

Reprinted from THE REVIEW OF SCIENTIFIC INSTRUMENTS, Vol. 33, No. 1, 131, January, 1962
Printed in U. S. A.

Improved High Pressure Valve*

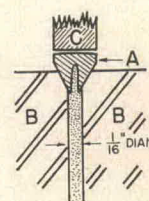
WILLIAM B. DANIELS

Princeton University, Princeton, New Jersey

(Received September 12, 1961)

THE valve described in this note incorporates a self-sealing mechanism which has provided improved closure over the 10-kilobar range for which it has been used. High pressure valves commonly consist of a conical point or a ball held against a conical orifice. To avoid the necessity of a high pressure packing on the valve stem, the pressure is usually contained in such a way that it acts to unseat the valve. This is a disadvantage because any compression of the valve stem due to increasing pressure in the system reduces the valve seating pressure increasing the probability of leak or requiring excessive preload on the sealing surfaces leading to their early deterioration. This can in a large part be avoided, making the valve self-sealing to a certain extent, by using a hollow point cone for the sealing member as shown in Fig. 1. Note that increasing pressure in the system causes the sealing member to expand

FIG. 1. High pressure valve seat and sealing member. A—hollow sealing member, 0.025-in. bore, 60° cone, 0.188 in. o.d.; B—valve seat; C—valve stem.



increasing the seating pressure or at least compensating for the withdrawal of the valve caused by compression of the stem. We have found the initial seating pressure to be much reduced by use of this arrangement. The self-sealing effect can, of course, be overdone making controlled release of pressure difficult, but, using the dimensions indicated and a hardened steel sealing member, we have had no difficulties in a liquid system.

*This work was supported in part by the Office of Ordnance Research.