

# NASA TECH BRIEF

## NASA Pasadena Office



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### Full-Flow Fluid Filter

**The problem:**

A full-flow filter with a minimal pressure drop is needed for use with corrosive media or in applications where minimum effect upon the media is desired.

**The solution:**

An etched-disk filter was developed with fluid passageways in a configuration which allows a relatively unrestricted flow of fluid and has stagnation areas for the collection of impurities. In addition, a filter housing without a center post was developed to improve the flow characteristics.

**How it's done:**

The full-flow etched-disk filter produces a zero reversal of flow and a minimal pressure drop. A permanently-sealed (welded) filter housing without a center post has improved flow characteristics. Figure 1 shows an etched-disk filter element consisting essentially of a relatively-thin metal disk with shallow, radially-disposed, etched, fluid channels, incorporating stagnation areas located away from the main fluid flow streams. Fluid may flow in either direction. The disk has inner alignment tabs, which insure

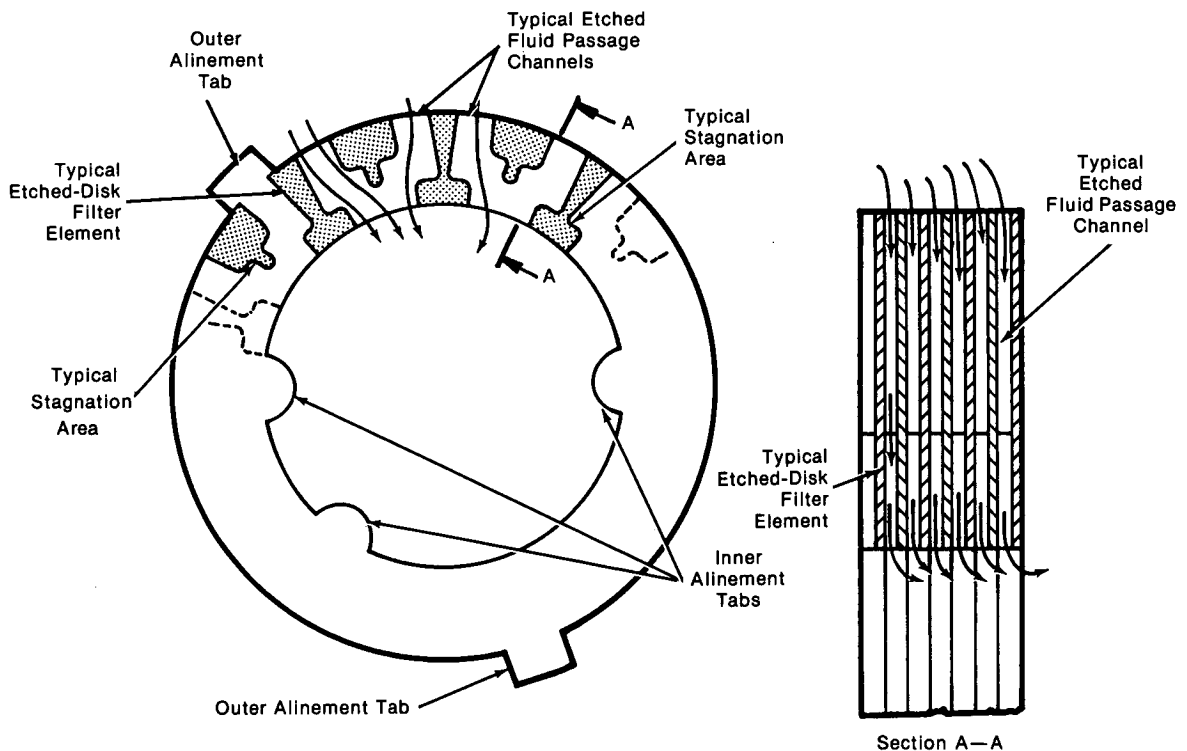


Figure 1. Etched-Disk Filter Elements

(continued overleaf)

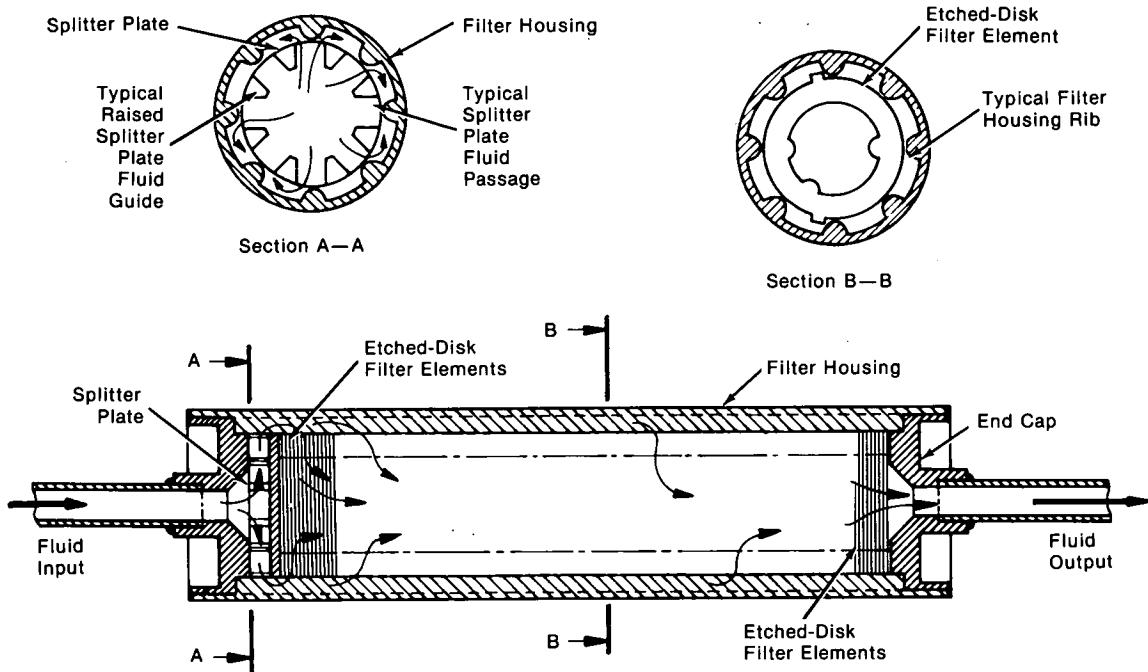


Figure 2. Etched-Disk Filter Assembly

proper front-to-back orientation, and outer alignment tabs, which serve to hold the disks in alignment within a housing. The sectional view in this figure shows how the disks are oriented, front-to-back, so that the unetched surfaces are adjacent to the aligned, etched channels.

Figure 2 shows the assembled filter. The filter housing can be cut from extruded or broached tubing stock. Its length is determined by the desired flow rate and contamination capacity. An end cap is first welded, as shown, into one end of the prepared tubing. After this weld is leak tested, a stack of prealigned filter elements is inserted into the housing, followed by a splitter plate and a second end cap. The second end cap is welded into place, and the assembled filter is given a final leak test with high-pressure nitrogen. The heavy arrows in Figures 1 and 2 show the fluid flow in one direction. The splitter plate serves to direct the fluid flow into the fluid passages of the housing, from which it passes through the filter elements.

**Note:**

Requests for further information may be directed to:

Technology Utilization Officer  
 NASA Pasadena Office  
 4800 Oak Grove Drive  
 Pasadena, California 91103  
 Reference; TSP74-10277

**Patent status:**

Title to this invention, covered by U.S. Patent No. 3,827,568, has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457(f)], to the California Institute of Technology, Pasadena, California 91125.

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