

Subject 51

August 3, 2018

SUMMARY OF TOPICS

The following change in requirements to the Standard for Power-Operated Pumps and Bypass Valves for Anhydrous Ammonia, LP-Gas, and Propylene, UL 51, is being proposed:

1. Addition of Endurance Test for By-Pass Valves

STP BALLOTS AND ALL COMMENTS DUE: September 3, 2018

For your convenience in review, proposed additions to existing requirements are shown underlined.

1. Addition of Endurance Test for By-Pass Valves

RATIONALE

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Over the past several years changes in delivery practices within the propane industry pertaining to on site filling of cylinders such as forklift motor fuel containers from the delivery hose of a bobtail truck has become common practice.

The delivery system piping configuration is currently designed in a manner that allows a typical flow rate range of approximately 50-65 gallons per minute through the hose end delivery valve, and also includes a bypass valve of common construction within the piping section designed to open and circulate flow from the pump back to the source vessel mounted on the bobtail chassis to prevent deadheading the system when the hose end delivery valve is closed at the end of the filling cycle and prior to shutting off the pump.

This configuration has worked well for making domestic and commercial deliveries to fixed 500-1000 gallon ASME containers, however the current flow rate capacity has proven to be too high when delivering propane on-site to splash fill small motor fuel cylinders at industrial locations. In these scenarios, 55-65 gallon per minute flow rates into a 33# propane cylinder can cause overfill situations to occur due to the flow rate combined with delayed reaction time when liquid is observed through the fixed maximum liquid level gauge.

The proposed bypass valve configuration incorporating an integrated variable flow control section resolves this issue by allowing the delivery driver to open the integrated variable control valve in these scenarios allowing a higher bypass return flow back to the source vessel while correspondingly reducing the transfer flow rate through the hose end delivery valve.

This significantly increases the safety of these filling scenarios while reducing the risk of overfilling the containers.

The intended scope of construction would allow for either manual control of the integrated flow control section by external lever.

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PROPOSAL

5 Glossary

5.2.1 BYPASS VALVE WITH VARIABLE FLOW CONTROL – A bypass valve incorporating an integral flow control valve section operated by a handle or lever, designed to allow controlled increase of return flow through the bypass valve.

PERFORMANCE

18 Endurance Test – Pump

18.1 A drive shaft seal shall not leak after the pump has been subjected to the endurance test described in 18.2 and 18.3.

18.2 This test is to be conducted on a pump sample previously subjected to the Deformation Test, Section 16, and the Leakage Test, Section 17. The test pump is to be connected to an electric motor of sufficient power rating to permit continuous operation of the pump for a total of 300 hours without causing the motor to overheat as follows:

- a) 250 hours at pressure differential of 25 psig (170 kPa) and
- b) 50 hours at the maximum pressure differential for which the pump is rated.

18.3 During this test, operating parts of a pump are to be kept “wet” by a continuous flow of a suitable test liquid. Other conditions of the test are to simulate, insofar as practicable, those of actual service.

18.4 A Leakage Test, Section 17, on the drive shaft seal is to be conducted immediately after completion of this endurance test.

18A Endurance Test – By-Pass Valve

18A.1 A by-pass valve with a handle or lever shall be capable of complying with the applicable leakage test requirements of Section 17, after being subjected to 6,000 cycles of opening and closing the handle or lever. This test does not need to be performed on the poppet/spring arrangement of a bypass valve. There shall be no sticking of the valve, nor shall the valve become inoperative. Required corrosion protection shall not be impaired.

18A.2 The samples used for this test are to have previously been subjected to the Deformation Test, Section 16 and the Leakage Test, Section 17.

18A.3 A by-pass valve for use only with LP-Gas that has a pressure rating of 250 psi (1.7 MPa) gauge or higher, or one for use with either LP-Gas or anhydrous ammonia, is to be tested with the valve outlet plugged, the valve body filled with n-hexane, and the valve inlet subjected to a pressure of 250 psi (1.7 MPa) gauge. If the shutoff valve for LP-Gas service has a rating of 125 psig, the test is conducted with n-hexane and the valve inlet subjected to a pressure of 125 psi (0.9 MPa) gauge.