

Form 2H-2. Calculation of Wall Effects Replacement Velocity Values (Any Method 1 Traverse ≥ 16 Points)

1st Probe Type/ID/Pts. Sampled: _____

Tester(s): _____

2nd Probe Type/ID/Pts. Sampled: _____

Affiliation: _____

Entry Port ID (e.g., A, B, C, or D): _____

1. Diameter of the stack or duct (ft)		Radius, r , of the stack or duct (in.) (= diameter × 6)	
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2. Location (Column A), measured and decay velocities (Columns B and C), and volumetric flow (Column G) associated with each successive wall effects traverse point.

(A)	(B)	(C)	(D)		(E)	(F)	(G)
Distance (d) from Wall	Measured Velocity (v_d) at Distance d	Decay Velocity (v_{dec})	Intermediate Calculations			Area of Sub-sector (A_d)	Volumetric Flow in Sub-sector (Q_d)
		$\frac{v_{d-1} + v_d}{2}$ Note: $v_0 = 0$	$\frac{2}{p}\pi[r-d+1]^2$	$\frac{2}{p}\pi[r-d]^2$		(Col. D - Col. E)	(Col. C × Col. F)
(in.)	(ft/sec)	(ft/sec)	(in. ²)	(in. ²)		(in. ²)	(ft-in. ² /sec)
$d = 1$							
$d = 2$							
...							
d_{last}							

Note: $d_{last} \leq d_b$, as defined in section 8.2.2.3 of the method.

3. Total volumetric flow for all sub-sectors located between stack wall and d_{last} (total Col. G).

4. Volumetric flow for remainder of the Method 1 equal-area sector.

a. Velocity measurement at distance d_{rem} from stack wall (v_{drem}). (If $d_{rem} - d_{last} < 1/2$ in., then no measurement at d_{rem} is necessary. Enter the velocity at d_{last} on this line.)

b. Total area in remainder of Method 1 equal-area segment (A_{drem}). Subtract $\left(\frac{p-2}{4p}\right)\pi(r)^2$ from last entry in item 2, column E, and enter the result on this line.

c. Multiply values on lines 4a and 4b. (Q_{drem})

5. Wall effects-adjusted velocity in the Method 1 near-wall equal-area segment.

a. Add the values on lines 3 and 4. (Q_T)

b. Divide line 5a by $\left(\frac{1}{2p}\right)\pi(r)^2$. The resulting value is one of four "replacement" point velocity values adjusted for wall effects, \hat{v}_{e_j} , as derived in Equation 2H-15.

6. Substitute the value shown in 5b for the unadjusted velocity value in the Method 1 sector. (See Eq. 2H-17.)

Notes:

- Column B: If no measurement is taken at distance d , enter the velocity value obtained at the first subsequent traverse point where a measurement was taken, followed by the letters "NM". See section 8.7.1.2.
- For clarity, only English units are shown in this form. Following are metric equivalents of the English units used in the form. In row 2, column A: 1 in. = 2.5 cm; 2 in. = 5.1 cm. In row 2, column D: If metric units (cm) are used, the term $\frac{1}{4}\pi(r-d+1)^2$ must be changed to $\frac{1}{4}\pi(r-d+2.5)^2$. In row 4a: $1/2$ in. = 12.7 mm. Throughout the form, the metric equivalents of in., in.², ft, ft/sec, and ft-in.²/sec are cm, cm², m, m/sec, and m-cm²/sec, respectively.