

Dual purpose smoke ventilation fans.

The UK, and most of the rest of Europe, has a market for dual purpose smoke ventilation units, which are used in two modes of operation:-

- 1) Day to day ventilation
- 2) Emergency smoke extraction.

They have been third party certified (at considerable expense) under EN12101-3 as a requirement of the Construction Products Regulation, as fulfilling both functions, and as such, the tip clearance for this fan type is greater than that of ambient temperature fans. The tip clearance has to be greater on dual purpose fans because of the material properties of the impeller and case at higher operating temperatures. The great majority of smoke extract fans employed in Europe are of this type.

Due to the increased tip clearance these fans cannot be as efficient as other ventilation fans and therefore Nuaire Limited (NAL) feel that they should not be judged in the same way. Figures 1 & 2 shows the affect of tip clearance on efficiency.

The difference in efficiency levels between 2013 and 2015 for this fan type is detailed below.

Fan Type	Measurement category	Dual purpose efficiency grade		Difference 2015-2013
		2013	2015	
Axial	A & C	26	35	9
Axial	B & D	40	53	13

Table 1. Summary of efficiency grades.

The maximum rise in motor efficiency between IE2 and IE3 is 2.5%,

Note that the influence of tip clearance is a fundamental characteristic of axial flow fan performance as shown. The efficiency is increased if the tip clearance is reduced but this reduction affects the life safety aspect of the product. The combination of reduced tip clearance and IE3 motor will not improve the efficiency of the product by 13%.

Additionally, this fan type is a life safety device which is today, incorporated system designs as a single unit; no provision will have been made at the design stage to have an ambient temperature fan **and** an emergency smoke ventilation fan.

This will mean that fans which are required for dual purpose operation will not be available throughout Europe after 1/01/2015 should these regulations remain unchanged.

Yours Sincerely

A. Breen

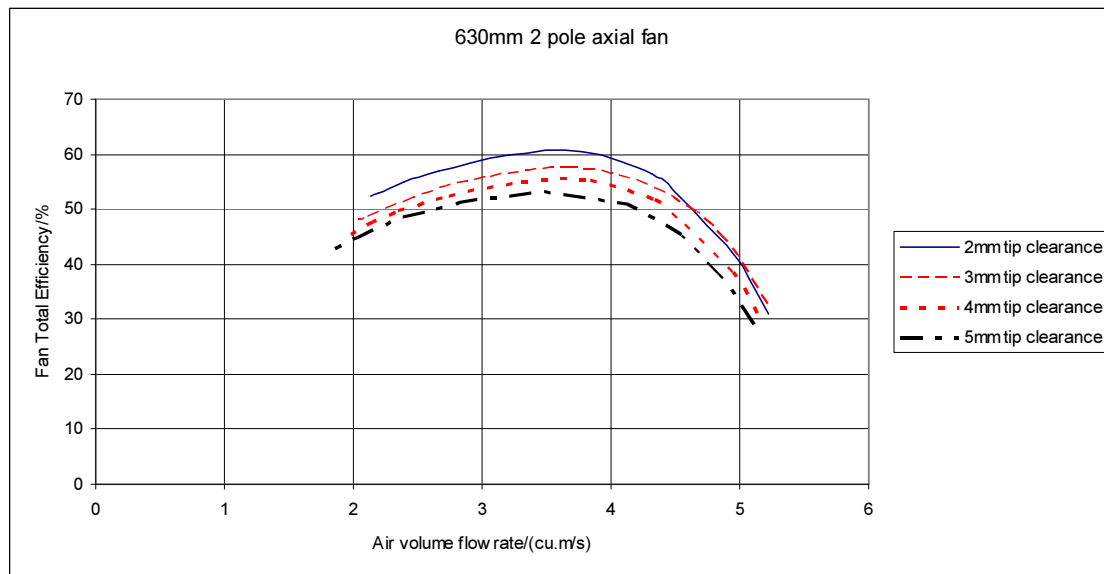


Figure 1. The affect of increased tip clearance on efficiency for a 630mm diameter fan.

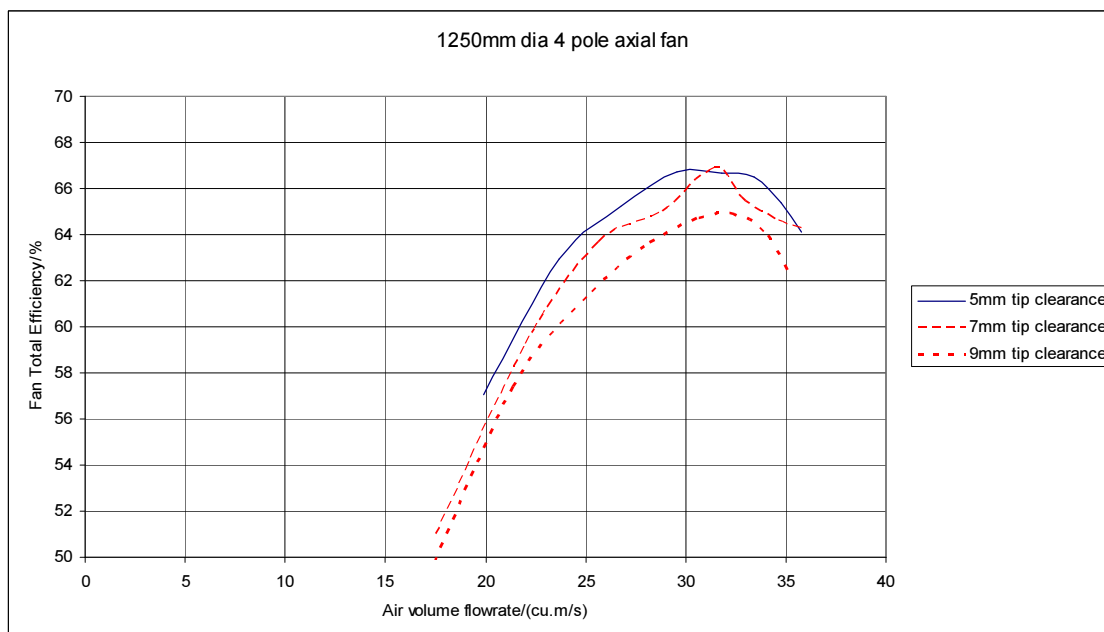


Figure 2. The affect of increased tip clearance on efficiency for a 1250mm diameter fan.

Note: Figures show fan efficiencies not overall efficiencies therefore motor and drive losses are not included.