MECHANICAL SMOKE EXTRACT IN SHOPPING MALLS

Mechanical smoke extract systems are mandatory in special structures such as shopping malls, which are highly complex buildings that experience high footfall. Most fatalities in a fire occur due to smoke inhalation. And this is precisely why smoke control plays a critical role in ensuring personal safety. Because they are essential for self rescue, external rescue, firefighting and protection against loss of property, mechanical smoke extract systems are a sensible solution and, ultimately, the safest option for everyone involved.

Smoke extract by creating layers.
This approach uses aerodynamics to create two separate horizontal layers:

• a layer of smoke near the ceiling
• a layer of fairly clean air near the ground so that people are able to pass and exit the building safely

In the event of a fire, the buoyancy of the smoke drives contaminants and soot particles upwards to the ceiling area of the fire compartment. In the process the updraught induces air, which results in a higher flow rate of the hot fire gas.

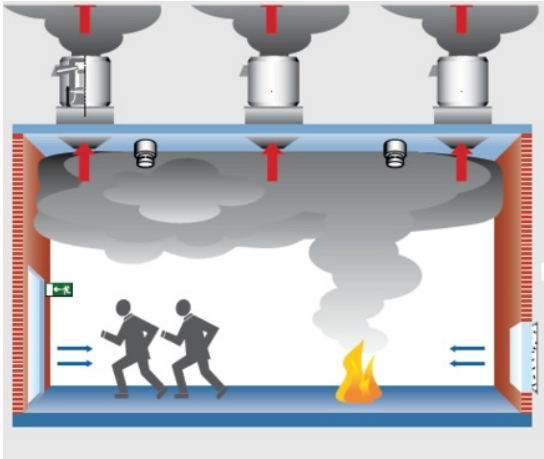
The mass flow of hot fire gas extracted near the ceiling is replaced by a lowvelocity fresh air supply near the ground. There has to be a balance between the incoming fresh air and the outgoing hot fire gases so that the life saving layer of clean air is maintained.

The intake of additional supply air on one hand and the air extract on the other hand result in a pressure drop. This pressure drop is countered by smoke exhaust fans so that the volume flow rate setpoint is achieved and the hot fire gases can be safely removed from the fire compartment.

In spaces that are larger than 200 m², the clean air layer near the floor should be at least 2.5 m high. The calculation basis for determining volume flow rates and temperatures when sizing mechanical smoke and heat exhaust systems is specified in DIN 18232-5. It applies to internal spaces of 400 to 1,600 m² with a height of at least 3 m.

Smoke extract by dilution.
For spaces where a clean air layer for safe evacuation and firefighting is not a priority, smoke dilution can be applied. Due to the high degree of mixing, however, the space will not be

completely free from smoke. Dilution can also be used to prevent the spontaneous combustion of partial combustion products and unburnt pyrolysis products (backdraught with potential subsequent flash over).



SMOKE EXTRACT BY CREATING LAYERS:

Smoke detectors are installed throughout the space and are automatically activated in the event of a fire. As a consequence, the supply air inlets open and the fans begin to exhaust the preset volume flow.

X-FANS SMOKE EXHAUST FANS

are available for 200 °C, 300 °C, 400 °C and 600 °C.

X-FANS SMOKE EXHAUST FANS FOR ROOF INSTALLATION

are available in various designs and for a wide range of temperatures. They are used for the central or decentralised smoke extract in production facilities and in retail and assembly spaces.