The calculation of the tensile strength of tablets

In a recent paper (Rowe, Elworthy & Ganderton, 1973) we introduced the term $1/(1-\epsilon)$, where ϵ is the porosity of the sample, into the Frocht equation (Frocht, 1948) in order to compare the strength of tablets of different porosities. Recently, Newton (1974) has criticized this correction factor on the grounds that the term $(1-\epsilon)$ expresses the solid area of a planar diametral interface and not the area over which failure occurs. Our studies were concerned with the compression of non-porous spherical polymer particles with a very narrow size distribution, and it can be calculated from the studies of Pelzel (1955) that, in the deformation of the extreme packing arrangements (viz. body centred and simple cubic packings) that such a system can adopt, the area of contact is linearly related to the term $(1-\epsilon)$ over the porosity range 0·1 to 0·4. It is reasonable to assume that this relationship will also apply to the random and intermediate packings normally encountered. The inclusion of the term $(1-\epsilon)$ in the Frocht equation is then both necessary and justified if a true comparison of the bonding strengths of particles in tablets of different porosities is to be made. Its use, however, must be restricted to particulate systems that are as well defined as the one described above and which fail at the interface created during deformation.

Department of Pharmacy,
The University of Manchester,
Manchester M13 9PL
I.C.I. Pharmaceuticals Division, Alderley Park,
Cheshire, U.K.

R. C. ROWE
P. H. ELWORTHY
D. GANDERTON

February 13, 1974

REFERENCES

FROCHT, M. M. (1948). *Photoelasticity*, **2**, p. 121. John Wiley, New York.

NEWTON, J. M. (1974). *J. Pharm. Pharmac.*, **26**, 215–216.

PELZEL, E. (1955). *Z. Metallkunde*, **46**, 813–817.

ROWE, R. C., ELWORTHY, P. H. & GANDERTON, D. (1973). *J. Pharm. Pharmac.*, **25**, *Suppl.*, 12P–16P.