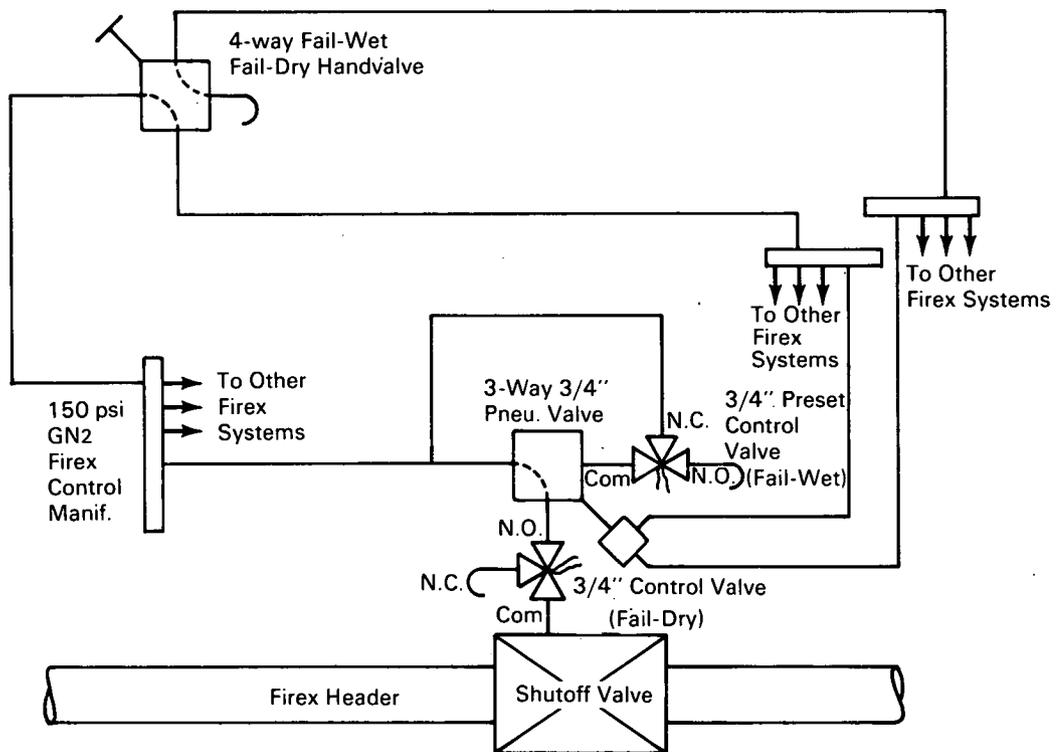


# NASA TECH BRIEF



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## Fire Extinguisher Control System Provides Reliable Cold Weather Operation



### The problem:

To develop a fast-acting fire extinguisher system, effective in freezing climates and capable of operation after electrical power loss. Previous systems are dependent upon controls which might be frozen at sub-freezing temperatures. Pneumatic fire extinguisher (firex) controls appear to be a logical solution to the cold climate problems, but they are extremely slow when controlled by one "fail-wet" valve. The addition of multiple "fail-wet" valves to speed the response increases the time necessary to put the system in "fail-wet" operation.

### The solution:

A fast acting, pneumatically and centrally controlled, fire extinguisher (firex) system has been designed for geographical areas subject to freezing. The easy-to-operate system provides a "fail-dry" function which is activated by an electrical power failure. Instead of the multiple "fail-wet" valves previously suggested, one hand-operated, four-way "fail-wet" valve is used.

### How it's done:

The firex system consists basically of one 4-way "fail-wet" valve, one 3-way pneumatic valve, an ordinary firex solenoid control valve, 150 psi gaseous

(continued overleaf)

nitrogen manifolds, and a solenoid preset valve for each shutoff valve on the firex headers.

The system is normally in the electrically operated "fail-dry" mode. Gaseous nitrogen flows through the pneumatic valve and through the normally open control valve to the shutoff valve on the firex header. The gas pressure holds the shutoff valve in the closed position, preventing fluid flow. To turn on the fire extinguisher, the control valve is electrically activated, automatically, or by a hand switch. This closes the normally open side of the valve, shutting off the gas flow, and opens the normally closed side, venting the closing pressure of the shutoff valve. Thus the shutoff valve is open, allowing the firex fluid to flow.

When the "fail-wet" mode is required, the preset valve is activated, but not the control valve. The 4-way valve is opened, allowing the gaseous nitrogen to pass through the pneumatic valve where it is rerouted through the preset valve. The preset valve is activated by an electrical failure, as the valve is opened and vent is closed electrically.

Thus, if the electrical power fails, the open side of the preset valve closes, stopping the nitrogen gas

flow to the shutoff valve. The vent side opens, venting the closing pressure of the shutoff valve, and allowing the fire extinguisher fluid to flow.

**Notes:**

1. This may be of interest to manufacturers and users of fire protection systems, and gas and pipeline control systems.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B67-10622

**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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