ERRATA SHEET FOR

ANSI/AMCA STANDARD 210-16 (ANSI/ASHRAE STANDARD 51-2016) Laboratory Methods of Testing Fans for Certified Aerodynamic Performance rating

July 30, 2018

The corrections listed in this errata sheet apply to the all printings of ANSI/AMCA 210-2016 (ANSI/ASHRAE STANDARD 51-2016).

Page	Erratum
16	Change Eq. 7.18 SI to read: $\mathrm{Re} = \frac{\sqrt{2}}{\mu} C D_6 Y \sqrt{\frac{\Delta P_{\rho_X}}{1 - E\beta^4}}$
16	Change Eq. 7.18 I-P to read: $\mathrm{Re} = \frac{1097.8}{60\mu} C D_6 Y \sqrt{\frac{\Delta P_{\rho_X}}{1 - E\beta^4}}$
18	Change Eq. 7.33 SI to read: $\mathrm{Re} = \frac{D_h V \rho}{\mu}$
19	Change Eq. 7.33 I-P to read: $\mathrm{Re} = \frac{D_h V \rho}{60\mu}$
67	In section G.3, Step 1-1, first line, change equation to read: $\mathrm{Re} = \frac{1097.8}{60\mu_6} C e D_6 Y \sqrt{\frac{\Delta P_{\rho_5}}{1 - E\beta^4}}$
67	In section G.3, after a constant was changed in a previous edition (1096 was changed to 1097.8), the example calculation that followed was not corrected. Section G.3, as shown below, includes corrected numbers indicated by a highlight.
67	In the last line of Section G.4, change to read, "The formula is based on C = 9.5, Y = 0.9.6, E = 1.0, and μ_6 = 1.222 X 10^{-5} lbm/ft-s.

G.3 Example iteration

Iteration 1

Step 1-1 — Calculate Re, using:

$$\mathrm{Re} = \frac{1097.8}{\mu_6} C e D_6 Y \sqrt{\frac{\Delta P \rho_5}{1 - E\beta^4}}$$

Where:

μ_6 = 1.222 × 10^{-5} lbm/ft•s
Ce = 0.99 (estimated)
D_6 = 6 in. = 0.5 ft
Y = 0.998 (calculate per Section 7.3.1.3)
ΔP = 1.005 in. wg
ρ = 0.0711 lbm/ft^3
$(1-E\beta^4)$ = 1 for iteration purposes

$$\mathrm{Re}_1 = \frac{1097.8}{(60)(1.222 \times 10^{-5})}(0.99)(0.5)(0.998)\sqrt{(1.005)(0.0711)}$$

$$\mathrm{Re}_1 = 197{,}722$$

Step 1-2
Calculate Ce_1, using Re_1 from the previous step, assuming that *L*/*D* = 0.6:

$$Ce_1 = 0.9986 - \frac{7.006}{\sqrt{(\mathrm{Re}_1)}} + \frac{134.6}{\mathrm{Re}_1}$$

$$Ce_1 = 0.9986 - \frac{7.006}{\sqrt{197{,}722}} + \frac{134.6}{197{,}722}$$

$$Ce_1 = 0.9835$$

Check: $|Ce - Ce_1| = |0.99 - 0.9835| = 0.0065$

Since 0.0065 > 0.001, a second iteration is required.

Iteration 2

Step 2-1 — Re-estimate Re, using Ce_1:

$$\mathrm{Re}_2 = \mathrm{Re}_1\left(\frac{Ce_1}{Ce}\right)$$

$$\mathrm{Re}_2 = 197{,}722\left(\frac{0.9835}{0.99}\right)$$

$$\mathrm{Re}_2 = 196{,}424$$

Step 2-2 — Recalculate C, using Re_2:

$$Ce_2 = 0.9986 - \frac{7.006}{\sqrt{\mathrm{Re}_2}} + \frac{134.6}{\mathrm{Re}_2}$$

$$Ce_2 = 0.9986 - \frac{7.006}{\sqrt{196{,}424}} + \frac{134.6}{196{,}424}$$

$$Ce_2 = 0.9835$$

Check: $|Ce_1 - Ce_2| = |0.9831 - 0.9835| = 0.0004$

Since 0.0004 < 0.001, no further iterations are required, and $Ce_2 = 0.9835 = C$.

If, for some unusual conditions, the iterations do not converge, then try a different starting initial guess for *Ce*.