

NEW JERSEY DEPARTMENT OF COMMUNITY AFFAIRS  
DIVISION OF FIRE SAFETY  
OFFICE OF THE STATE FIRE MARSHAL



# SAFETY ALERT

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SAFETY ALERT 09-1

## Large Diameter Hose Appliance Failure Issued April 23, 2009

Approximately one month ago, a fire department in Hunterdon County, NJ experienced a failure of a cast aluminum large diameter hose appliance. This appliance was set up with a LDH inlet and outlet and four gated 2.5-inch outlets. The appliance, commonly known as a street hydrant or manifold, was equipped with a pressure relief valve and was being used to fill tenders at the time of the failure. The appliance was sent back to the manufacturer for further investigation and analysis.

As a result of the analysis by Snap-tite Hose, Inc., it was determined from the evidence provided that the cause of this failure was a severe over-pressure condition, such as water hammer. Fire department personnel stated that they were careful not to create any conditions that might result in water hammer. However, the local water authority stated that they had caused an overpressure in the water system. Improper operation of a valve in their system could have set up a water hammer condition that travelled through the hydrant and to the manifold. It was also found that the relief valve on the manifold had not been maintained or tested as suggested by NFPA 1962, Chapter 8. Periodic testing of the valve would have detected that it was non-operational.

It should be noted that the relief valve would likely not have prevented damage to the manifold in this situation since it appears that the manifold was subjected to a sudden, significant pressure increase. As stated in NFPA 1965, par.A.4.4, relief valves are not designed to relieve water hammer, which is described as a sudden pressure increase in the system.

For more information on water hammer, there are many articles on the internet. Two comprehensive articles can be found at:

<http://www.pump-zone.com/pumps/pumps/the-causes-of-water-hammer-part-one.html>

and

<http://www.pumpzone.com/valves/valves/water-hammer-part-two-causes-and-variables.html>

### **The New Jersey Division of Fire Safety and Snap-tite Hose, Inc. recommend the following:**

1. Water hammer is an extremely destructive force and must be prevented at all costs.
2. Due to the significant damage caused to this appliance, Snap-tite Hose highly recommends a thorough inspection of components that may have been subjected to pressure spikes. This would include appliances, hoses, connectors, adapters, and perhaps truck piping and pumps.
3. Relief valve maintenance is critical to the safety of personnel and equipment. The guidelines for appliance maintenance and testing as established in NFPA 1962 are highly recommended. It is recommended that all relief valves be immediately tested for proper operation, and that a schedule be created, maintained and documented.
4. All appliances should be service tested annually as recommended by NFPA 1962.

For the safety of all firefighters, it is important that departments implement these recommendations as soon as possible.

**PLEASE POST IMMEDIATELY**













