

SMOKE VENTILATION

Smoke is a bigger cause of injury and death to people, as well as damage to property, than the fire that causes it.

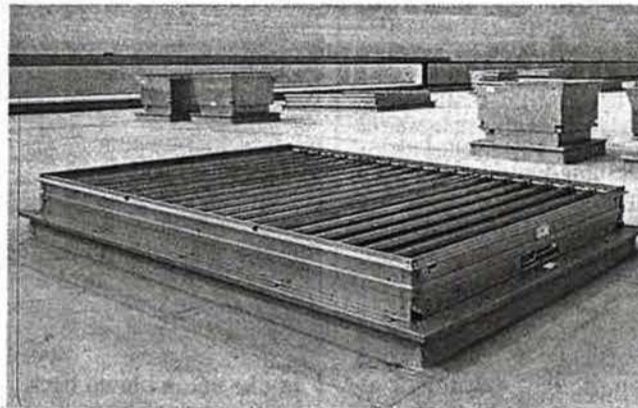
Effective smoke ventilation is an essential weapon in aiding escape from a building and minimising damage.

Clearing the smokescreen

As buildings become increasingly innovative, complex fire-engineering solutions are often the only way that adequate levels of safety, as required by the Building Regulations, can be achieved. But, says Charles Green, this also means specifiers taking greater care to ensure that the correct standards are applied to systems intended for life-safety use.

Although product manufacturers now bear a legal responsibility to ensure that their products are fit for purpose, buyers are well advised to continue exercising a degree of caution. This principle is particularly applicable to architects, consultants, contractors and building-services engineers who are, in effect, paid protectors of the interests of their clients.

Fire-protection systems tend to comprise a



Reliability is essential to ensure that smoke ventilators operate effectively if fire should break out - even after not having been operated for a lengthy period of time.

manufacturer has not lied, but neither has it supplied all the information for the specifier to reach a balanced conclusion whether the product actually meets the correct specifications. Another approach adopted by some manufacturers has been to have some tests completed on a product to the BS7346: Part 1 standard, and some tests done using other methods, but once again stating that the product has been tested to BS7346: Part 1.

Worrying

It is particularly worrying when the coefficient of discharge for the ventilator has been determined by test methods that differ from the established standard because, in some cases, very high coefficients of performance are being claimed which would not have been achieved if the product was tested correctly.

For example, louvred ventilators will have

coefficients of discharge of 0.6 to 0.7, figures which have been substantiated by tests both in the UK and Germany. Products which are claimed to have higher coefficients should, therefore, be viewed with considerable suspicion.

We have tested many competitors' products in our own laboratories, and, despite some of the more elaborate claims, have found that each type of ventilator has a very similar coefficient of discharge.

There is a tangible reason for specifiers to exercise caution when considering ventilators which claim an unrealistic coefficient of discharge. Smoke layers being calculated using unrealistic coefficients will, in fact, be much deeper than expected, because the ventilators will not exhaust at the rate anticipated. This, of course, could be extremely dangerous when the smoke-control scheme has been designed for life safety and to facilitate safe evacuation, because the smoke layer could be below head height.

We have also become

HT fans join Aerofoil range

The new JM HT (high temperature) Aerofoil fan range from Woods has been designed to meet the requirements of powered smoke ventilation systems.

The series offers five different temperature/time endurance categories and nine diameters from 315 to 1000 mm, and the fans comply with BS 7346 Part 2. All rotating impeller components are X-rayed to ensure soundness of castings essential for fans operating in fire-safety systems.

Jim Wild, fire safety application manager for Woods, says, 'The high performance standard JM Aerofoil range was designed with this as one

of the applications in mind, so the HT models share a high proportion of standard components.

For example, the standard JM aluminium impeller is designed to withstand the accelerated stresses created by hot smoke ventilation, without modification. Unlike the ferrous metal impellers used traditionally in smoke venting fans, it also provides much higher levels of energy efficiency in day-to-day running.

Many standard JM fan casings and mountings can also accommodate the higher specification motors required for HT applications without alteration. All JM models come in short-cased or long-cased configurations. **Reader Reply No. 101**

combination of passive and active protection measures.

Smoke-ventilation systems are usually put forward as part of a relaxation against extended travel distances or large compartment sizes. The objective of these systems is to maintain smoke-free conditions for escape, allowing occupants to leave the building safely, to assist with fire fighting and reduce damage to building and stock.

With such systems heavily reliant on the successful operation of all products within the system — from the smoke detectors to the smoke-extract units — reliability is essential to ensure effective operation in a fire situation, even after not having been operated for a lengthy period of time.

As with most fire-precaution methods, many years of research into fire and its effects have gone into developing design methods and performance standards for system components. As well as standards for fire testing, sprinklers and detection systems, there are also specific standards relating to the minimum requirements for smoke-exhaust ventilators, fans and smoke curtains. These requirements are based on the most up-to-date research and testing of component design and are given in BS7346 'Components for smoke and heat-control systems'.

The British Standard gives specific requirements relating to the performance of

ventilators throughout their life and during a fire condition. These requirements include construction, type of control, coefficient of performance, temperature responses, life-cycle testing, wind and snow loading and rain tests. The standard includes the necessary methods of testing and the needs for regular maintenance. With the failure of any part of a smoke-ventilation system potentially having serious results on the safety of occupants within a building, the standards available should clearly be considered as a minimum level of product compliance.

However, this is not always the case in practice, with the result that some manufacturers have been able to get away with not telling the whole truth about their products.

For example, an architect or consulting engineer may specify that a product should comply with BS7346: Part 1. There are, though, some less reputable manufacturers who will have their products tested against one or two of the individual performance standards, usually the heat tests, and then state in their promotional literature that the product has been 'tested to BS7346: Part 1'.

Regrettably, there have been instances where the unsuspecting specifier has taken this at face value, believing that the ventilator has been fully tested for all the performance criteria set down in the standard. The

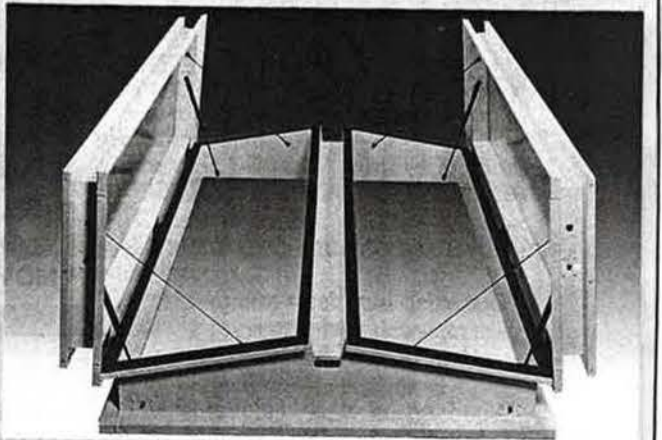
Making light work of fire safety

To combine the functions of smoke release and natural daylighting, McKenzie-Martin's Firemac ventilator is now available with the option of translucent lids.

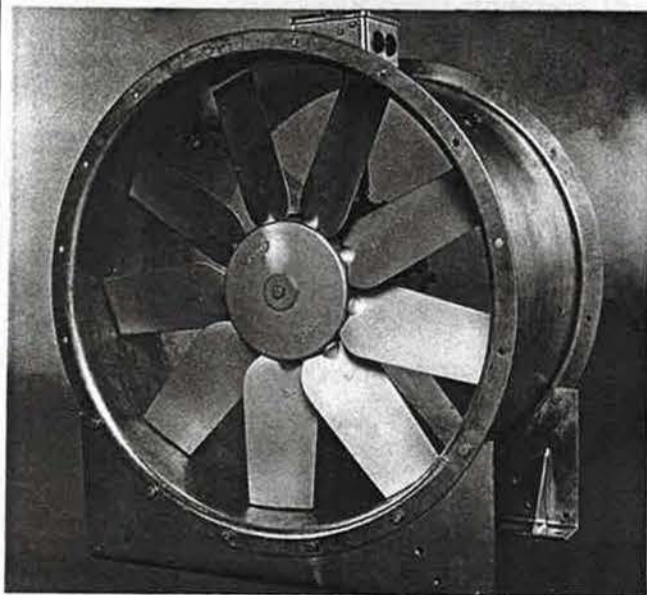
The lids are manufactured using triple-wall polycarbonate which offers high light transmission (82%) and weather resistance. Other features include high

thermal insulation, UV protection and impact strength for safety during any roof maintenance work.

The Firemac are offered with twin or single flaps. Various electrical and pneumatic controls operate the ventilators, which are designed to incorporate smoke or temperature rise detection devices so that the units will open automatically in a fire. **Reader Reply No. 102**



McKenzie-Martin's Firemac smoke release ventilator now has the option of translucent flaps to let in daylight.



The Woods' high-performance JM HT Aerofoil fan range is designed for powered smoke ventilation systems.

aware recently of a number of projects where, rather than using dedicated smoke-exhaust ventilators, a more cost-effective alternative comprising glazed windows with automatic openers has been put forward. These ventilators are often 'hybrid' designs, where components such as the opening mechanisms and window are supplied by different manufacturers claiming that the components meet the requirements of BS7346.

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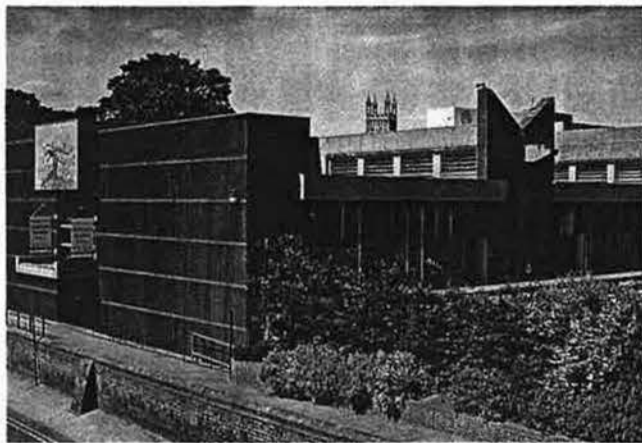
However, unless the ventilator has been tested as a whole, that is the window and controls together, it cannot be considered as complying with the standard.

When specifying equipment, designers must be aware of what is required of the equipment and ensure that the correct standards are applied in their entirety to systems intended for life-safety use. Our advice would be for specifiers to demand a 'certificate of conformity' from product manufacturers. This document would set out the performance criteria or requirement from the particular standard or specification, and would clearly state the results of any tests and whether the product complies with the requirements.

Manufacturers with nothing to hide should have no objection to such an initiative which, most importantly, would help the professionals to protect the clients and their own reputations. □



Charles Green is managing director of Colt International Ltd, New Lane, Havant, Hants PO9 2LY.



L & S Ventilation designed and built the smoke-ventilation system at Eastgate Market, Gloucester.

L & S Smoke vents for indoor market

L & S Ventilation has designed and built an innovative smoke-ventilation system for the Eastgate indoor market in Gloucester.

Thirty-two Open Sky ventilators were mounted vertically in banks of two on the roof, to provide an efficient all-weather smoke-vent system.

Inside the building, the area has been divided into two, with a powered smoke curtain installed to create two ventilation zones. In an emergency, the curtain automatically lowers to contain the

danger to one zone.

Wind sensors were installed on the roof to provide extra control. In very windy conditions, the sensors select the most appropriate ventilator bank to be opened, to eliminate the possibility of smoke being blown back inside the building. They also select other vents in the second zone to allow outside air into the building, enabling the smoke to be exhausted quickly and efficiently.

The system is controlled pneumatically.
Reader Reply No. 103

Colt's follow-on contract

Colt International has completed the installation of a smoke-ventilation system for the first phase of a document warehouse development for Her Majesty's Stationery Office (HMSO) and has also been awarded the second phase contract.

The warehouse, with an area of over 9000 m², is close to the HMSO's existing facility in Oldham. It has been fitted with a pneumatically-controlled smoke-ventilation system comprising more than 20 Colt Seefire ventilators and associated control systems.

A second HMSO building close by is to be a mirror image of the first. However, the specification

for the smoke-ventilation system has been changed from pneumatic control to Colt's recently launched OPV (one per vent) control system.

The OPV system, which effectively puts a computer into every ventilator, enables natural ventilators to be controlled efficiently both individually and as part of an integrated automatic scheme.

This system offers faster vent opening times, faster closing times in rain and 24-hour protection against mains failure. In addition, no compressor is required, which offers space advantages, and only a single-phase supply is needed.

Reader Reply No. 104



HMSO's new document warehouse in Oldham is protected by a Colt smoke-ventilation system.

Our finest performance at our finest price.

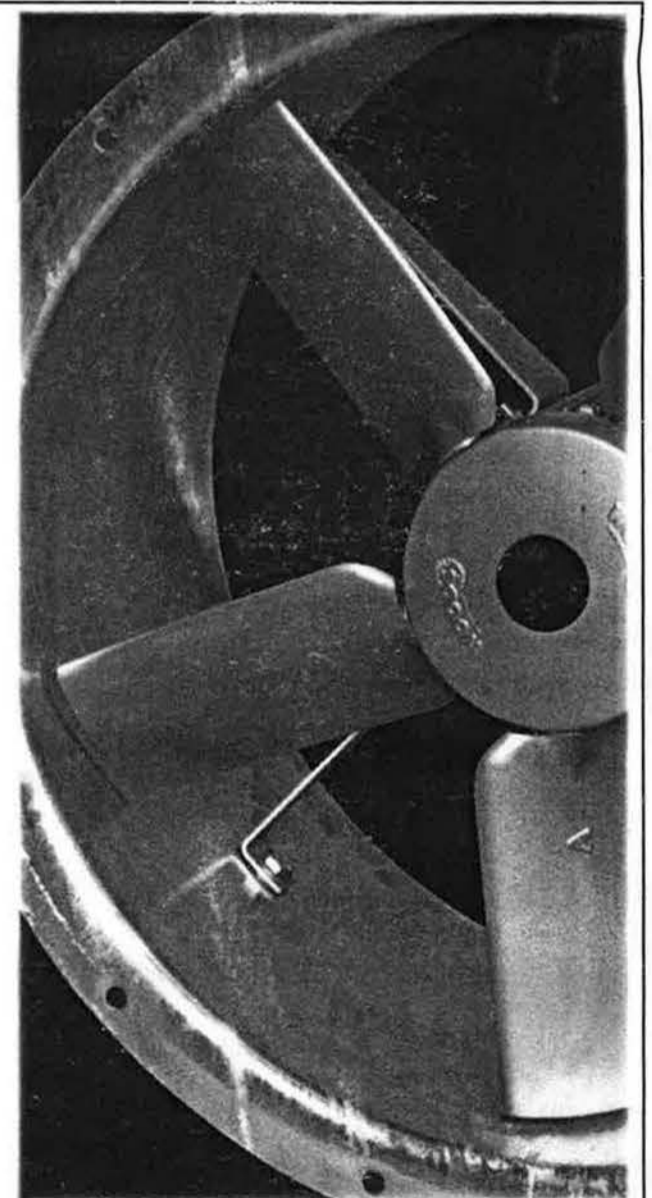
Our new JM Aerofoil range offers first class performance at a fine price, to any size business seeking quiet and energy saving ventilation. The new JM impeller has a unique new aerofoil section which provides lowest possible sound levels, higher pressure development and overall optimum performance.

Whether you're installing in a cafe, shop, office, garage or industrial unit the JM range of fans provides an easy to fit solution that won't break the bank. The new JM range is available now, so for your nearest stockist and for assistance with all your ventilation needs, contact our sales helpline on (01206) 44122.



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