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NASA TECH BRIEF

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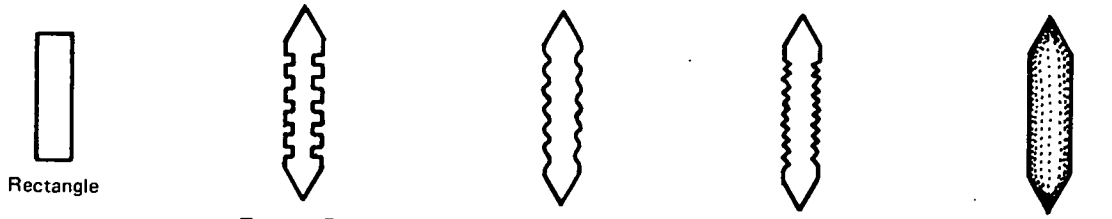
Improved Optical Filters for Automated Visual Inspection



The problem:

Automated visual inspection equipment frequently utilizes spatial filter slits to scan for defects in integrated circuits or for biomedical cell comparison and analysis. In any given application, slit shape must be chosen to minimize the transmission of erroneous information.

The solution:

Sides of the spatial filter slits are shaped so that their contribution to the signal is reduced. Thus, the number of errors in scanning is minimized.

How it's done:

The simplest spatial filters are the rectangular thin slits with sharply defined edges. Their optimal aspect ratios range from 20:1 to 100:1. However, this shape requires a critical alignment in, for example, applications where two integrated circuits are to undergo a simultaneous optical comparison. The figure shows different slit shapes considered in this study.

To minimize the alignment problem, tapered and serrated slits have been considered. These slits provide reduced transmission at the edges, which is an advantage as long as misalignment is less than the depth of the serrations. Slits with shaded edges provide similar characteristics.

Best characteristics have been obtained with the shaded edge and sawtooth edge slits. With the equipment used it was possible to obtain alignment to about 0.002 mm. Although optimum slit size is dependent on application, the preferred slit dimensions range from 0.25 to 0.50 mm long and 0.004 to 0.015 mm wide.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Headquarters
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Washington, D.C. 20546
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Patent status:

No patent action is contemplated by NASA.

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Category 03