

Smoke and Heat Ventilation Systems

RWAupdate



Preventative fire
protection

Legal aspects

Economic
aspects

Maintenance
and service

Maintenance of smoke and heat ventilation systems

ZVEI:

Specialist group
for electrically driven
smoke ventilation
and natural ventilation



Preface

Owners of buildings have a permanent duty to ensure that their buildings do not put public safety and order at risk, particularly with regard to life and health in case of fire, and this duty is in respect of both the users of the buildings and the legislator.

This duty is of particular importance for smoke and heat ventilation systems which are required to keep escape and rescue routes reasonably clear of smoke in the event of fire and ensure that the fire authorities can respond to the fire quickly.

Ensuring that smoke and heat ventilation systems are in a permanent state of readiness for operation is only possible if the technical components are regularly serviced by qualified persons.

Since it is often the case that the owners or operators of buildings do not have sufficient qualified personnel themselves, maintenance contracts provide one means of ensuring that both statutory duties and the duties of operators in relation to fire and property insurance can be fulfilled by having proper maintenance carried out.



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The fire protection chain

A large number of individual components, which vary largely depending on the use, type and location of the building, combine together to form a “fire protection chain”, the effectiveness of which is ultimately dependent on the weakest link. The failure of just a single link in the chain can have drastic consequences. It is therefore essential that all the links in the “fire protection chain” work together reliably without catching or breaking.

An important part of this “fire protection chain” is the smoke and heat ventilation system. It does not prevent fires directly and is not an extinguishing system either – but for saving lives and restricting damage to property and buildings a functioning smoke and heat ventilation system is indispensable.

Smoke and heat ventilation systems in the fire protection strategy

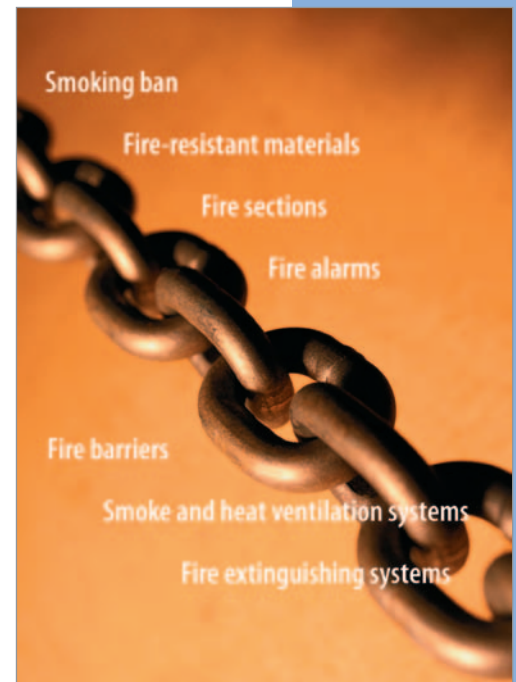
Reliable fire protection is a fundamental part of building safety. About 90 percent of the 600 fire victims in Germany each year are killed by smoke poisoning and suffocation. In addition, smoke and gases from fire account for about 6,000 serious injuries in Germany each year, with the victims often suffering health problems for the rest of their lives. This is because smoke, conflagration gases and heat, initially rising upwards, spread much faster than the fire itself. They have a massive influence on the people attempting to escape and on the development of the fire, its extinguishing and rescue efforts. Dense smoke often makes it impossible to find or move along escape routes and hinders efforts to fight the fire.

If smoke and heat are not removed quickly, secondary fires may develop; the result is a conflagration and under certain circumstances the ignition of explosive gases, the dreaded “flash-over”.

It is possible to curb these effects with the use of smoke and heat ventilation systems. They are an important component of fire protection strategies for buildings such as hospitals, high-rise buildings and every kind of public building in which people congregate in large numbers. Natural smoke and heat ventilation systems reliably remove the smoke, using the principle of thermal lift, either through manually or automatically opened windows, dome lights or similar. The precondition for preventative fire protection is that all the components in the fire protection strategy work together reliably and without a hitch.

Summary:

It only takes a single part of the fire protection strategy to be either missing or to fail for the fire protection system as a whole to be rendered ineffective.





Duties of the owner

The owner/operator of a smoke and heat ventilation system is duty-bound to take all necessary safety precautions to prevent the risk of danger to people and property in their building. By ensuring that the smoke and heat ventilation system is regularly maintained and kept in proper working order, he considerably reduces the risk of harm and damage and also his third party liability risk in the event of an incident. He must be able to provide documentation at all times to verify that he has met his duty to maintain the smoke and heat ventilation system in an operational and functional state. Maintenance work should only be undertaken by qualified specialist firms, e.g. smoke and heat ventilation systems with ZVEI certification.



Maintenance fundamentals in accordance with DIN 31051

According to the aforementioned standard, maintenance refers to measures taken to maintain and restore the required state of technical systems and measures taken to determine and assess the actual state of such systems.

Determination and assessment of the actual state:	Measures for delaying the diminution of the available useful life contingency:	Measures for returning a unit under consideration to proper working order:	Combination of all measures to increase the functional reliability of a unit under consideration without changing the required function:
Measure Test/inspect Count Operate Document Analyse	Readjust Clean Replace Operate Log	Repair Set Replace Operate Log	Planning Preventative measures Approval Implementation Test/inspect Documentation

Standards and legislation (selection)

1. German Basic Law (Grundgesetz [GG]), Article 2:

Everybody has the right to physical integrity.

2. Standard Building Regulations (Musterbauordnung [MBO]), Section 3 (1) and 14:

Physical structures shall be arranged, constructed, altered and maintained in a manner conducive to preventing the outbreak and spread of fires and smoke (spread of fire), and, in the event of fire, to facilitate the rescue of people and animals and effective firefighting.

3. DIN 18232 Smoke and heat control systems - Part 2 Natural smoke and heat ventilation systems

10.2 Maintenance

At regular intervals, normally once a year, and in accordance with the manufacturer's specifications, natural smoke ventilation systems and their actuation and control elements, opening units, energy supply lines and accessories must be checked, maintained and, if necessary, repaired, to make sure





they are in proper working order and ready for use. Maintenance work may only be carried out by specialist firms (e.g. ZVEI-certified installers) which have approval for the smoke ventilation system. The owner must also carry out at least one visual inspection between each of these maintenance intervals, and this is to be documented in an inspection booklet. NOTE: At establishments which are susceptible to particularly heavy amounts of dirt or dust, the maintenance intervals should be reduced accordingly. Non-repairable and replacement parts may only be replaced by original parts. All inspections and maintenance work must be entered in the inspection booklet.

4. Warranty extension in accordance with the German Contract Procedures for Building Works (Ver-gabe- und Vertragsordnung für Bauvorgabe):

Here the legislator provides explicit confirmation of the importance of maintenance for safety devices with moving parts.

5. Regulations of the German federal states (inspection regulations) on the monitoring of technical equipment in buildings:

In addition to regular annual maintenance, smoke and heat ventilation systems in special types of buildings, e.g. commercial establishments, places of assembly, and large-scale garages, have to be inspected every three years by a certified expert consultant/specialist in building law. Regular main-tenance is a key precondition for these statutory inspections. The maintenance firm generally takes over the owner's duty to provide suitably qualified personnel for the inspection of the systems to be carried out by the expert consultant.

6. Liability:

In addition, if the owner fails to have maintenance carried out and a fire occurs he will be liable, under civil law, for compensation for damages to any person incurring injuries from smoke, which may therefore mean the costs associated with medical treatment, a lifelong pension because of reduced earning capacity, bodily injury caused by negligence, or involuntary manslaughter.

Insurance legislation (selection)

1. VdS CEA Guidelines 4020:

Insurance companies set out requirements which are based on and are similar to the aforementioned standards, and these are described in VdS CEA Guidelines 4020 as follows: "At regular intervals ... , but no less than once a year, ...the smoke and heat ventilation systems must be serviced and, if necessary, repaired in accordance with the specifications of the installer."



2. General conditions for insurance against fire in Germany (Allgemeine Bedingungen für die Feuer-versicherung [AFB]):

Section 7 of the AFB stipulates that the insurance policyholder must comply with all statutory, official and any other agreed regulations. If the policyholder violates this obligation, in this instance the maintenance of smoke and heat ventilation systems, the insurer is entitled in accordance with Section 6 (1) and (2) to cancel the contract or to refuse performance.





Commercial considerations

Fire damage can be assumed to be one of the worst kind of accident that can happen to an industrial building or indeed any building. In addition to lost production or rental income it is also necessary to account for the enormous costs of clearing up, increased customer care, logistics management, etc. At the same time the ongoing costs of personnel, vehicle fleet, etc., will not have stopped either, so it is by no means inconceivable that what was a flourishing company one day can run into serious cashflow literally overnight. The overall worth of a one-off investment in a fire protection system can only be appreciated if it is regularly serviced by a specialist firm. If regular maintenance is not carried out, the inevitable consequences of system failure are associated with enormous costs for the time-consuming work of repair and replacement. A maintenance contract ensures that the ongoing costs for the maintenance of the fire protection systems are kept within manageable limits.



Wider economic considerations

Fire damage is not just a problem for the affected property but for the economy as a whole and for our environment. The costs in the Federal Republic of Germany alone are in the region of several billion Euro every year. Many top-name companies simply cease trading after a fire, because of their inability to continue deliveries following the fire and their failure to win back lost customers. The loss of jobs at the affected company and even among its customer and suppliers are further problems.





Who is permitted to carry out maintenance work?

To be permitted to carry out maintenance work on smoke and heat ventilation systems, the following points must be met:

- The specialist capabilities of the maintenance firm and the staff it deploys must be validated by a certificate.
- Supply of original spare parts must be guaranteed.
- Authorization from the manufacturer of the system may be required.
- For electrical smoke and heat ventilation systems, presentation of an electrician's certificate in accordance with DIN VDE 1000, Part 10, is required.

Selection of a maintenance firm

Selecting a competent maintenance firm for smoke and heat ventilation systems is not an easy task for the owner. The following important criteria should be taken into consideration:

- The company should be located close to the property requiring maintenance.
- The maintenance technicians must receive regular training.
- The maintenance firm must be a certified installer from the “Specialist group of installers for safety systems (ZVEI)”.
- The maintenance work must be carried out on the basis of system-specific checklists.
- Smoke and heat ventilation system logbooks must be kept.
- The maintenance firm must have adequate third party liability insurance.
- In the case of VdS (German Association of Property Insurers) stairwell smoke and heat ventilation systems, evidence of installer certification in accordance with VdS 2222 must be presented.

Binding obligations because of a maintenance contract?

Advantages of a maintenance contract:

- Maintenance never gets forgotten
- Relieved of carrying out checks yourself
- Validation for authorities, insurers, etc.
- Manageable costs
- Help in an emergency (fault/failure)

Disadvantages:

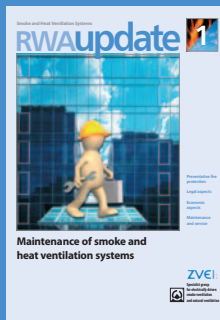
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Your contact

The member firms of the “Specialist group for electrically driven smoke ventilation and natural ventilation” of the ZVEI and the certified installers in the “Specialist group of installers for safety systems (ZVEI)” are specialist firms who meet all the aforementioned criteria for the maintenance of smoke and heat ventilation systems. Contact one of these firms with the confidence that you are in safe hands. This will guarantee that your system is properly maintained and retains its value. You will find your specialist ZVEI firm at: www.ZVEI.org/sicherheitssysteme or www.ZVEI-errichter.de



More publications are available
from your specialist ZVEI firm or
direct from the ZVEI.



All publications are also available in German.

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