Flowmeter for Pharmaceutical Powders

Keyphrases ☐ Flowmeter for pharmaceutical powders—determination of flow rates ☐ Powders, pharmaceutical—flowmeter, determination of flow rates

Sir:

Monodisperse powders have been reported by many authors to have a maximum flow rate (Q) at a particular diameter (x) (1–3). We have found that beyond the maximum the flow rates often follow a parabolic decline in the sense that:

$$\log Q = a \cdot \log x + B \qquad \text{(Eq. 1)}$$

where a and B are product-dependent constants (Figs. 1 and 2).

The flow rates here were determined in a flowmeter[1]. Both the glass beads and granulations tested were of normal flow patterns in other respects. For example, the flow rates increased with increasing length of efflux tube (Fig. 3), as reported by Jones and Pilpel (4) and Bingham and Wikoff (5).

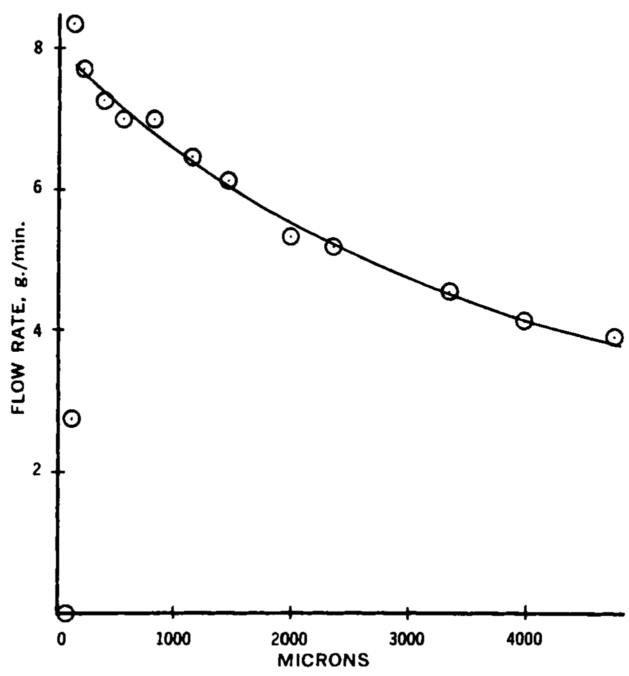

Figure 1—*Flow pattern of a granulation showing maximum flow rate at 210 μ.*

[1] The Lewis-Howe flowmeter developed at Lewis-Howe Co. in 1954. The Erweka flowmeter (marketed at a later date) is based on somewhat the same design.

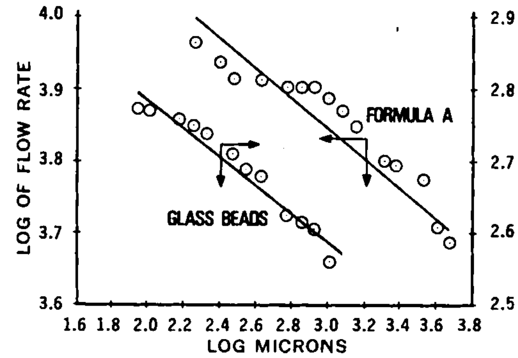

Figure 2—*Flow rates of glass beads and of a granulation (Formula A) plotted according to Eq. 1.*

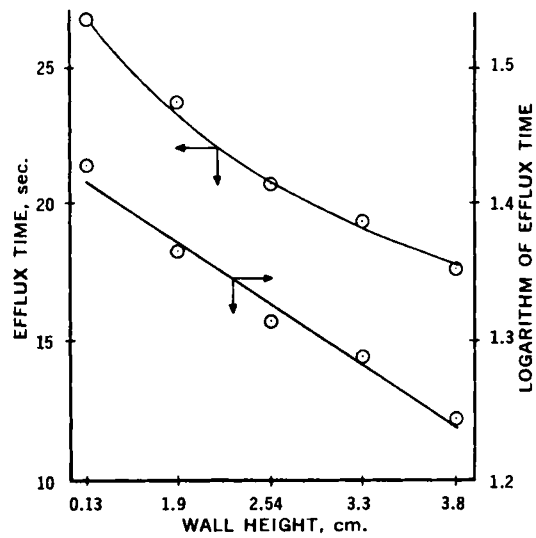

Figure 3—*Flow rate as a function of height of efflux tube of 500 g. of spray-dried lactose. Semilogarithmic plotting (right ordinate) shows adherance to the Bingham–Wikoff (5) equation.*

Equation 1 allows a good estimation of optimum diameter in four determinations (two below x_{max} and two above), assuming (for calculation purposes) that the curve is linear on the low side of x_{max}.

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(2) T. M. Jones and N. Pilpel, *J. Pharm. Pharmacol.*, **18**, 81(1966).
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(4) T. M. Jones and N. Pilpel, *J. Pharm. Pharmacol.*, **17**, 440 (1965).
(5) E. C. Bingham and R. W. Wikoff, *J. Rheol.*, **2**, 395(1931).

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Received June 3, 1963.
Accepted for publication February 2, 1973.
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