

**FEDERAL REFERENCE METHOD 2**  
**Determination of Stack Gas Velocity and Volumetric Flow Rate**  
**(Type S Pitot Tube)**

**INPUT PARAMETERS**

Area of stack (m <sup>2</sup> ) or (ft <sup>2</sup> )	= $\pi r^2$ or $\pi (D/2)^2$ or L x W	=	A <sub>s</sub>	=	_____
Pitot tube coefficient		=	C <sub>p</sub>	=	_____
Stack gas temperature (K) or (°R)		=	T <sub>s</sub>	=	_____
Average of square root of velocity head (mm. H <sub>2</sub> O) <sup>1/2</sup> or (in. H <sub>2</sub> O) <sup>1/2</sup>		=	$(\sqrt{\Delta p})_{avg}$	=	_____
Barometric pressure (mm. Hg) or (in. Hg)		=	P <sub>bar</sub>	=	_____
Stack gas static pressure (mm. H <sub>2</sub> O) or (in. H <sub>2</sub> O)		=	P <sub>g</sub>	=	_____
Absolute stack gas pressure (mm. Hg) or (in. Hg)		=	P <sub>s</sub>	=	_____
	<b>Note:</b> P <sub>s</sub> = P <sub>bar</sub> + P <sub>g</sub> (mm. H <sub>2</sub> O)/13.6 or (in. H <sub>2</sub> O)/13.6				
Stack gas moisture (fraction)		=	B <sub>ws</sub>	=	_____
Stack gas dry molecular weight (g/g-mole) or (lb/lb-mole)		=	M <sub>d</sub>	=	_____
Stack gas wet molecular weight (g/g-mole) or (lb/lb-mole)		=	M <sub>s</sub>	=	_____
	<b>Note:</b> M <sub>s</sub> = M <sub>d</sub> (1 - B <sub>ws</sub> ) + 18.0 B <sub>ws</sub>				

**CALCULATIONS**

v<sub>s</sub> = Stack gas velocity, ft/s

$$v_s = K_p \times C_p \times (\sqrt{\Delta p})_{avg} \times \sqrt{\frac{T_{s,avg}}{P_s M_s}} = \text{_____ m/s (ft/s)}$$

K<sub>p</sub> = Velocity equation constant (34.97 metric, 85.49 english)

C<sub>p</sub> = Pitot tube coefficient (.084 baseline coefficient, else use wind tunnel calibration.)