November 1969

Brief 69-10649

NASA TECH BRIEF

High-Pressure Seals for Rotary Shafts

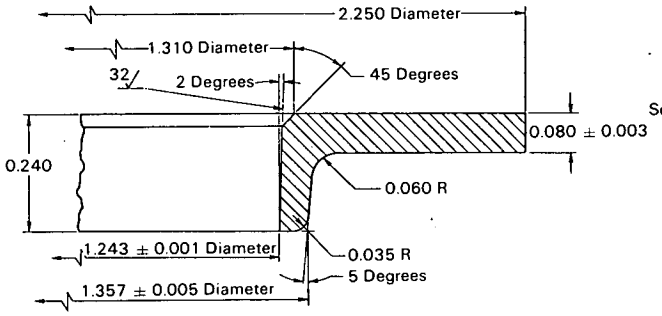

Fig. 1. Cross-Section of a Seal (dimensions are in inches)

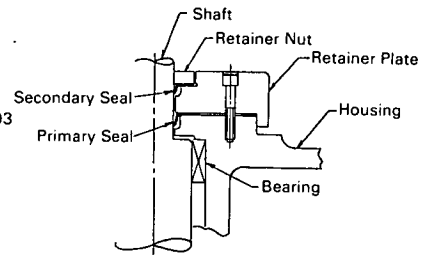

Fig. 2. Seal Assembly

The problem:

Development of 5,000-lb/in^2 seals for shafts rotating at temperatures between −400° and +900°F (500°F for continual operation).

The solution:

A new type of seal, machined from a polyimide resin, meets these specifications. It is more durable, longer-lived, and 85% cheaper than the older seal made of plastic-coated metal; it does not require the long stem now used on most cryogenic valves to form a gas pocket between the cold fluid and the seal.

How it's done:

The new seals are machined (fig. 1) from either blocks (available thicknesses, 0.25 to 2 in.), or sheets ranging from 0.015 to 0.060 in. in thickness. Available blocks are of the basic resin or contain one of three additions: 15% by weight of MoS_2, for unlubricated seals and bearings in vacuum or dry environments; 44% by weight of glass fibers, for precision parts in which only minimal thermal expansion is tolerable; or 15% by weight of graphite, for unlubricated seals and bearings.

A seal assembly comprises two lip-type seals: primary and secondary. The seals, separated by a retainer plate that is bolted to the housing, are locked in place by a retainer nut (fig. 2). A vent port in the retainer plate enables monitoring of leakage. The seal is suitable for all rotary machinery at speeds as high as 1,200 rev/min.

Notes:

1. The seal may interest designers or manufacturers of rotary machinery.
2. No further documentation is available. Inquiries may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference B69-10649

Patent status:

No patent action is contemplated by NASA.

Source: C. P. Holden of
North American Rockwell Corporation
under contract to
Marshall Space Flight Center
(MFS-18548)

Category 05