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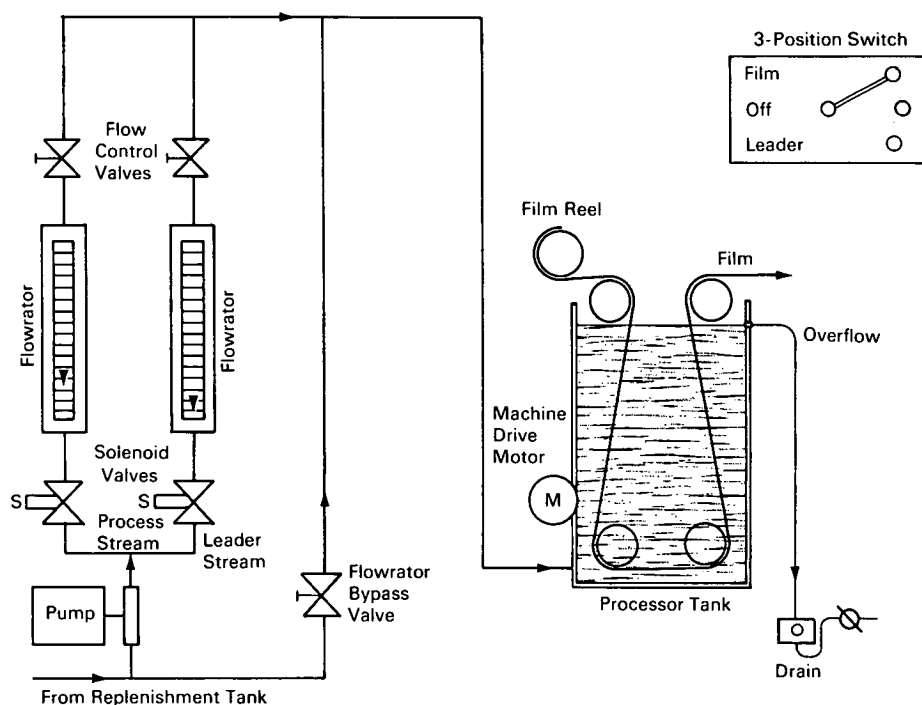
Brief 67-10485

# NASA TECH BRIEF



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## Dual Photochemical Replenisher System Reduces Chemical Losses



### The problem:

To reduce chemical losses and maintain optimum solution concentration during long nonprocessing cycles of photo processing machines. Most photo processing cycles are relatively short with little chemical loss. However, in some special situations, where rapid film processing requires considerable leader time while maintaining optimum solution concentration, severe losses may result if no adjustment is made in the amount of developer flowing into the processing tank.

### The solution:

A dual replenisher system, incorporating a single 3-position switch and solenoid control valves, provides instantaneous flow control to each processing tank, permitting cumulative savings during periods of intermittent operations.

### How it's done:

The schematic drawing shows a typical tank section of a film processing machine and its replenisher system. In the development of film, the density of the developed image depends upon the strength of the developer, the length of time the film is in the developer,

(continued overleaf)

and the temperature of the solution. Since the machine keeps the film in the developer for a determined period of time, sufficient replenisher must be added to maintain the strength of the developer.

Less replenisher is required when the leader goes through the processing tank than when the film is processed. To conserve the chemicals, there are two feed circuits: one governs the replenishing rate for the film; the other governs the replenishing rate for the leader. A 3-position switch operates the solenoid valves to select the flow rate, depending upon whether film or leader is moving through the unit at a given time.

During film processing, higher replenishment is obtained by setting the 3-position switch to the "film" position. This closes the solenoid valve in the leader stream and opens the solenoid valve in the process stream. Setting the switch to "leader" position reverses the valve sequence and low replenishment is obtained. Flow rates for different types of film are varied readily by adjustment of the flowrator valves in each stream.

The electrical circuit is interlocked with the drive motor on the processor to facilitate automatic shut-down of the replenisher system. The switching system virtually eliminates the chance of accidental activation during down time.

**Notes:**

1. Depending upon the leader and film processing times, savings may be estimated on the basis of film processing replenishment costs ranging from 3 to 5 times the cost of processing the leader.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Kennedy Space Center  
Kennedy Space Center, Florida 32899  
Reference: B67-10485

**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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