

1. Simplification of the SFP_{int} equation

In the document “Explanatory note on SFP_{int}” on the website www.ventilationunits.eu in Chapter 5. “Summarized alternative to determinate SFP_{int} (DTI)” one can find the below formula:

$$SFP_{int\ UVU} = \frac{\Delta p_{Fan} - \Delta p_{s,ext}}{\eta_{Fan}} * \frac{P_{Fan}}{P_{Fan,ext}}$$

but

$$\eta_{Fan} = \frac{q * \Delta p_{Fan}}{P_{Fan,ext}}$$

so

$$SFP_{int\ UVU} = \frac{\Delta p_{Fan} - \Delta p_{s,ext}}{\Delta p_{Fan}} * \frac{P_{Fan} * P_{Fan,ext}}{q * P_{Fan,ext}} = \left(1 - \frac{\Delta p_{s,ext}}{\Delta p_{Fan}}\right) * \frac{P_{Fan}}{q}$$

but

$$SFP_{Fan,unit} = \frac{P_{Fan}}{q}$$

so it can also be written

$$SFP_{int\ UVU} = \left(1 - \frac{\Delta p_{s,ext}}{\Delta p_{Fan}}\right) * SFP_{Fan,unit}$$

which was expected.

2. Conclusion

We only have to find the relation Δp_{Fan} against q from a measurement of the fan outside the unit (no need to find the $P_{Fan,ext}$).

We have all information to calculate the SFP for the fan in the unit; $SFP_{Fan,unit}$

This can easily be transferred to a similar equation for a BVU.