1. Revise paragraph 28.8.3.1 to read as follows:

28.8.3.1 A system shall be provided or the pump shall have operating characteristics that are capable of limiting the increase of net pump pressure to a maximum pressure rise of 40 percent over the rated pump pressure when all discharges are closed when the engine and pump controls are set to produce the rated capacity at the rated net pump pressure of the pump.

2. Revise subsection 28.12.7 and add new list items (5) and (6) to read as follows:

28.12.7 Pressure Control Test. The pressure control system of an ultra-high pressure fire pump at the pump-rated flow and pressure for pumps with two or more discharges, the pump system shall be tested for pressure rise as follows:

(1) The ultra-high pressure fire pump shall be operated to deliver at rated capacity and at rated discharge gauge pressure.

(2) If a pressure control system is supplied, it shall maintain the rated discharge gauge pressure within 10 percent, or if it is adjustable, it shall be set in accordance with the manufacturer’s instructions, to maintain the rated discharge gauge pressure within 10 percent.

(3) All discharge valves shall be closed, not more rapidly than in 3 seconds and not more slowly than in 7 seconds.

(4) The Any rise in discharge pressure shall not exceed 40 percent of the rated discharge pressure and shall be recorded.

(5) The pump shall be operated with the discharge lines closed for 3 minutes without the temperature of the pump exceeding 140°F (60°C).

(6*) The final discharge pressure, any rise in discharge pressure, and the final pump temperature shall be recorded.

3. Add a new A.28.12.7(6) to read as follows:

A.28.12.7(6) Positive displacement UHP pumps equipped with trap pressure unloaders trap pressure between a check valve in the outlet of the unloader and the discharge nozzle when the spray nozzle is closed while bypassing pump output back to the pump intake or back to a tank. The pump recirculates water without building any more pressure than is required to overcome the friction loss of pushing the water through the unloader and through whatever passageway (internal passageway or external hose, pipe, etc.) back to intake or tank. UHP systems on which the discharge pressure gauge is installed on the pump head will indicate a significant drop in the observed gauge pressure when the discharge is closed. If the observed final discharge pressure reading during the pressure control test fails to indicate a significant drop, this might indicate that the setting of the unloader is incorrect, the check valve is damaged or fails to fully close, or the bypass passageway has become restricted. Such changes indicate that the unloader should be investigated and repaired.

Substantiation. During the Second Draft Meeting for NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus held February 2-3, 2016,
the Fire Department Apparatus Committee recognized that the testing requirements developed in the First Draft of 1911 for Ultra-High Pressure Fire Pumps did not recognize the actual operating characteristics of UHP systems. Subsequent action by the committee with input from a task group of the committee resolved relevant 1911 public comments with the same text as shown proposed for 28.12.7. The proposed text for 28.8.3.1 is accordingly changed to reflect the proposed change in the design/performance requirement section of the standard.

The proposed changes of this TIA are based on the following information and rationale:

A. Positive displacement pumps (PDP’s) may be equipped with trap pressure unloaders or with relief valves that bypass when discharge valves are closed.

B. PDP’s with trap pressure unloaders will trap pressure between a check valve in the outlet of the unloader and the discharge nozzle when the spray nozzle is closed while bypassing pump output back to the pump intake or back to a tank. The pump recirculates water without building any more pressure than is required to overcome the friction loss of pushing the water through the unloader and through whatever passageway (internal or external hose, pipe, etc.) back to intake or tank. This arrangement doesn’t present an overheat issue in the near term.

C. PDP’s equipped with a relief valve to maintain the desired discharge pressure, causes all of the output flow to pass through the relief valve and then back to intake or tank when the discharge is closed. In this case, the pump is still under full load and unless the recirculation involves a large volume of water, the unit will likely overheat rapidly.

D. Typical trap pressure unloaders structurally are very similar to relief valves and in fact include a spring tension relief valve of the type commonly employed in relief valves. Additionally, the unloader includes the provision for a check valve in the outlet and a bypass circuit back to intake or tank. Both unloaders and relief valves must be installed and adjusted according to their manufacturer’s instructions for proper operation. For instance, trap pressure unloaders must be adjusted to bypass a small amount of water while the delivering rated flow through the discharge.

E. PDP systems with trap pressure unloaders with two discharges, when adjusted properly, will see little increase in discharge gauge pressure when one discharge is closed.

F. If the master discharge pressure gauge required by NFPA 1901 & 1906 takes pressure readings on the pump head, the pressure reading will drop when the pump discharge is closed for a PDP equipped with a trap pressure unloader. The pressure will essentially stay at the relief valve setting when the pump discharge is closed for a PDP with relief valve.

G. NFPA 1901 and 1906 only state that a master pressure gauge shall be provided (28.11.1). The text does not specify where on the pump system the gauge should take the pressure measurement. The standards are also silent on specifying that provision should be provided for taking additional pressure readings elsewhere on the UHP discharge system.

H. At least two manufacturers that use trap pressure unloaders take master pressure gauge measurements from the pump head.

I. The proposed pressure rise limit of 40% is proposed based on the following factors:
   i. The system has previously been subjected to a hydrostatic test at 1.4 times the rated pump discharge pressure.
   ii. Handlines used on UHP pumps flow 20 gpm or less limits the change in nozzle reaction force due to relatively low mass flow rates.
   iii. Higher flow rates (with greater nozzle reaction forces) are through turret nozzles or ground sweep nozzles rather than being handled by a fire fighter.

J. The proposed pressure rise limit of 40% is applicable to both positive displacement and centrifugal pumps and is based on pressure rise characteristics observed for both types of pumps.

K. A requirement to monitor and record the pump temperature is included in the proposed text to confirm that the UHP pump, whether positive displacement or centrifugal pumps, are capable of being operated for a reasonable time without overheating.

**Emergency Nature:** The Ultra-High Pressure Pump chapters are new additions for the 2016 editions of both NFPA 1901 and 1906 in recognition that fire apparatus are being manufactured that incorporate...
these types of pump systems. The performance and test requirements for UHP pumps that were developed during the revision cycle of these standards mirrored to a large extent the format of the fire pump, auxiliary pump and wildland fire pump requirements the standards. Now that UHP pumps are covered by the standards, the fire service expects to be able to specify and procure apparatus compliant with either 1901 or 1906 standards. The chapter 28 pressure control system performance and test requirements for UHP pumps in the 2016 editions of the 1901 and 1906 have now been found to unachievable by the UHP pumps used in this type of firefighting service. Failure to implement the changes proposed in this TIA will prevent fire apparatus with UHP systems from being able to comply with the NFPA 1901 or 1906 standards.

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.