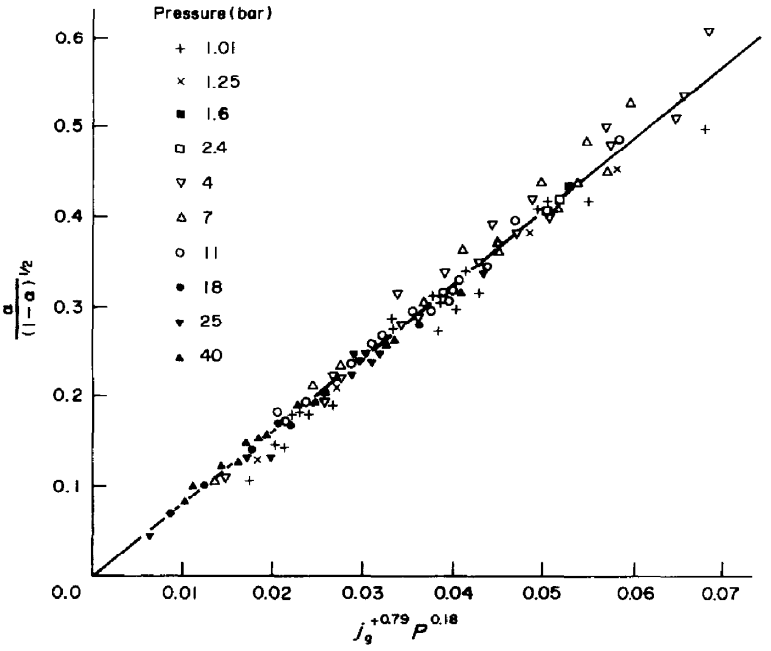

FIG. 2.

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Reply to 'Discussion of "Drift flux model for large diameter pipe and new correlation for pool void fraction"'

THERE are several ways in correlating experimental data. The mathematical expression in one correlation may differ considerably from that in another correlation. In comparing correlations, one should take into account the uncertainties of constants and exponents in the correlations.

Gardner's correlation has one constant and three exponents which are determined by experimental data. His correlation may be written as

$$\alpha = K(1-\alpha)^l j_g^{+m} p^n. \quad \text{(A)}$$

Here, K, l, m, and n have uncertainties which are given by

$$K = K_0 \pm \Delta K, l = l_0 \pm \Delta l, m = m_0 \pm \Delta m, p = p_0 \pm \Delta p. \quad \text{(B)}$$

As was done by Gardner, if one substitutes equation (A) into the drift flux relation, one obtains

$$V_{gj} = F(\alpha, K_0 \pm \Delta K, l_0 \pm \Delta l, m_0 \pm \Delta m, p_0 \pm \Delta p). \quad \text{(C)}$$

Due to the uncertainties, ΔK, Δl, Δm, and Δp, the value of V_{gj} given by equation (C) has also uncertainty. Therefore, in the V_{gj}–α plane, equation (C) is represented not by a single line but by a band with certain width. The consistency between Gardner's correlation and ours should have been discussed in such a band. By the way, the lines, F_1 and F_2 in his Fig. 1 have nothing to do with uncertainty consideration as mentioned above, because in that figure, the strong depen-

dence of K on exponent l is not considered and F_1 and F_2 are arbitrarily shown.

The validity of the assumption that C_0 and V_{gj} are constant, is confirmed by the experimental data used in our paper. Some examples are shown in Figs. 4 and 7 there.

Gardner's correlation is categorized into an empirical power law correlation as discussed in Section 2.2 in our paper. Of course it has a certain improvement over previous empirical correlations. However, it still has the disadvantages as pointed out in our paper. It can well correlate a particular set of data. However, the constants and exponents differ from one data set to another. Moreover, it does not have consistency with the void correlation under a forced convection system.

We think that this letter offers us a good opportunity to think over the relations among various pool correlations and has some contribution to future improvement of the correlations.

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