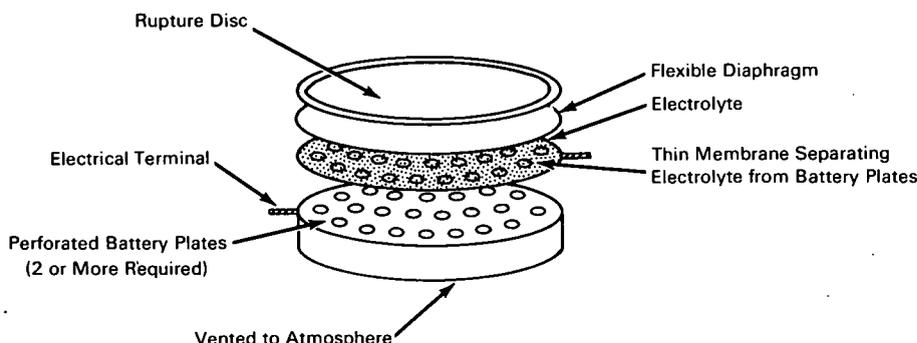


NASA TECH BRIEF



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Pressure Sensor Responds Only to Shock Wave



The problem: Simple pressure transducers or pressure switches are sensitive to overpressures as well as to shock waves and cannot be used to identify either. A device is needed that is sensitive only to the high pressure crest of a shock wave but will not respond to conditions of overpressure.

The solution: A sensor that uses the force of a shock wave to energize the plates of a battery to produce a voltage. The sensor remains inoperative in the presence of overpressure forces.

How it's done: The device is made up of two major parts, a rupture disk and a sensor. The sensor, directly beneath the rupture disk, consists of a flexible diaphragm, a cavity filled with electrolyte, a thin membrane, two or more perforated battery plates, and a backing plate that is vented to the atmosphere. A shock wave consists of a very high pressure crest preceded and followed by much lower pressure. This pressure formation acts to shatter the rupture disk and drive it into the sensor, since the backing plate of the sensor is vented to the lower pressure preceding the shock wave crest. The shattered disk permits the pressure of the shock wave crest to be impressed on the

electrolyte-filled cavity through the flexible diaphragm. The electrolyte, being noncompressible, ruptures the thin membrane through the battery plate perforations and contacts the battery plates, producing a voltage. This voltage is routed to desired instrumentation by the battery plate terminals.

Notes:

1. The output voltage can be used to actuate an alarm signal or crew escape system and could be combined with other instrumentation in a "decision" circuit or "coincident" circuit to perform varied functions.
2. The invention requires no external power.
3. The invention has fast response and full output voltage can be reached by the time the shock wave has travelled the depth of the sensor, a distance of one inch.
4. This is a "one-time" device and would have to be rebuilt or replaced after each use.
5. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama, 35812
Reference: B65-10184

(continued overleaf)

Patent status: NASA encourages the immediate commercial use of this invention. It is owned by NASA and inquiries about obtaining royalty-free rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

Source: The Boeing Company under contract
to Marshall Space Flight Center
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