NASA TECH BRIEF

Improved Burst Disk/Cutter Assembly

Burst disks have been a frequent source of external leakage into a vacuum annulus when installed to prevent annulus overpressure. A burst disk/cutter assembly has been developed, prewelded before assembly, which eliminates this failure condition, and provides a means for more accurate burst-pressure prediction. This device should be of use in medium and high-pressure systems which must be accurately controlled. It should interest personnel in the fluid power and food processing industries.

The reverse buckling burst disk has been established as the best unit for nonspring relief of vacuum annulus overpressure. Two reverse buckling type configurations were developed and thoroughly tested, which showed high reliability for field applications: the all-welded and the mechanically assembled unit which permits field replacement of the diaphragm.

The all-welded unit was designed with a 304 stainless steel body and a nickel 200 or Inconel 600 diaphragm. Both diaphragm and cutter were coated with polytetrafluoroethylene. Cutter-corrosion rate was evaluated to determine the effect of corrosion on the cutter-piercing point. Salt sprayed cutters showed that no corrosion had occurred on the coated samples. The reverse buckling disk design (the all-welded unit) proved to have a reliable lifetime of 5 or more years.

The burst-disk assembly with a replaceable diaphragm combines features which permit hardware to be assembled in the field with little chance of damage and a very reliable permanent seal. The replaceable diaphragm units should provide the same extended service life predicted for the all-welded unit. The cutter and bursting diaphragm are combined as a welded assembly that can be handled easily without damage. The profile of the burst-disk assembly is minimized to avoid damage after installation, thus decreasing costs. Sealing is accomplished by line contact of contoured conical surfaces with slightly different radii. A light film of high vacuum grease can be added to the sealing surface prior to assembly. With the grease and a grit free surface, all test units were disassembled and reassembled many times without leakage or other difficulty.

Notes:

1. For information relating to the use of the burst disk for testing reverse buckling, see B70-10582.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   Kennedy Space Center, Code AD-PAT
   Kennedy Space Center, Florida 32899
   Reference: B70-10583

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

Patent Counsel
Mail Code AD-PAT
John F. Kennedy Space Center
Kennedy Space Center, FL 32899

Source: Joseph Martinez of AMETEK/Straza under contract to Kennedy Space Center (KSC-10516)

Category 07