

Simple Inexpensive Electrical Insulating Leads for High Pressure Applications*

GEORGE H. SHAW AND NIKOLAS I. CHRISTENSEN

*Department of Geological Sciences, University of Washington,
Seattle, Washington 98105*

(Received 13 October 1969)

MANY materials have been found to be effective insulators for electrical leads to high pressure vessels. Most insulators are machined from solid materials^{1,2} such as pipestone, boron nitride, mica, or Pyrex. Some success has also been achieved with epoxy and Araldite resins.^{3,4} Machined solids have the disadvantage of high cost, whereas resins must be allowed to set.

Recently in our laboratory we have found that ordinary notebook paper is an effective electrical insulator when used with cone-type leads for high pressure application. The paper is easily cut to the proper shape and dimensions so that it may be wrapped around the metal cone. A slight overlap is left at the top and bottom of the cone to assure complete coverage. A small amount of rubber cement is used to hold the paper in place while it is slid into the cone seat. Since perspiration from the hands is a good conductor,

it is necessary to use care to keep the paper clean and dry.

Our system uses "Plexsol" as a pressure medium and is capable of generating 15 kilobars in a cavity of approximately 250 cc. The paper seals have a leakage resistance of 10-20 M Ω and have been in use for several months. We have found the life of the seals, which generally exceeds 40 runs to 10 kilobars, to be superior to that of boron nitride or mica.

Note added in proof. J. L. Downs and R. T. Payne have recently published an excellent review of electrical feed through techniques.⁵

* Supported by National Science Foundation Grant GA-1461.

¹ P. W. Bridgman, Proc. Amer. Acad. Arts Sci. **74**, 11 (1940).

² H. A. Bowman, Nat. Bur. St. Tech. News Bull. **39**, 71 (1955).

³ D. F. Gibbs and M. Jarman, J. Sci. Instrum. **35**, 472 (1958).

⁴ D. Gagan, J. Sci. Instrum. **33**, 160 (1956).

⁵ J. L. Downs and R. T. Payne, Rev. Sci. Instrum. **40**, 1278 (1969).