NASA TECH BRIEF

Lewis Research Center

An Optical Quality Meter Suitable for Cryogenic Liquids

The problem:

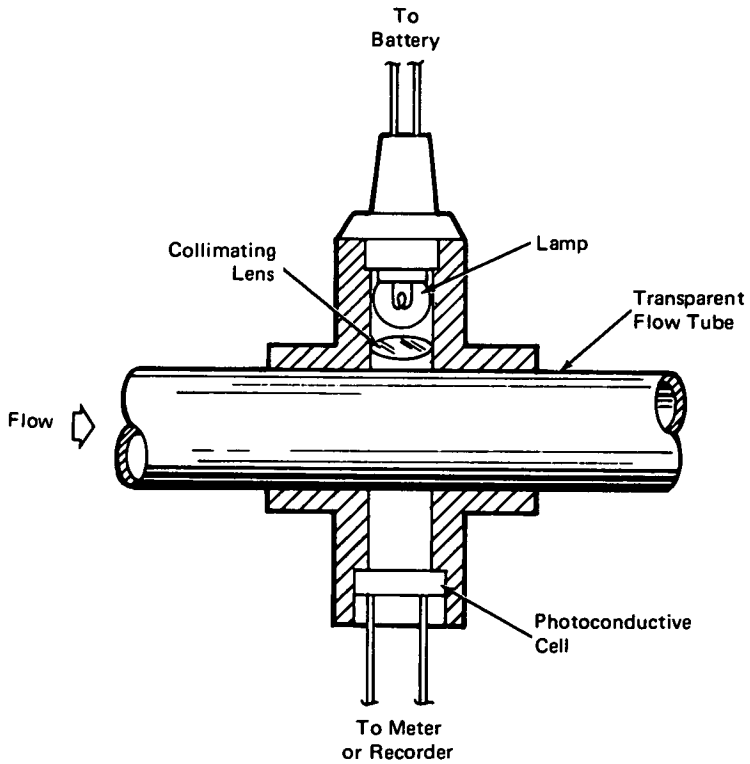
To measure the quality (ratio of liquid to gas) of a flowing transparent fluid.

The solution:

Good measurements of quality have been obtained using a transparent flow section, a collimated light source, and a photoconductive cell as shown in the figure.

How it's done:

With a clear (100 percent liquid) fluid, the light beam directed through the fluid and impinging on the photocell produces a particular value of resistance in the cell. If the liquid begins to boil, cavitate, or contains bubbles for some other reason, it becomes more opaque, and the amount of light transmitted is reduced, producing a different resistance in the cell. The output of a circuit



(continued overleaf)

containing the photoconductive cell can be read on a meter, recorded, or used with an optical meter relay to control devices such as valves, alarms, pumps, etc.

A prototype quality meter of this kind has been built and used successfully in a liquid hydrogen flow system. The principle can be used to measure quality in almost any transparent fluid. Most of the cryogens are transparent and the quality of the fluid is most important when pumping or flowing these low boiling point fluids.

Notes:

1. A description of the transparent flow section and sight glass assembly used on the liquid hydrogen flow system to provide a transparent path through the pipe is given in NASA Tech Brief 66-10394.
2. No further documentation is available. Specific questions, however, may be directed to:
   Technology Utilization Officer
   Lewis Research Center
   21000 Brookpark Road
   Cleveland, Ohio 44135
   Reference: B72-10686

Patent status:

NASA has decided not to apply for a patent.

Source: Howard F. Hobart and
Herbert L. Minkin
Lewis Research Center
(LEW-11814)