TROX® TECHNIK
The art of handling air

PRESSURISATION SYSTEMS IN STAIRWELLS

For stairwells in taller shopping malls, keeping escape and rescue routes free from smoke is an essential requirement for maintaining viable evacuation and firefighting options, even over longer periods of time.

Stairwell pressurisation and purging systems.
There are various different systems and strategies available to meet the safety objective of keeping escape and rescue routes, and especially stairwells, free from smoke. Depending on the fire protection strategy, different safety objectives may be defined to prevent smoke logging. While some smoke may be acceptable for some areas, others will have to be completely free from smoke, depending on the type and usage of a building.

If it is not essential to keep a space completely free from smoke, a purging system with pressure control is suitable. This allows stairwells to remain mostly free from smoke. A pressure control unit is installed in combination with a roof light dome, e.g. at the top of a stairwell. When a smoke detector detects a fire in the building, the dome opens and the fan is activated. The pressure control unit creates a minimum closed-door pressure of 15 Pa. The maximum dooropening force must not exceed 100 N. Smoke entering the stairwell is diluted and purged. Keeping a stairwell in this case almost free from smoke is possible as long as the doors to the stairwell are not opened frequently.

If a space should be totally cleared, a pressurisation system is used to extract the smoke. This approach ensures that 2 m3/s flow through the open door and that the stairwell is kept free from smoke. The door-opening force for this system type must also not exceed 100 N. Smoke-free escape routes allow occupants to move to safety, and firefighters to get in and attack the fire.

Pressurisation and purging systems should comply with the following standards and guidelines:

DIN 12101-6:2005 Specification for pressure differential systems, Kits
MHHR 2008 – Guideline for high-rise buildings
VDMA code of good practice no. 24188 – 2011
User guidelines for pressurisation systems – 2011

Positive pressure smoke control:
Maintaining positive pressure keeps stairwells free from smoke.

Components of a pressurisation system:

- Push button fire alarm
- Supply air fan
- Multileaf smoke protection dampers
- Pressure control dampers
- Pressurisation system control
- Ventilation grilles