

Appendix 2/19

Minutes of the 24th meeting of the ALC Technical Working Group (TWG), 10th January 2019

Composition of TWG = HSE, BOHS, FAAM, ACAD, ARCA, UKATA, Independent Industry Representative

Measuring the inward Air Flow of a Negative Pressure Unit

Appendices are attached to Technical Working Group minutes when the nature and extent of discussions (or the complexity of the subject) warrants further explanation and clarification. The following is a summary of the discussions and conclusions on the above topic.

Purpose

This document provides information on how to calculate the inward airflow of a negative pressure unit (NPU) using an anemometer. The inward airflow is a measure of the performance of the NPU. NPUs are used to extract air from asbestos enclosures.

Introduction

The air volume flow (ie the air flow performance) of a NPU can be determined by measuring the inward air velocity at the filter face of the unit (in metres per second (m/s)) and by multiplying the result by the area of the filter face (ie length x breadth).

The calculated result gives the air volume flow of the unit in cubic metres per second (m³/s). This figure is multiplied by 3600 to convert the measurement units from seconds to hours (m³/hr).

The air velocity at the filter face is measured at five locations as shown in Figure 1 to obtain an average value and to ensure that any inlet face variation is taken into account. The average inward face velocity is calculated by dividing the sum of the five measurements by five.

The air velocity is measured using an air velocity measuring instrument (called an anemometer). The instrument must have a valid calibration certificate. An example of a vane probe thermo anemometer is shown in Figure 2. There are other types of anemometers.

Worked example of airflow calculation:

Measured air velocities across the filter face (m/s): **4.1, 3.9, 4.0, 4.1, 4.2**

Average face velocity (m/s): **4.1m/s (20.3/5)**

Filter face size (m²): 0.37m x 0.37m = **0.137m²**

Air volume flow in m³/s: **0.56 m³/s (4.1 x 0.137)**

Air volume flow in m³/hr: **2016 m³/hr (0.56 x 3600)**

Caveat: The calculated result will be a small overestimate (usually around 10%) of the actual air volume flow as the area of the filter lattice structure has not been deducted.

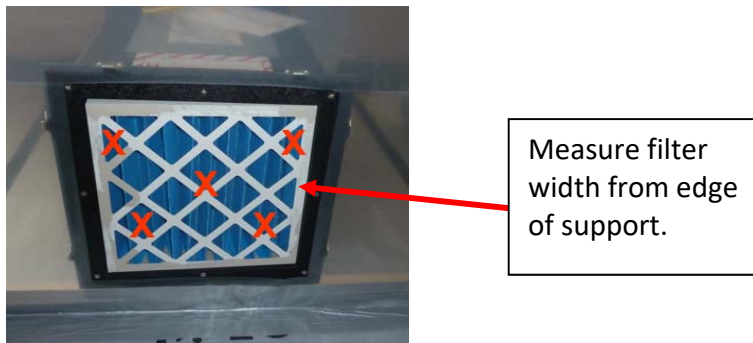


Figure 1: Approximate locations where air velocity is measured at the filter inlet face of the NPU to establish average face velocity. Measurement points should be towards the corners (4 places) and one in the centre of the filter. The measurement points should not be directly in front of the strands of the lattice structure.

The person taking the measurements should stand to the side of the NPU (ie to minimise airflow disruption) and should hold the anemometer vane over the various locations.

The area of the filter face is the blue area of the inlet and is measured from the edge of the supporting white frame (as shown in Figure 1).



Figure 2: Example of a vane probe thermo anemometer