ELTA
GROUP LIMITED

# REVISION OF FAN REGULATION 327/2011

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## MINIMUM EFFICIENCY LIMITS:

The original review study and the 1st Stakeholders meeting included categories for axial flow fans <300 Pa and >300 Pa so there is an acknowledgement that pressure affects the fan. The efficiency of a propeller fan, a tube-axial fan and a vane-axial fan are very different and to have one value covering all categories will be either too high for the low pressure fans or too low for the high pressure fans.

The variations in fans have evolved over many years to meet the requirements of the market in terms of fan type and pressure/volume characteristic. It is very difficult even with a good high efficiency axial impeller and the current range of commercially available motors to produce ErP 2015 compliant small axial flow fans of 500 mm / 1kW and smaller.

The effort to reduce the number of categories to one value regardless of fan type has the resultant consequence of introducing loop holes for the lower pressure/efficiency fans which form the bulk of the market requirements. Manufacturers are forced to withdraw product from the market or to declare ErP data for plate mounted fans without guard and Type A/C (static) ErP data for tube axial fans when the fan is often installed in Type B/D (total) applications.

The reduction in fan categories will result in the misapplication of an efficient fan operating far from its best efficiency point in order to comply with a pared down fan regulation. Logic dictates that more categories are required to cater for all the different fan categories in order to ensure that the final installation achieves the objective of reducing the overall energy usage.

## DUAL USE FANS:

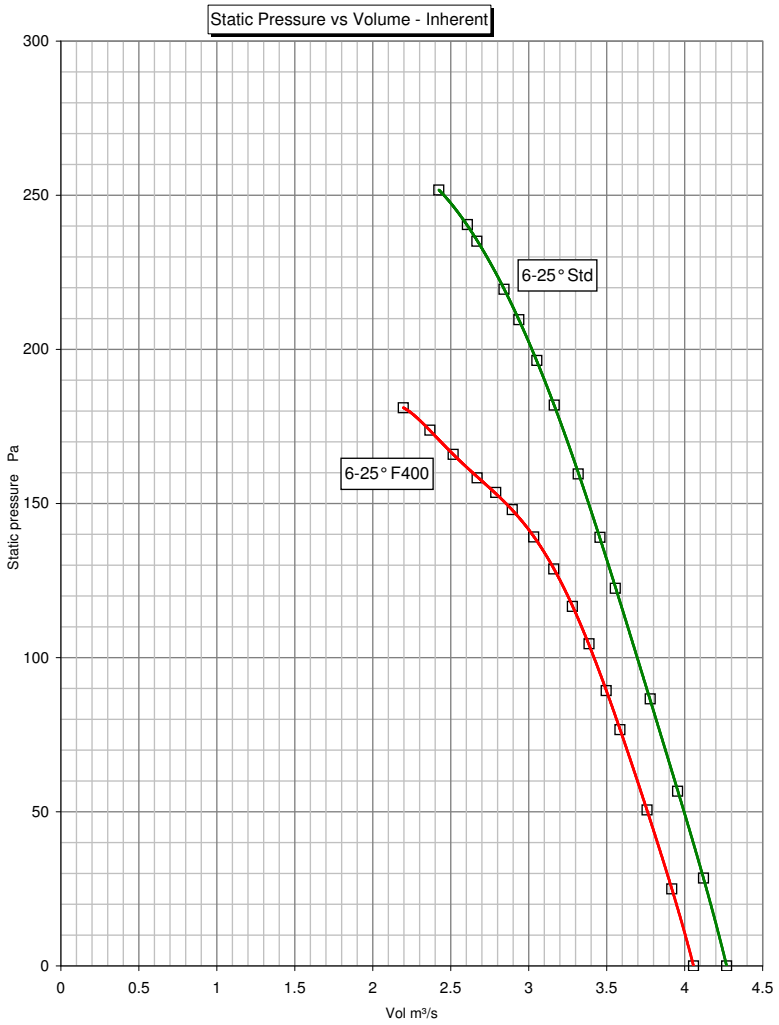
VHK proposal to continue applying only -5% (0.95 compensation factor) for dual use fans.

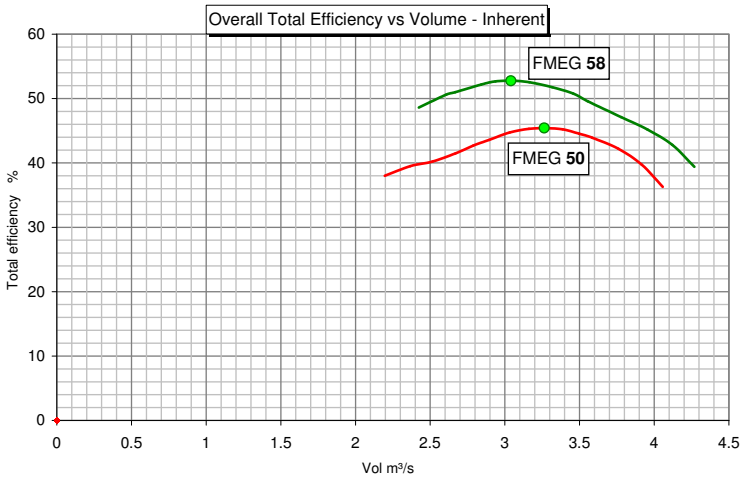
Dual use smoke ventilation fans are used for day to day ventilation as well as for once-off emergency operation in the event of a fire. Due to differential expansion rates of the aluminium impeller and the steel casing, increased impeller tip clearance is required to ensure that the fan continues to operate under emergency high temperature smoke extract conditions. Typical temperature/time ratings for
dual use smoke ventilation fans to EN 12101-3 are 400° Celsius for 120 minutes.

See attached data for a 630 diameter 4-pole fan with 6-blades (Fig 1) and 12-blades (Fig 2). This is taken as representative with the reduction in efficiency varying with size, motor speed and impeller blade solidity. The graphs are actual test data for a uni-directional fan tested first with standard tip clearance and then re-tested after cropping the impeller to F400 tip clearance. Dual use fans require a 0.85 factor to compensate for the increased tip clearance. Dual use fans are subject to independent third party testing and factory production control per EN 12101-3 at great expense to the fan manufacturer for life critical applications.

Reversible applications will require an additional 0.9 factor (i.e. 0.85 x 0.90 = 0.77) to allow for the non-aerodynamic blade profile required for the application.
If the proposed 0.95 compensation factor is applied, fan manufacturers will not be able to supply dual use smoke ventilation fans for many applications. This will create a loop hole as the manufacturers will supply the fans for emergency only application and the end-users will utilise the fans for dual use applications as there is no market surveillance.

Fan test performance graphs



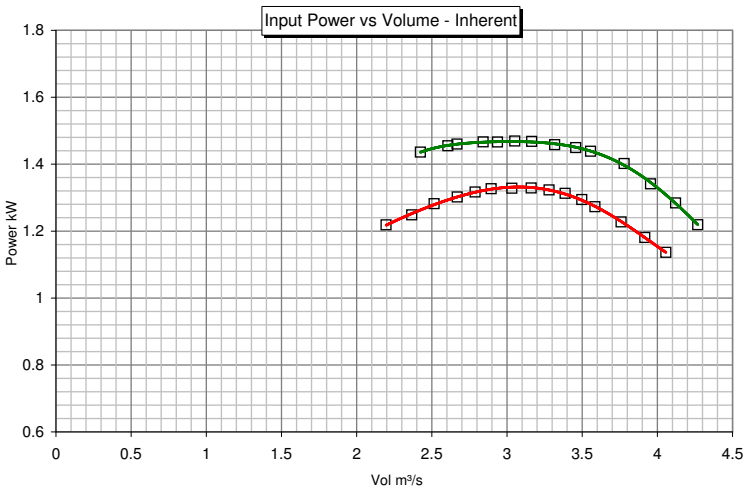
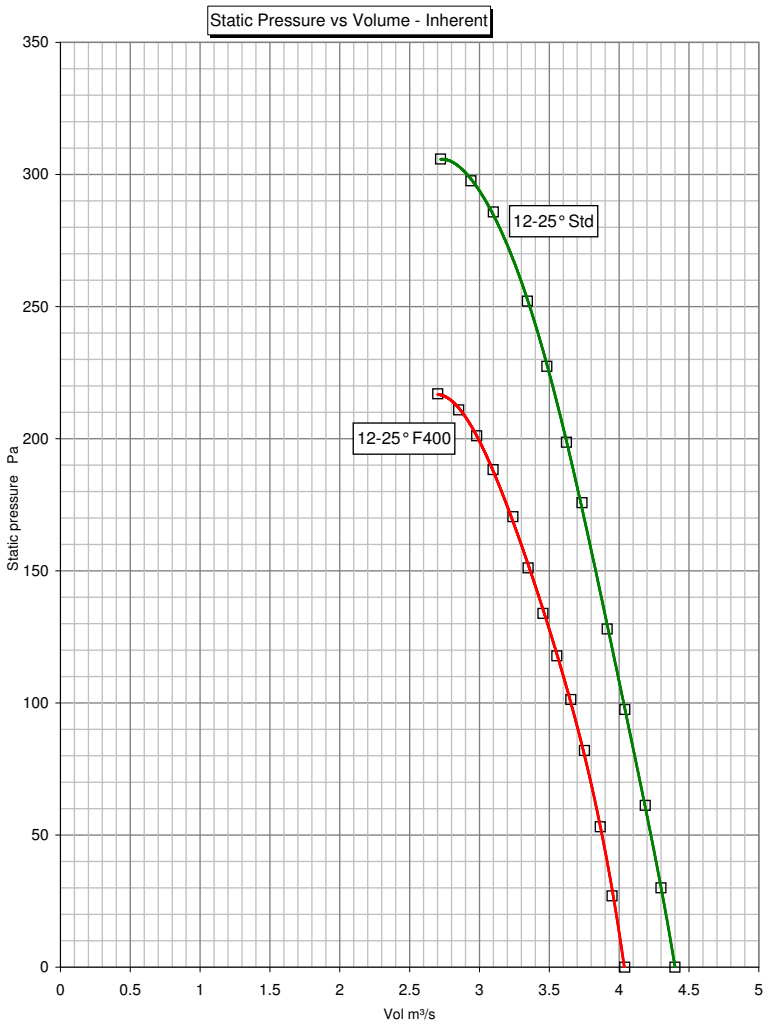
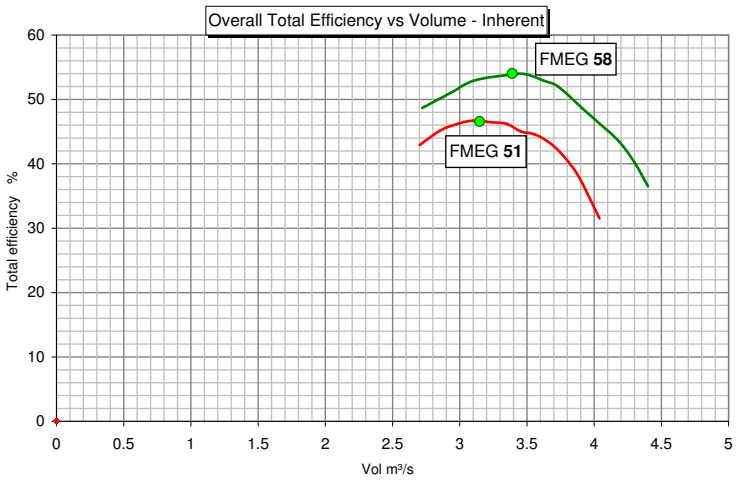




Fig 1.

Fan test performance graphs



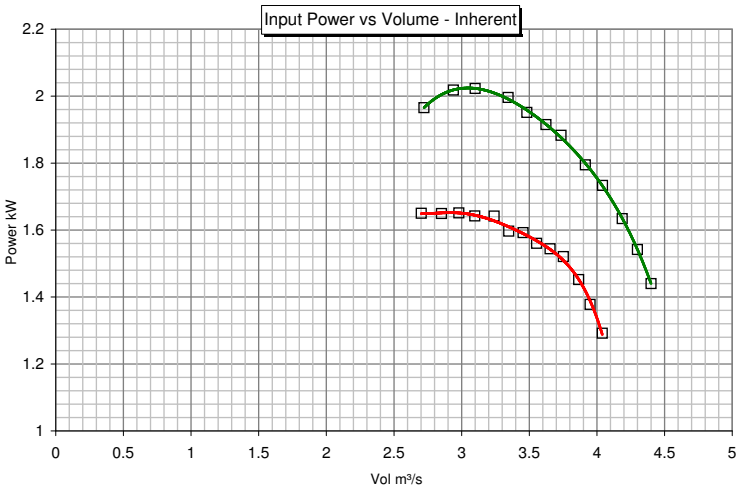




Fig 2.

## ATEX FANS:

VHK proposal to apply a -10% (0.9 compensation factor) for ATEX fans.

Consideration for ATEX fans to follow standard fans with a compensation factor can only be made once ATEX motors are aligned with standard motors in terms of efficiency and due consideration would have to be given to the restrictions in usage of VSD's for ATEX fans.

The physical construction of an ATEX fan (Fig 3) is very different to a standard fan. ATEX fans have increased impeller tip clearance, the reduction in internal casing diameter and turbulence effect of brass spark tacking, obstructive terminal boxes and cabling/conduit and heavier physical construction all of which obstruct the airflow and reduce the fan efficiency. A cumulative compensation factor of 0.9 will not be sufficient to cater for the special construction features required for an ATEX fan.

Fan manufacturers would require time to undertake test work to determine the effect on efficiency of the specific build requirements for ATEX fans and to propose an achievable compensation factor.

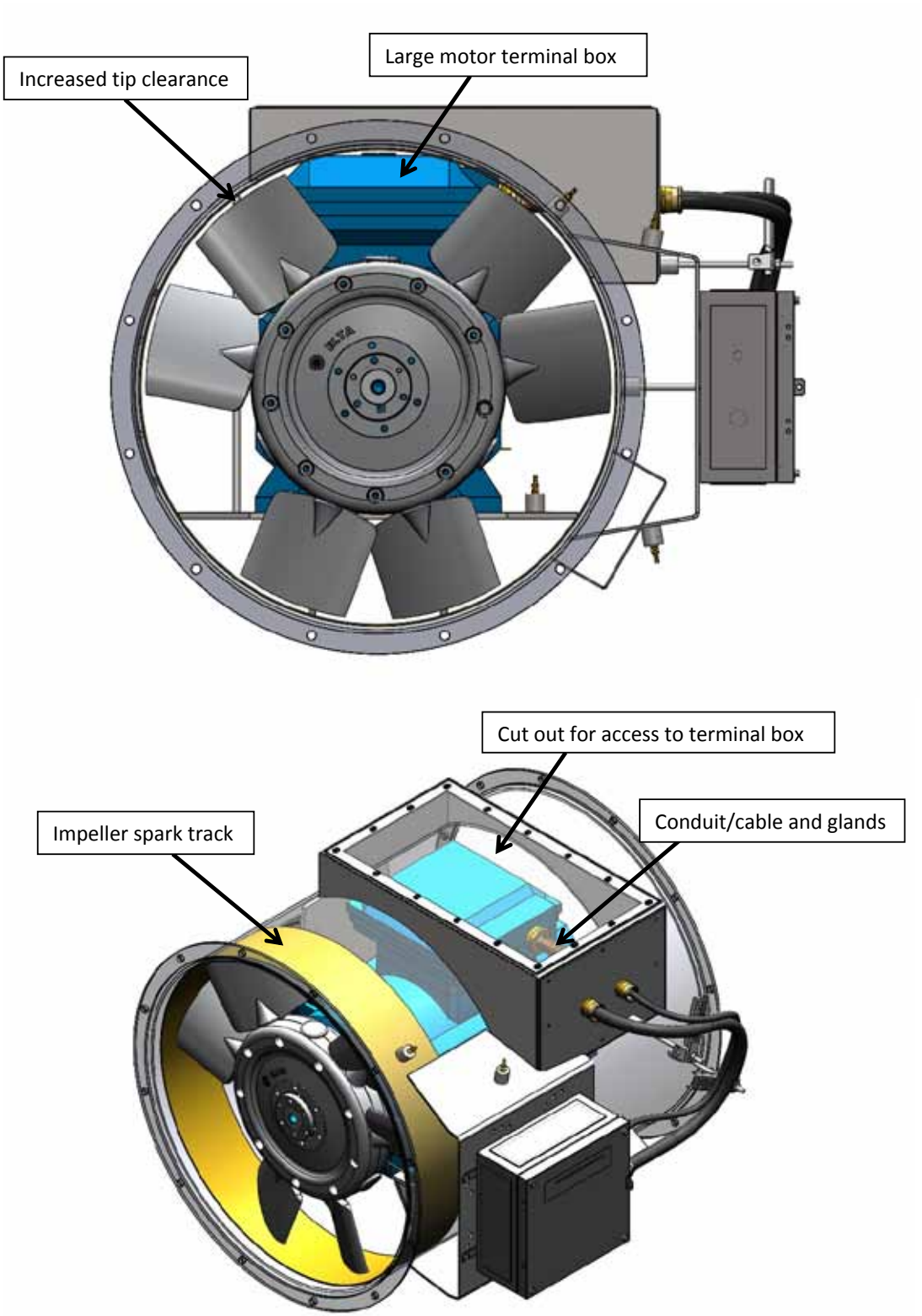

Increased tip clearance
Large motor terminal box
Cut out for access to terminal box
Impeller spark track
Conduit/cable and glands

Fig 3.