FLOWTEST

Flowtest is Flowserve's newly designed auxiliary lift device. An auxiliary lift device is defined as: A device used to determine the set pressure of a pressure relief valve, in conjunction with system pressure, providing a supplemental force to overcome the spring force on the valve disk.

The calibrated lift assist device is attached to the stem of the valve and load is applied while maintaining constant system pressure until the valve opens.

The valve opening is characterized by an audible sound, momentary drop in assist load and/or system fluid release. At the time of the opening, simultaneous readings of the system pressure and applied load are recorded.

The set pressure is then determined by calculating an equation based on the load, life area of the valve, and system pressure.

\[
\text{Set Pressure} = \frac{\text{Assist Load} + \text{System Pressure}}{\text{Force Life Area}}
\]

- Set pressure is the pressure at which the relief valves open, normally defined as POP.
- Assist load is the load measure by the load cell on the ALD.
- Force life area is the affected area of the valve disk by the system pressure that causes the valve to open against the spring force.
- System pressure is the pressure of the system that the relief valve is protecting.
Hydraulic Ram
Load Cell
Spindle Adapter
Relief Valve Spindle
Relief Valve

Bi-Directional Ram
Lift Restrict Collar
Amplified Load Cell
Clamp Designed for Closing Valve

Flowtest Prototype
Advantages of Flowserve’s Unique Auxiliary Lift Device

• Unique designed bi-directional hydraulic ram allows opening and closing with the same ram.

• Adjustable lift restriction collar.

• Clamp designed to hold device on valve while forcing stem closed.

• Utilizes any notebook computer for ease of repair and replacement.

• Amplified load cell—improves noise to signal ratio does not require fixed bridge voltage to maintain accuracy.

• Can be shipped without damage.

• Load cells can be calibrated on site.

• Computer program includes customer data base

The Use of Auxiliary Life Devices is Approved by:

ASME
Section 1, Code Case 2368: Demonstration of safety valve performance.

Section I, PG-73.4.2.2.2: The valve may be fitted with a hydraulic or pneumatic lift assist device.

Section XI, IMV, 3512: Testing in place with hydraulic or pneumatic assist equipment.

Operation and Maintenance of Nuclear Power Plants, Appendix 1, (OM-1).

Performance Test Codes

Pressure Relief Devices (PTC-25), 4.3.2 Test Methods (c), testing with auxiliary lift devices.

The National Board, NBIC, RA-2238, lift assist testing

API 576, 7.3.1, Process Units: a pressure relief valve may be tested on stream with specialized equipment by hydraulically lifting the valve stem.

Reasons for Using an Auxiliary Lift Device

• Valves can be tested without removal
• Valves can be tested while operational
• Prior to an outage, valves needing repair can be identified
• Cycling relief valves tends to eliminate micro-bonding
• Saves the customer money