

Comments received on verification tolerances, 6-2-2015

Dear Mr. Van den Boorn,

- Issue:

The verification tolerance of the surveyed model, used to verify the compliance with the provisions set out in the Regulation, is proposed to be changed from 0,9 to 0,93.

Precisely it is proposed to "consider that the model complies with the provisions of the Regulation, if the average of the overall efficiency ( $\eta_e$ ) of the three units is at least the minimum fan efficiency\*0,93 using the formulas in Annex II (Section 1) and the applicable efficiency grades".

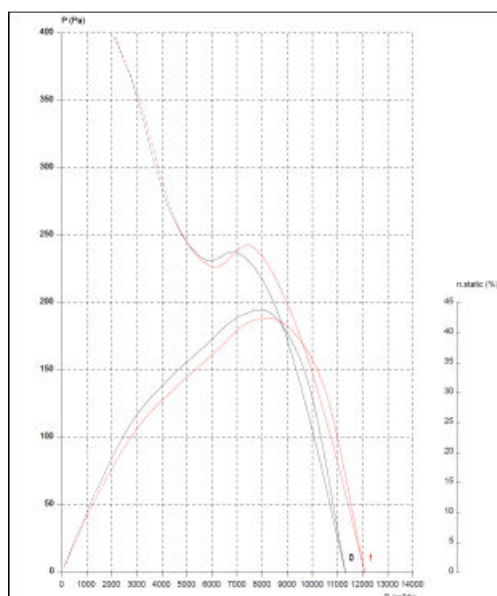
The argue behind the proposal is that 7% deviation from the declared value is the same as for ventilation units which are even more complex to test.

- Our Position:

The reason that the current verification tolerance is generous compared with the one used in the ventilation units regulation is not fair. Any change should be based on a deep and technical analysis, not only as a comparison from another Lot, which could be wrong. When considering the verification tolerances it must be analyzed holistically the uncertainties that affect not only the verification of a single unit but of all the production units in different productions.

We think that the current verification tolerance is too low to consider all the uncertainties involved in the manufacturing process of a fan: motor, impeller, inlet-ring, assembly, production stability, etc. Only the allowable average motor tolerances given in IEC 60034-1:2010 and EN 60034-1:2010 is 0,95. This tolerance has to be increased due to the manufacturing uncertainties of the rest of the components and assemblies. Therefore the verification tolerance given in the current Regulation (0,9) is already a challenging value considering reasonable manufacturing deviations.

As an example, the aerodynamic efficiency deviation in a typical axial fan when is manufactured with a tolerance pitch angle  $\pm 1^\circ$ , results in an aerodynamic efficiency deviation of 0,95:



Therefore motor efficiency deviation time aerodynamic manufacturing deviation ( $0.95 \cdot 0.95 = 0.90$ ) gives a though challenging tolerance as tip clearance, etc. is not considered in this example. Thus we ask for an amendment to the proposal discussion document 21<sup>st</sup> November 2014 by changing the proposed verification tolerance to 0,9 which is the current one.

Regards,

Roger Madorell

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