

Sampling in Square and Circular Ducts.

There is an array independently validated Standard Test Methods for the measurement of pollutants at industrial sources. All of which make provision for the measurement in both square and circular duct work. The best example is probably EN 13284 for the measurement of Total Particulate and excerpts below show that sampling is conducted across a grid of traverse points (diagrams for rectangular and circular ducts are shown). This grid sampling is cross referenced by many other standard methods for other pollutants, including EN 1948 for measurement of dioxins and furans.

C.1.2 General method for circular ducts

In the "general method" applicable to circular ducts, the sampling plane is divided into equal areas. The sampling points, one at the centre of each area, are located on two or more diameters (sampling lines), and one point at the centre of the duct (see Figure C.1).

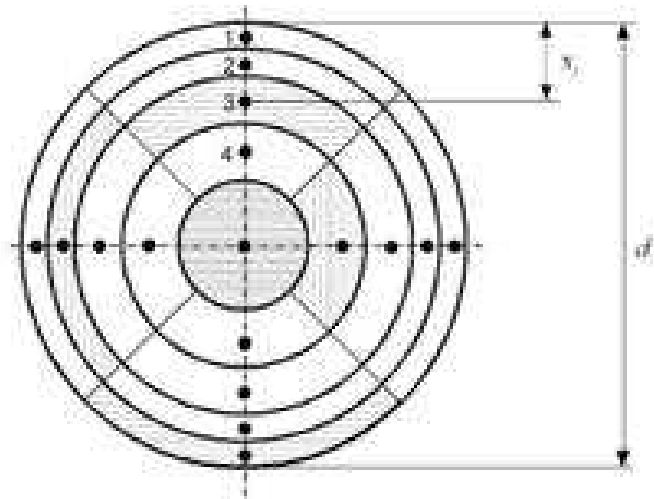


Figure C.1 — Sampling point positions in circular ducts - General method
(showing positions for ducts over 2 m in diameter -
The shaded positions are of equal area)

C.2 Method for rectangular ducts

In the method applicable to rectangular ducts, the sampling plane is divided into equal areas by lines parallel to the sides of the duct, and a sampling point is located at the centre of each area (see Figure C.3).

In general, both sides of the rectangular duct are divided into an equal number of parts, giving areas which have the same shape as the duct. The number of partial areas is thus the square of 1, 2, 3, etc. (see Figure C.3 a).

L_1 and L_2 being the dimensions of a section, where L_1/L_2 is greater than 2, side L_1 shall be divided by a higher number than L_2 , so that for each of the partial sections, the ratio L_1/L_2 (partial section) is less than 2.

If the lengths of the sides of the duct L_1 and L_2 are divided into n_1 and n_2 parts respectively, the number of sampling points is n_1 times n_2 and the smallest distance from a wall of the duct will be $L_1/2n_1$ and $L_2/2n_2$.

EN 13284-1:2001 (E)

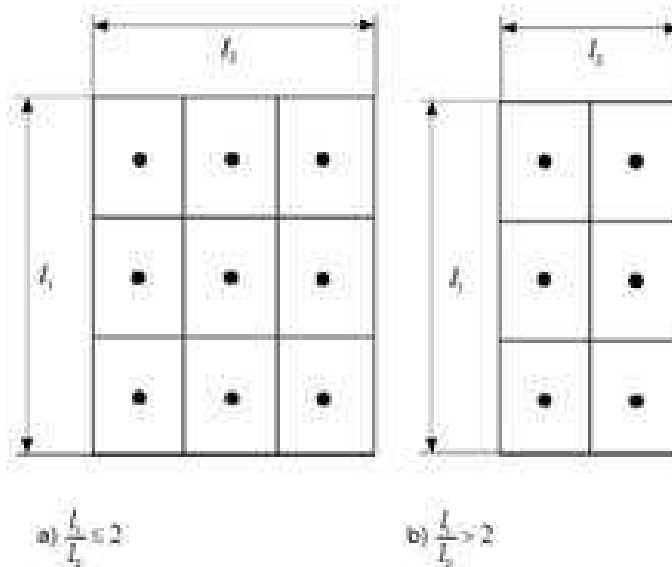


Figure C.3 — Illustrations of sampling point positions in rectangular ducts

Separate to this you will note that our site specific protocol makes provision for a homogeneity test. A homogeneity test will determine if the waste gas stream is well mixed and verify whether the positioning of the sampling probe might impact on the result. The extensive ducting that I observed at your site suggests that the stream will indeed be homogeneous by the time it has passed the sampling location.