

## Source Test Procedure **ST-18**

### **STACK TRAVERSE POINT DETERMINATION**

(Adopted January 20, 1982)

#### **1. APPLICABILITY**

1.1 This procedure is used to determine the number and location of traverse points required when determining stack gas velocity or extracting a sample from a type "A" sample point.

#### **2. PRINCIPLE**

2.1 Depending on the stack geometry, a cross-section of the stack perpendicular to the gas flow is divided into specified number of equal area. Each traverse point is then located at predetermined points in each area.

#### **3. CALCULATIONS**

3.1 For circular ducts, the following guidelines for the number of traverse points shall be followed:

**Table 18-1**

| <u>Duct Diameter, inches</u> | <u>Number of Traverse Points</u> |
|------------------------------|----------------------------------|
| D < 12                       | 4                                |
| 13 < D < 20                  | 6                                |
| 21 < D < 30                  | 8                                |
| 31 < D < 48                  | 10                               |
| D > 48                       | 12                               |

3.2 For circular ducts, the following formula shall be used to determine the location of each traverse point:

$$r_i = \sqrt{\frac{(i - 0.5)R^2}{a}}$$

Where:

- $r_i$  = distance to the  $i^{\text{th}}$  traverse point on radius from the center
- $i$  =  $i^{\text{th}}$  traverse point on radius
- $a$  = total number of traverse points on a radius
- $R$  = inside radius of the duct

- 3.3 For rectangular stacks, the following formula shall be used to determine the equivalent diameter of the stack:

$$\text{Equivalent Diameter} = \frac{2 (\text{Length})(\text{Width})}{(\text{Length}) + (\text{Width})}$$

The number of traverse points is then determined from Table 18-1 using the equivalent diameter.

- 3.4 For rectangular ducts, divide the cross section into elemental areas such that the ratio of the length to width of the elemental areas is between one and two. Locate the traverse points at the centroid of each elemental area.
- 3.5 No traverse point shall be located within one inch of the stack wall.