

its edges being ground by about $\frac{1}{2}$ mm and thus form conical rims. This reduces markedly chipping of the windows which may occur under pressure. The window, plugs J, D and E are made of Bofors steel ROP 21 (1 % C, 5.5 % Cr, 1.1 % Mo and 0.2 % V) hardened to about 56 Rockwell C. The O-rings are made of nitrile rubber of hardness 70 IHR.

OPTICAL CELLS

The liquid to be investigated is enclosed in a cylindrical Pyrex or quartz cell having an optically flat bottom and two, oppositely placed, optically flat windows. Depending on requirements the windows are 15 mm or 2 mm apart and, if necessary, a quartz spacer may reduce the optical path to about 0.1 mm. A specially designed holder keeps the cell rigidly in the required position.

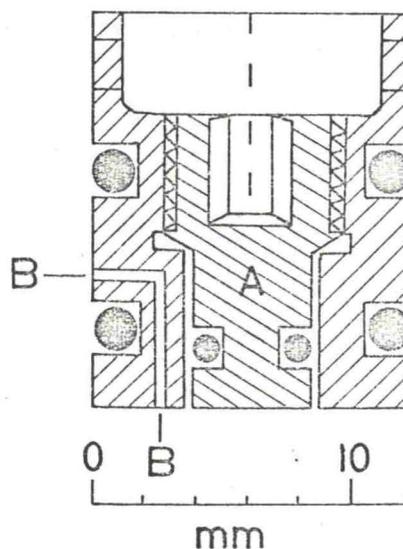


FIG. 2. An O-ring plug for the optical cell

The optical cell, after being filled with the solution, is closed by an O-ring sealed steel plug composed of two parts, as shown in fig. 2, to facilitate opening of the cell. Each part is fitted with O-rings, both their material and hardness being chosen according to the nature of the investigated solution. On placing the outer parts together, some liquid from the cell is first squeezed through a tiny channel, as shown in the figure, into the space between the outer O-rings. At the same time its level rises in the inner hole. Thereafter, the inner part is screwed in and, as soon as its O-ring seals the liquid, further screwing in presses the whole plug slightly up. Thus the solution is tightly sealed in the cell and air bubbles are absent.

The tiny channel is of great importance. In its absence, glycerol may suddenly leak through the outer O-ring and accumulate at high pressure between the O-rings, when the critical pressure is reached. The liquid then bursts the cell during decompression. The channel equalizes the pressure inside the cell and in the space between the O-rings and thus prevents its destruction. Hence, only one O-ring (the outer) is used for sealing, the other serves to provide mechanical guidance. If necessary, two such pistons can be placed, one above the other, for protection of the solution which may be destroyed by its contact with glycerol wetting the cell wall.