NFPA® 25-2014
Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
TIA Log No. 1123
Reference: 8.3.1.1, 8.3.1.2, and A.8.3.1.1
Comment Closing Date: January 17, 2014
Submitter: Russell Fleming, National Fire Sprinkler Association, Inc.

1. Revise 8.3.1.1 to read as follows:

8.3.1.1* A non-flow test shall be conducted for diesel engine-driven fire pumps without recirculating water back to the pump suction on a test frequency in accordance with 8.3.1.1.1 or 8.3.1.1.2.

2. Revise 8.3.1.2 to read as follows:

8.3.1.2* A non-flow test shall be conducted for electric motor-driven fire pumps without recirculating water back to the pump suction on a test frequency in accordance with 8.3.1.2.1, 8.3.1.2.2, 8.3.1.2.3, or 8.3.1.2.4.

3. Revise A.8.3.1.1 to read as follows:

A.8.3.1.1 Fire pump systems conforming to the 1999 and more recent editions of NFPA 20 should be designed so that the pressure relief valve has a minimum flow (to verify pressure relief valve is properly set and operating) at churn, and only allows a larger flow under abnormal conditions (i.e. engine overspeed or failure of a variable speed pressure limiting control). In situations where the discharge from the relieve valve is piped back to the pump suction, the fire pump imparts more energy into the water when recirculating the water through the pump than when the pump is operating at churn (no flow). Since the 1999 edition of NFPA 20, requires a circulation relief valve has been required downstream of the pressure relief valve whenever the pressure relief valve is piped back to the pump suction. Improperly installed and/or operating circulation relief valves can result in unacceptably high water temperature, especially when recirculating the water to the pump suction. High water temperatures can affect the operation of a diesel engine drive. Modern engines, due to EPA requirements, are more sensitive to cooling water temperatures. For fire pump systems conforming to editions of NFPA 20 prior to 1999 that permitted recirculation of the discharge from relief valves to the suction side of the pump without a circulation relief valve, precautions need to be taken during the churn test of the pump. Suction and discharge pressure gage readings can be taken quickly while there is no flow into the fire protection system, then a small flow can be created by opening an inspector’s test connection, alarm bypass or main drain downstream of the pump to prevent the pump from overheating during the rest of the duration of the test.

Submitter’s Substantiation: This proposed TIA is an extension of the discussion that appeared before the Standards Council in Agenda Item 13-8-1-e-1 from the July 2013 Standards Council meeting. The National Fire Sprinkler Association made a successful Certified Amending Motion at the June 2013 meeting regarding NFPA 25, however, the subsequent re-balloting of the committee resulted in a difficult situation that can only be remedied by a TIA.

The fundamental concern that this TIA addresses is that there are many fire pump systems that were installed in complete compliance with NFPA 20 at the time that they were designed and installed that cannot be safely tested in accordance with NFPA 25 due to the changes in the 2014 edition. Specifically, there are three types of fire pump systems affected by the language as it was processed by the NFPA:

1. Centrifugal pumps designed and installed in accordance with the 1993 and older editions of NFPA 20 where the pressure relief valve discharge was returned to the suction side of the pump. This practice was allowed in most of the editions of NFPA 20 up to (and including) the 1993 edition. The language in the 2014 edition of NFPA 25, it is allowed to continue without this TIA, now prohibits these pumps from being tested safely. Sections 8.3.1.1 and 8.3.1.2 require that the test be run “without recirculating water back to the pump suction”, which means that the pressure relief valve will need to be forced closed every week (or month) when this test is run. By forcing the pressure relieve valve closed, the fire pump will over-pressurize the fire protection system, which is not a safe condition during a pump test.

2. Centrifugal pumps designed and installed in accordance with the 1999 and more recent editions of NFPA 20 where the pressure relief valve discharge was returned to the suction side of the pump and a circulation relief
valve was installed. In these systems (as the annex note explains), the relief valve is supposed to be set to open a little bit under the churn condition to make sure that it works. But each week (or month) this would have to be shut down in order to run the test “without recirculating water back to the pump suction”. While this shutdown would not immediately be a safety concern, if the driver were to go into an overspeed situation during the test, it would over-pressurize the system with the pressure relief valve closed in order to run the test.

3. Positive displacement pumps that send the discharge from the pressure relief valve to the pump suction. Chapter 8 of NFPA 25 applies as much to positive displacement pumps as it does to centrifugal pumps. A positive displacement pump works on the principle of pushing a specific volume of water through the use of pistons or rotary gears. The water has to go somewhere when it is being pushed. New sections 8.3.1.1 and 8.3.1.2 require the positive displacement pumps to be churn tested on a regular basis, but they specifically prohibit any recirculation of the water to the suction, which is exactly how NFPA 20 allows the user to deal with the issue of churn.

For all of the three conditions listed above, NFPA 20 has allowed the user to recirculate water during the churn test of the pump. It is wrong, and unsafe, for NFPA 25 to come along and say that the pump now needs to be run without recirculating the water. Pressure will build up in the fire protection system and blowouts will occur.

It has been suggested that NFPA 25 could stay as it is without this TIA and that the users of NFPA 25 could be retrained to close the discharge control valve prior to running the churn test. But that suggestion will not work. First, it assumes that the components of the pump installation up to the relief valve can handle the high pressure that might come from the pump. That would be an assumption since some of those components were not expected to see those pressures, so they might not be designed to handle them. Second, NFPA 25 discourages the closing of the control valves on the pump during testing. While NFPA 25 does not outright prohibit this practice, it does say that the Impairment Procedures would need to be followed whenever closing this valve in order to perform testing. That would be an extremely expensive way to deal with a weekly or monthly test.

The recirculation of water to the suction side of the pump has been an integral part of fire pump design for a long time as a mechanism for saving an important natural resource; water. Long before it was fashionable to design “green” buildings, fire protection professionals were recirculating water to the suction side of the pump rather than discharging it in a drain. Those systems have worked well over the years and we should not take a step backwards and force people to re-pipe their existing fire pumps to dump the discharge from the relief valve in a drain so that they can safely test them. We should accept this TIA and leave these existing systems alone.

We recognize that the newer engines have different needs. And the more recent editions of NFPA 20 properly see to their needs. If engine manufacturers are seeing a problem with the installation of newer engines, then enforcement of the rules already in NFPA 20 is a much better solution to the problem than a change to the rules of NFPA 25 that affect all existing systems.

Emergency Nature: This TIA meets two of the criteria for Emergency Nature as published in the NFPA’s Regulations Governing Committee Projects. It meets item 5.3(c) because it is correcting an existing hazard that was created by the 2014 edition of NFPA 25. It also meets item 5.3(f) because the new language in NFPA 25 adversely affects existing fire pump installations that were working fine under previous editions of NFPA 25 that are now going to have to go through tremendously difficult and expensive procedures in order to safely conduct their weekly or monthly pump tests.

Anyone may submit a comment by the closing date indicated above. To submit a comment, please identify the number of the TIA and forward to the Secretary, Standards Council, 1 Batterymarch Park, Quincy, MA 02169-7471.