In addition, TDEC regulations require water mains of six inches or larger for the installation of fire hydrants. It is possible that developers, planners, builders, and others who are not aware of the need for adequate fire flows did not consult with the local fire department during the planning and design phase of a project. This is a key reason why it is critical that the fire department be involved in the review of proposed residential and commercial developments in a community.

Another reason is that needed fire flows are not always available during the design phase of a water system project. Many other factors also determine actual flows and water main sizes to certain areas. Fire hydrants are also used to flush public water systems and many hydrants have been installed for this sole purpose. Nevertheless, inadequate and unmarked fire hydrants provide a false sense of security to the fire department and property owners.

Correcting Deficient Fire Flows

Reference Number: MTAS-1898

TDEC Rule 0400-45-1-.17(18) provides a fire chief with justification to request improvements in the water system. The regulation does not prevent the fire department from using a deficient fire hydrant (for example to fill tanks), but it does prevent the fire department from using a deficient fire hydrant with the fire apparatus pump engaged, which may result in inadequate fire flows and a poor outcome in firefighting operations (i.e. increased property loss). Once the fire department has identified at-risk areas with deficient water supplies for firefighting, the fire department should request of the water department, and any other departments, agencies, or entities that would be involved in decision-making and funding, a plan to upgrade the water system to provide adequate water for the protection of life and property. An inadequate water supply for fire protection makes it difficult for a community to get a good ISO rating for affordable property insurance rates.

The TDEC regulation provides fire departments with a way to identify hydrants with deficient fire flows so that the fire department does not use the deficient fire hydrant if another hydrant with adequate fire flows is within a usable distance of the fire. The regulation requires that deficient fire hydrants be marked with a red top to denote that the fire hydrant flows less than 500 gallons per minute, thus identifying the hydrant as a deficient fire hydrant for responding firefighters.

Once areas of a community with deficient fire flows are identified, the fire department and water utility should use a cooperative approach to create and implement a plan of corrective action. The common goal for both the fire and water department should be to protect the water system and public health while delivering adequate fire flows to the entire community. Improving the water system can be costly, requiring engineering studies and design work, which takes time. In addition, the utility must find funding sources for the improvements. Therefore, correcting deficient flows will take time, but the sooner everyone develops and approves a plan, the sooner the community will enjoy the benefits of an adequate water supply for fire protection purposes.

Improving the water system, installing larger water mains, replacing older/smaller water mains, and installing fire hydrants is expensive. Smaller communities may be eligible for community development block grants (CDBG) to provide financial assistance in improving the water system for fire protection purposes. This is the link for the CDBG program in Tennessee for more information on these grants: <https://www.tn.gov/ecdc/community-development-block-grant/cdbg.html> [1]

Identifying and Marking Deficient Fire Hydrants

Reference Number: MTAS-1899

For the purposes of marking fire hydrants, a deficient fire hydrant is a fire hydrant that cannot provide a fire flow of at least 500 gpm at 20 psi residual pressure. Deficient fire hydrants (Class C hydrants) must be properly marked and identified. The public also needs to be educated in this area. A typical homeowner who sees a fire hydrant near their home, or a business owner who sees a hydrant near his business, may not realize that the fire hydrant cannot provide enough water to extinguish a fire in the home or business. In addition to giving the homeowner or business owner a false sense of security, inadequate fire flows result in higher property insurance premiums. Most insurance requirements state that adequate water flows must be available within 1,000 feet of structures to get full credit for fire hydrants.

Where fire hydrants are properly marked, most fire departments only connect to a Class C hydrant as a last resort. The fire department needs a reliable water source and according to the Insurance Services Office (ISO) on community water systems, a minimum of 500 gpm is needed to fight a basic residential structure fire. Actually, depending on the distances between structures, the needed fire flow is much higher. ISO also does not recognize hydrants on water mains less than six inches in diameter. Therefore, connecting into a red top hydrant does not supply basic needed fire flows and is only done as a last resort. However, ISO will recognize a fire hydrant in a rural setting as a suction point where tanker shuttles are necessary as long as the hydrant can deliver a minimum flow of 250 gpm at a residual pressure of 20 psi for two hours.

Links:

[1] <https://www.tn.gov/e cd /community-development-block-grant/cdbg.html>

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