Question 3.33

Topic: Flow Measurement in Rectangular Stacks or Ducts

Question: If I use Method 2F to perform a flow RATA in a rectangular stack or duct, Part 75 requires me to report additional data to support each RATA run. Specifically, the stack diameter and the stack or duct cross-sectional area at the test port location are to be reported in the <RATASummaryData> record. How do I satisfy these reporting requirements for a rectangular duct?

Answer: For a rectangular stack or duct, the cross-sectional area reported in the <StackArea> field of the <RATASummaryData> record is simply the product of the stack or duct length times the width. To determine the appropriate diameter to report in the <StackDiameter> field, use the following equation:

$$Ds = \sqrt{\frac{4As}{\pi}}$$

Where:

Ds = Equivalent circular stack diameter (ft)
As = Area of the rectangular duct (ft^2)
Note that you should not use the equation in Section 12.2 of EPA Method 1 to determine the "equivalent diameter" of the rectangular stack or duct. The Method 1 equation should only be used for its intended purpose, which is to estimate the number of stack or duct diameters upstream and downstream of the measurement location, in order to determine the minimum number of Method 1 points for the velocity traverse.

References: 40 CFR 60, Appendix A-2, Methods 1, 2, 2F, and 2G

History: First published in December 2000, Update #13; revised in October 2003 Revised Manual; revised in 2013 Manual