

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

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, <i>r</i> , of the stack or duct (in.) (= diameter × 6) |
|---------------------------------------|--|----------------------------------------------------------------|

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 (<i>d</i>) from Wall | Measured Velocity (<i>v_d</i>) at Distance <i>d</i> | Decay Velocity (<i>v_{dec,d}</i>) | Intermediate Calculations | | | Area of Sub-sector (<i>A_d</i>) | Volumetric Flow in Sub-sector (<i>Q_d</i>) |
| | | $\frac{v_{d-1} + v_d}{2}$ | $\frac{1}{4} \pi [r-d+1]^2$ | $\frac{1}{4} \pi [r-d]^2$ | | (Col. D - Col. E) | (Col. C × Col. F) |
| | | Note: <i>v₀</i> = 0 | | | | | |
| (in.) | (ft/sec) | (ft/sec) | (in. ²) | (in. ²) | | (in. ²) | (ft-in. ² /sec) |
| <i>d</i> = 1 | | | | | | | |
| <i>d</i> = 2 | | | | | | | |
| ... | | | | | | | |
| <i>d_{last}</i> | | | | | | | |

Note: *d_{last}* ≤ 0.1340 *r*, where *r* is the radius of the stack or duct. See 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 $\frac{3}{16} \pi (r)^2$ 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 equal-area sector.

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

b. Divide line 5a by $\frac{1}{16} \pi (r)^2$. The resulting value is one of four "replacement" point

velocity values adjusted for wall effects, *v_{ej}*, as derived in Equation 2H-16.

6. Substitute the value shown in 5b for the unadjusted velocity value in the Method 1 sector. (See Eq. 2H-18.)

Notes: 1. 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.

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.