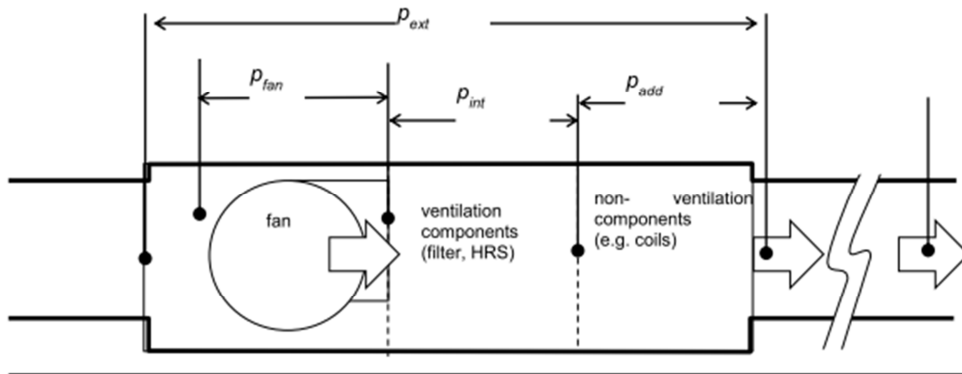


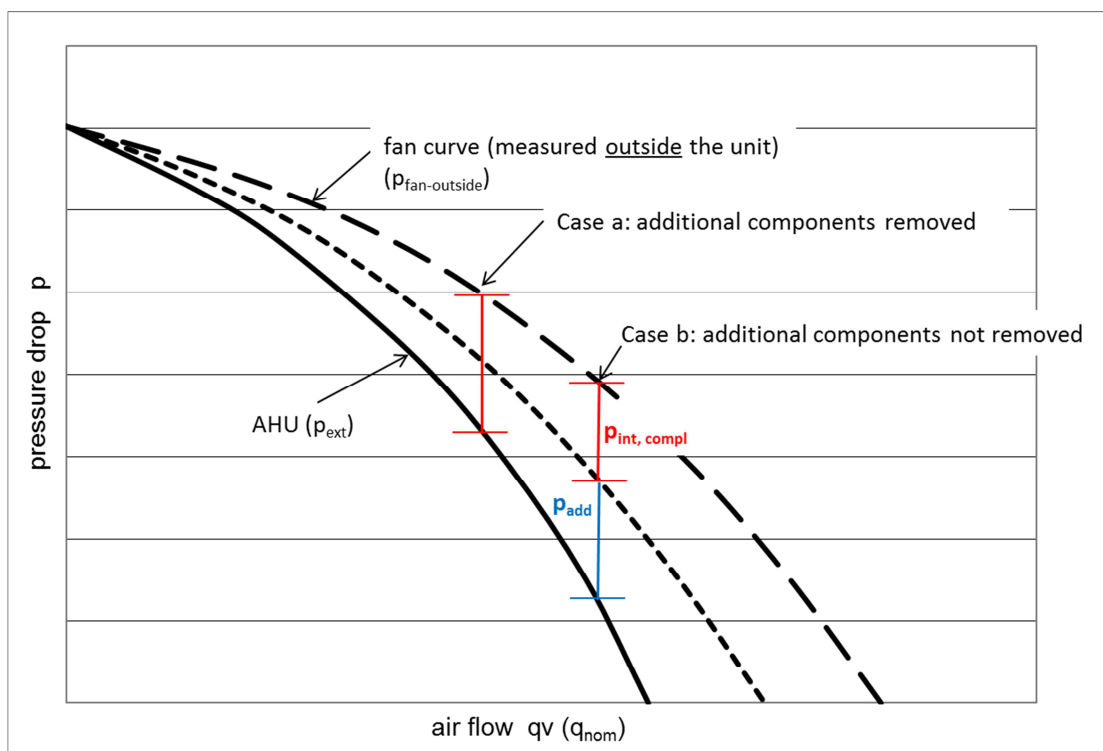
Evaluation of SFP_{int} – A Proposal for compact units

Especially for compact units where direct measurement of p_{int} and p_{fan} is not practicable or vague the following approach could lead to reproducible SFP_{int} values based on standardized measurements of the sole fan and the AHU with less arbitrariness in the calculation of component pressure drops.



(Sketch by Aldes)

1. All non-ventilation components (e.g. heating coil, extra filter,...) are removed from the AHU (if possible).
2. The characteristic performance curves (pressure/flow rate, electric power/flowrate) of the AHU is measured based on standardized methods (ISO 5801).
3. The characteristic performance curves (pressure/flow rate, electric power/flowrate) of the sole fan (fan-outside) is measured based on standardized methods (ISO 5801).



4. The complete interior pressure drop $p_{int, compl}$ results as

- a) $p_{fan-outside}$ minus p_{ext} (additional components removed)
- b) $p_{fan-outside}$ minus p_{ext} minus p_{add} (additional components not removed)

$p_{int, compl}$ contains not only the mere flow pressure drop but also pressure drop losses caused by the integration of the fan in the AHU. It should be sought to remove the non-ventilation components during the AHU measurement, otherwise their pressure drop has to be estimated and considered (case b).

- 5. The static fan efficiency $\eta_{fan-outside}$ and electrical power input $P_{el, fan-outside}$ is identified from the performance curves of the sole fan(s) at nominal flow rate q_{nom} (qv) and “max rated fan speed”.
- 6. The electrical power input $P_{el, AHU}$ is identified from the performance curve (electric power/flowrate) of the AHU at nominal flow rate q_{nom} (qv) and “max rated fan speed”.
- 7. Estimation/Approximation of SFP_{int} :

$$SFP_{int} = \frac{p_{int}}{\eta_{stat, fan-integrated}} \approx \frac{p_{int, compl}}{\eta_{stat, fan-outside}} \cdot \frac{P_{el, AHU}}{P_{el, fan-outside}}$$

The electrical power ratio ($P_{el, AHU}/P_{el, fan-outside}$) considers the (possible) effect on the efficiency of the sole fan caused by integration into the AHU.

The above described approach would provide a relative simple and transparent procedure to evaluate SFP_{int} values especially (but not only) for compact devices based on standardized measurements. Another benefit would be that available performance data of Lot11-fans can be used directly.

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