Journal of Heat Transfer

# Errata



## Erratum: "Self-Preserving Properties of Unsteady Round Nonbuoyant Turbulent Starting Jets and Puffs in Still Fluids" [ASME J. Heat Transfer, 124, pp. 460–469 (2002)]

F. J. Diez, R. Sangras, O. C. Kwon, and G. M. Faeth

The formulas for the temporal variations of the maximum streamwise penetration distances of self-preserving unsteady round nonbuoyant turbulent starting jets and puffs in still fluids were stated incorrectly in the originally published paper. The correct versions can be found from conservation of the specific momentum flux, $\dot{Q}_o u_o$, for starting jets and from conservation of the specific momentum force, $Q_o u_o$, for puffs, as follows:

$$(x_p - x_o)/d = C_x((t - t_d)/t^*)^n, \tag{1}$$

where

$$t^* = d^2/(\dot{Q}_o u_o)^{1/2}, \quad n = 1/2, \quad \text{starting jet} \tag{2}$$

and

$$t^* = d^4/(\dot{Q}_o u_o), \quad n = 1/4, \quad \text{puff.} \tag{3}$$

Within the self-preserving region a specific source property, such as the source diameter, is no longer relevant and can be factored out of Eqs. (1)–(3) to yield the following compact equations for the maximum streamwise penetration distances within the self-preserving region:

$$(x_p - x_o)/((\dot{Q}_o u_o)^{1/2}(t - t_d))^{1/2} = C_x, \quad \text{starting jet} \tag{4}$$

and

$$(x_p - x_o)/((Q_o u_o)(t - t_d))^{1/4} = C_x, \quad \text{puff.} \tag{5}$$

The corresponding variations of the maximum radial penetration distances of self-preserving starting jets and puffs, however, are identical:

$$r_p/(x_p - x_o) = C_r. \tag{6}$$

Measurements of maximum streamwise and radial penetrationdistances of starting jets and puffs are plotted in Figs. 1 and 2 according to Eqs. (4)–(6). These results were obtained from new measurements over the test range considered in the original paper.

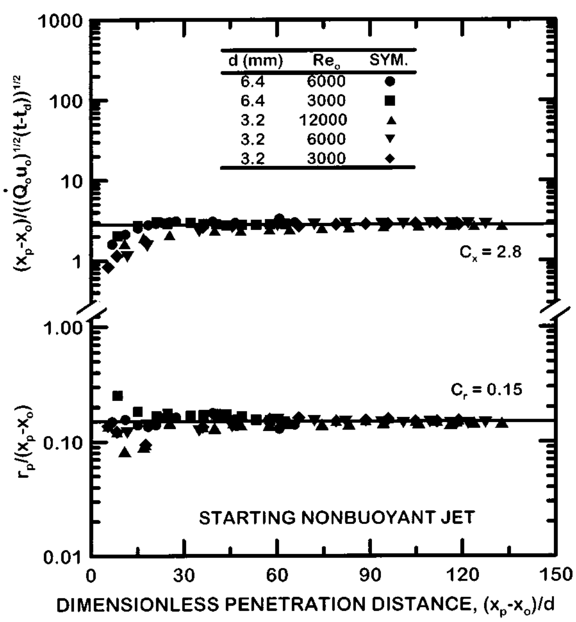


**Fig. 1 Normalized streamwise and radial penetration distances as a function of normalized streamwise penetration distances for round nonbuoyant turbulent starting jets in still fluids**

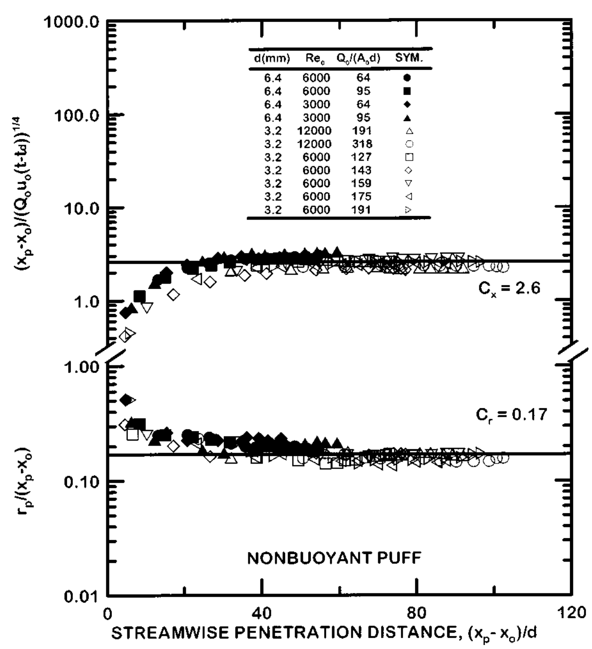


**Fig. 2 Normalized streamwise and radial penetration distances as a function of normalized streamwise penetration distances for round nonbuoyant turbulent puffs in still fluids**

  

The near-source properties of both flows vary as source properties are varied, however, self-preserving behavior satisfying Eqs. (4)–(6) is achieved for streamwise distances greater than 20–30 source diameters from the source. The various parameters of Eqs. (4)–(6), with uncertainties (95 percent confidence) shown in parentheses, are as follows:

$$C_x = 2.8(0.06), \quad C_r = 0.15(0.003), \quad x_o/d \approx 0, \quad \text{starting jet} \tag{7}$$

and

$$C_x = 2.6(0.06), \quad C_r = 0.17(0.005), \quad x_o/d = 8.5(2.0), \quad \text{puff} \tag{8}$$

where $x_o/d$ for starting jets could not be distinguished from the exit of the source whereas $x_o/d$ for puffs was independent of the amount of source fluid injected for the present test range, e.g., $Q_o/(A_o d) = 60-320$. This includes flows that were identified as interrupted jets, with $Q_o/(A_o d) = 159-191$, in the originally published paper.