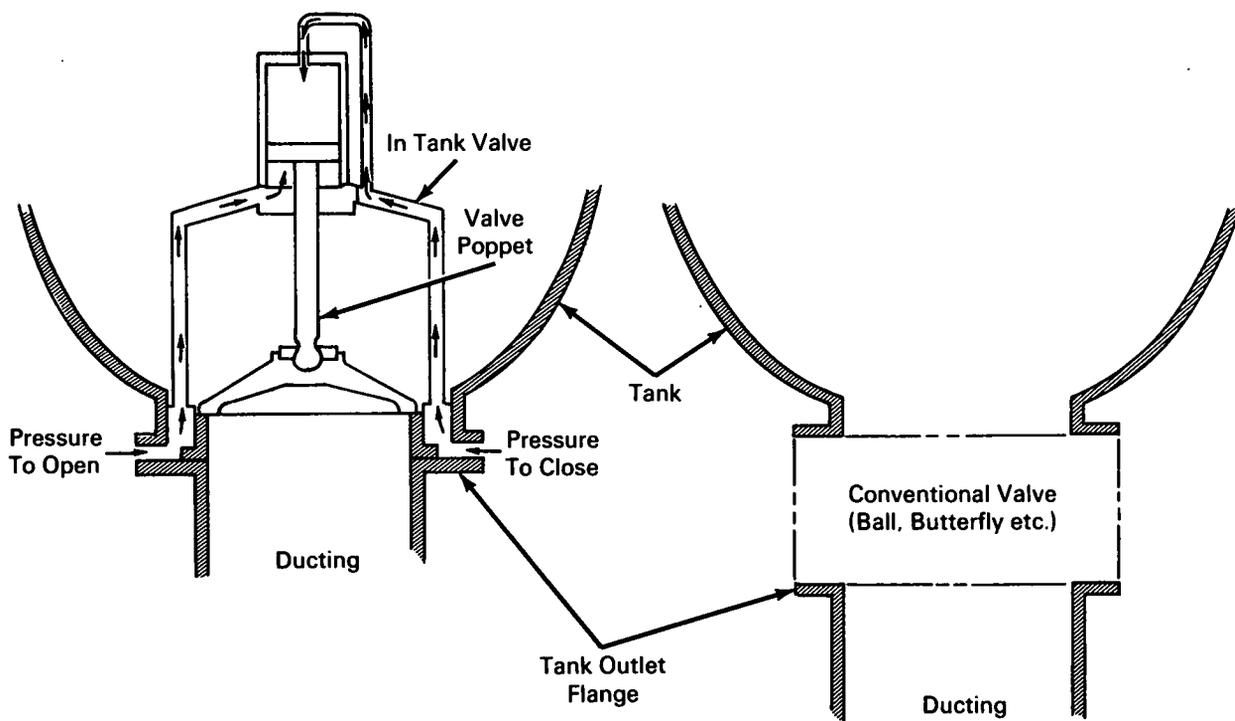


# NASA TECH BRIEF



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## In-Tank Shutoff Valve Is Provided with Maximum Blast Protection



### The problem:

To provide maximum blast protection to liquid hydrogen and lox tank shutoff valves during rocket engine test operations. Conventionally placed valves are frequently damaged during test operations resulting in fires caused by valve leakage.

### The solution:

An "in-tank" shutoff valve that is installed with the valve poppet and actuator inside the tank.

### How it's done:

The valve is installed directly at the tank outlet flange with the valve poppet and actuator inside the tank. Special seals are utilized because of the cryogenic fluids surrounding the actuator. The valve is constructed with a vertical rising poppet contained in a cage housing permitting free flow of the tank fluid. The valve minimizes heat leakage and the valve seat is capable of complete shutoff under most operating conditions.

(continued overleaf)

**Notes:**

1. This valve design may be applicable wherever explosive fuels are used and where space is extremely limited: chemical and petroleum industries, shipboard applications, rocket engine test sites, etc.
2. The in-tank valve is currently being used in lox and liquid hydrogen tanks at a rocket engine test site.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B66-10514

**Patent status:**

No patent action is contemplated by NASA.

Source: C. F. Holden  
of North American Aviation, Inc.  
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