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Information Update

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Free Area vs Cd Value

Free area and discharge loss coefficient (Cd) are measurements used to determine the amount of airflow through a louvre. The most common value is free area due to its simplicity, as its the smallest dimension measured between the two louvre blades.

$$Free\ Area = \frac{Smallest\ Dim}{Pitch} * 100$$

Equation 1: Free Area

Example equation uses data from figure 1.

$$Free\ Area = \frac{52}{100} * 100$$

$$Free\ Area = 52\%$$

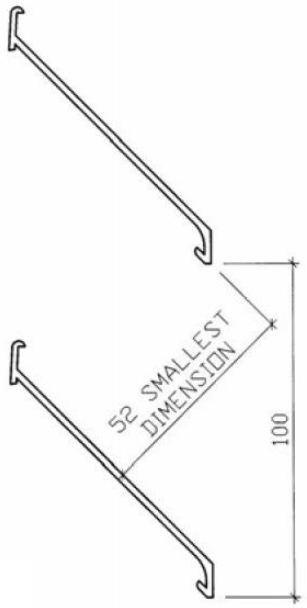

Figure 1: Free Area

Based on the above information a 5m² louvre would have an active are of 2.6m². This creates the assumption that a higher free area creates a higher airflow rate and enables up confusion as manufacturers can state the pitch is the "visual free area". Making it difficult for the customer to accurately compare manufacturers with correct information.

A more accurate method of determining the airflow is the Discharge Loss Coefficient (Cd) this is a measure of the resistance to air passing through the louvre. The two tubes to the right both have the same free area; however, the left tube would offer better airflow as there is an even pressure across the tube. The same principle can be applied to louvres, the blade profile can have a big impact. However, because it is a ratio it is sometimes hard to visualise what impact this would have on the louvre size, the engineer would also need to consider what flow rate needs to be achieved and the maximum pressure drop. Table 1 uses example calculations based on a flow rate of 20m³/s and a maximum pressure drop of 20Pa.

Louvre System	KW50Z	KW75Z	KW75S	KW100Z	KW75HPG
Free Area (%)	52	58	50	61	47
Cd Value	0.274	0.273	0.254	0.277	0.311
Required Area (m²)	12.83	12.69	13.64	12.51	11.14

Table 1: Louvre System and their Properties (values with HDPE mesh)