Natural Smoke and Heat Exhaust Ventilation Systems
Why extraction systems are necessary

Most victims of fires are killed not by the fire itself, but by the smoke. The smoke created by a fire can fill whole rooms and areas of buildings within minutes and quickly becomes a death trap. Not only do people in these situations suffer from serious smoke inhalation, but the smoke also greatly reduces visibility, making it more difficult for them to escape from the danger zone in time. On top of the loss of orientation caused by the lack of visibility comes the impairment of the senses caused by toxic fumes.

In order to prevent this, natural smoke and heat exhaust ventilation systems channel the smoke through the roof of the building before it can cool down and sink back down to the floor. The resulting smoke-free zone provides not only the air essential to allow people to breathe, but also makes it possible for them to get their bearings and helps to avoid panic. Moreover, it is thus easier for the fire brigade to quickly localise and extinguish the source of the fire.
Tested and certified systems

As natural smoke and heat exhaust ventilation systems (NSHEVs) are intended to save lives in emergency situations, there can be no compromises with regard to their operational reliability. E.M.B. Products AG supplies high-quality certified smoke and heat ventilation systems that are guaranteed to be in good working order even after many years of use. When it comes to important requirements such as their reliability under high wind or snow loads, our systems, which thanks to their high quality can also be employed for everyday ventilation, set new standards.

All of our NSHEV systems comply with DIN EN 12101-2 and VdS 2159.

Our NSHEV-systems are tested and certified for:

- Functional reliability up to Re 1000 (VdS approval min. Re 50)
- Functional reliability at wind loads up to WL 3000* (VdS approval min. 1500 N/m²)
- Functional reliability at snow loads up to SL 1500* (VdS approval min. 500 N/m²)
- Functional reliability at low ambient temperatures down to T(-15)* (VdS approval min. -5°C)
- Sound insulation levels according to our specifications
- Functional reliability up to heat-exposure rating of B 300-E (300 °C / fire-resistance rating E)
- Tested by the Material Testing Authorities of North Rhine-Westphalia*
- Tested by other independent testing institutes*
- Approved by VdS*

* depending on system size and model

NSHEV systems are also tested for:

- Correct operation during fatigue testing (10,000 opening cycles)
- Aerodynamically efficient opening surface
- Corrosion and aging resistance
**Smoke and heat extraction systems by roda**

We attach great importance to the high quality of all our products. All our smoke and heat extraction systems can also be used for everyday ventilation and stand out due to the following characteristics:

- Individually adaptable to all types of buildings
- Energy-saving natural lighting, which is glare-free when using opal polycarbonate or Lumira™-filled panels (light incidence from above is five times more effective than through side windows)
- All consoles are produced from high-strength castings
- Hail-and fall-through-proof depending on the specification
- Powder coating allows for individual choice of colours
- Plinth mounting using tension locks – no drill holes needed
- Flaps with fire-resistance rating A1 (depending on the specification)
- Low maintenance
- The products contain no harmful materials and can be recycled

Depending on the location and the requirements, the most suitable version can be chosen with regard to:

- Size
- Plinth mounting (EUROZARGE (frame) / EUROSOCKEL (plinth))
- Flange version

In the event of fire, all NSHEVs with pneumatic drives open:

- Automatically via a thermal priority valve connected to a CO₂ cartridge
- Via an emergency fire control unit with a CO₂ cartridge
- Via a fire alarm control unit triggered by smoke detectors or actuator buttons (optional)

In the event of fire a smoke-and-heat-extraction-system control cabinet with backup batteries actuates the 24 V versions with servomotors:

- Via smoke detectors or actuator buttons (optional)
- Via an intermediate fire alarm control unit (optional)

Triggering for everyday ventilation via the building’s compressed-air network, a ventilation control cabinet (pneumatic control), or a smoke-and-heat-extraction-system control cabinet (24 V servomotors):

- Ventilation control cabinet
- Actuator buttons
- Timer for night cooling (optional)
- Wind and rain sensors for protection against bad weather (optional)

Illustration: MULTIJET and EUROLIGHT mounted together on the ridge of a gable roof.
PHOENIX

In addition to its function as a natural heat and smoke extractor, the PHOENIX can be used for everyday ventilation; even coping with extreme weather conditions. On customers request the PHOENIX is available in insulated or non-insulated versions, or in the 33 version as a thermally separated system. The top flaps can be fitted with a choice of either 16 mm multwall polycarbonate panels or an aluminium sandwich structure. Depending on the top flap infill, sound absorption levels of up to 33 dB RW are possible.

Depending on the design, the top flaps open via compressed air cylinders with end-position locking at both ends or via electric servomotors. Weather tightness is achieved by means of EPDM profile seals. On request, the PHOENIX can be supplied with fall-through-safety grids, thus helping to guarantee the required fall-through protection. The system modules are pre-assembled and tested ready for operation.

Advantages:
• Flexible sizing makes the system ideal for use on flat roofs for all roof openings up to 2.5 x 3 m²
• Suitable for everyday ventilation (full ventilation at 90° vent position)
• Endurance tests with 10,000 opening cycles have confirmed the robust, functional design and the high quality of the materials used
• The thermally separated version reduces condensation problems
• Good aerodynamic efficiency
• Good U-value and low joint leakage
• Available with opaque flaps
• Efficient drainage of rainwater via central drainage channels
• Maintenance-free hinges are aluminium castings with Teflon-coated bronze bushes and stainless steel shafts
• Easy mounting in all roof and wall constructions up to a 90° angle

The PHOENIX comply with DIN EN 12101-2 and VdS 2159 (depending on the specification).

In addition, the pneumatically controlled PX1 and PX2 units have been tested for explosion protection (ATEX) according to the EU Directive 94/9/EC with reference to EN 1127-1, EN13463-1 and EN 13463-5 (depending on system size and model). The EC declaration of conformity for the product and the explosion proofing are delivered with the product.

Field of application:
• Flat roofs
• Northlight roofs
• Skylight systems
• Gable roof skylight systems

Illustration: A PHOENIX NSHEV unit on a large warehouse in Meco, Spain.
PHOENIX

Versions:

- PX1G – Single-flap in an opening or a non-opening version (only for skylights/Northlight roofs)
- PX2D – Double flap in opening or non-opening versions
- PX2MKII – Double-flap version with short cylinders

Design characteristics:

The unit is made of AlMg3 aluminium alloy with single- or double-skin insulation. In the 33 version the thermal separation is achieved by using rolled-in polyamide bars for both the top flaps and the base. The heat loss is reduced to a minimum by EPDM seals. The maintenance-free pivot points on the cylinders or servomotors are made up of Teflon-coated bronze bushings with stainless-steel pins. Mounting on the plinth is by means of tension locks or screw connections with sealing washers.

Top flap versions:

- PC – Clear or opal 16 mm polycarbonate panels (on request with LumiraTM insulation)
- A1 – Single-skin aluminium version
- A2 – Double-skin aluminium version (insulated)

The top-flap frames are made of aluminium alloy (AlMgSi05). They are inclined at 6° to the horizontal. The top flaps are attached using three hinges with carriage bolts. All versions are available up to the maximum frame size.

Sizes:

The systems are made to order and can be produced in all lengths and widths up to 2,500 x 3,000 mm.
MEGAPHOENIX

The multifunction ventilator MEGAPHOENIX extracts natural warm air via two independently working pairs of double flaps. Rainproof ventilation is achieved via pneumatically or electrically controlled lateral flaps. The top flaps are controlled by pneumatic cylinders with end-position locking and a remote unlocking system or by electric motors. An automatic (independent from any other control system) thermal release mechanism is integrated to open the top flaps in the event of a fire. The aerodynamically formed top flaps and the inner side flaps are equipped with rubber seals.

The MEGAPHOENIX complies with DIN EN 12101-2 and VdS 2159 (depending on the specification). The EC declaration of conformity is delivered with the product.

Field of application:
- Flat roofs
- Arched skylights
- Northlight roofs

Top flap versions:
The top-flap models available for the PHOENIX version are also available for the MEGAPHOENIX.

Sizes:
The MEGAPHOENIX can be produced in all lengths and widths up to 1,900 x 3,000 mm.
The FIREFIGHTER natural smoke and heat exhaust ventilation system meets the standards of preventive fire protection according to EN 12101-2 and VdS 2159. The ventilator meets very high standards regarding stability and sound insulation. The unit base and top-flap construction is made of AlMgSi05F22 with integrated thermal separation. There are three flap versions available: aluminium sandwich sheets, insulated glass or polycarbonate. The versions A33 / G33 are thermally broken according to DIN 4108.

Equipped with weatherproof profiled seals between the unit base frame and the top flaps, the units are manufactured with an integrated rainwater drainage system. For higher safety standards the base frames and the top flaps are manufactured from non-combustible materials according to DIN 4102. If required, the FIREFIGHTER can be delivered with fall-through-safety grids to guarantee the required fall-through protection. The units are tested and delivered ready for use.

Advantages:
• Flexible sizing makes the system ideal for use on flat roofs for all roof openings up to 4.75 m² (Duo version) or 3.75 m² (Delta version)
• Suitable for everyday ventilation (full ventilation at 90° vent position)
• High sound absorption characteristics up to 56 dB
• Thermal separation in accordance with DIN 4108 (depending on the specification)
• Endurance tests with 10,000 opening and closing cycles have confirmed the robust design and high quality of the materials used.
• Good aerodynamic efficiency
• Good U-value and low joint leakage
• Available with opaque flaps
• Maintenance-free hinges made of cast aluminium parts with Teflon-coated bronze bushes and stainless steel shafts
• Efficient drainage of rainwater via central drainage channels

The FIREFIGHTER complies with DIN EN 12101-2 and VdS 2159 (depending on the specification). The EC declaration of conformity is delivered with the product.

Field of application:
• Flat roof
• Gable roof
• Pent roof
• Pent-roof skylight
• Gable-roof skylight
• Northlight roof

Illustration: FIREFIGHTER installed on a glass atrium.
The FIREIGHTER DUO with horizontal top-flaps is available in two models: model 22 (no thermal separation) or model 33 (thermally separated). The FIREIGHTER DELTA with inclined top flaps at a 30° angle is only available in the thermally separated version.

Top-flap versions for model 22:
- 16 mm multiwall polycarbonate panels, clear (Lumira™ insulation on request) or opal
- any safety glass and glass for special requirements on request (fire-resistance rating A1)
- A2 – double-skin aluminium (50 mm insulated)

Top-flap versions for model 33:
- 16 mm multiwall polycarbonate panel, clear (Lumira™ insulation on request) or opal
- any safety glass and glass for special requirements on request (fire-resistance rating A1)
- A2 double-skin aluminium (50 mm or 70 mm insulation)

Design characteristics:
The maintenance-free pneumatic cylinders lock in the open and closed position to withstand pressures > 500 N/m² and suction forces >1500 N/m². In the event of a fire, on reaching a temperature of 68 °C, the thermal priority valve is activated via a CO₂ cartridge and the pneumatic cylinders open the top flaps. Alternatively, the top flaps can be opened by electric motors. The system can be remotely activated by a central control system. The equipment is delivered on site, preassembled and quality tested by the manufacturer, ready for installation. The construction is connected to the metal mounting frame with burglarproof tension locks. All pivot points are equipped with (maintenance free) Teflon-coated bronze bushes and stainless steel shafts.

Sizes:
As the FIREIGHTER systems are made to order, they can be produced in all lengths and widths up to 1,900 x 2,500 mm (Duo version) and 1,500 x 2,500 mm (Delta version).
MEGASTAR

The MEGASTAR is a multifunction ventilator for natural ventilation, all-weather ventilation, smoke extraction, and natural daylight lighting. In the event of rain, the top flaps close and the inside flaps open. The MEGASTAR is controlled by either pneumatic cylinders or electric motors. It can be equipped with insulated glass flaps for special needs such as insulation, sound reduction and natural lighting. There is a smoke alarm system and the smoke and heat extraction functions can be operated via a thermal priority valve with CO₂ cartridge (pneumatic version) or a 24 V electric motor.

The design of the MEGASTAR is identical to the MEGAPHOENIX in many aspects, the only functional difference being that the top flaps can be fitted with insulated glass.

The MEGASTAR fulfils the requirements of the DIN EN 12101-2 and VdS 2159 (depending on the specification). The EC declaration of conformity is delivered with the product.

Field of application:
• Flat roof
• Arched skylights
• Northlight roofs

Top-flap versions for model 22:
For the MEGASTAR we offer the same top-flap versions as for the FIREFIGHTER.

Sizes:
The MEGASTAR can be produced in all lengths and widths up to 1,900 x 2,500 mm.
SMOKEJET

The SMOKEJET is a louvred ventilator for natural ventilation and smoke and heat extraction. It is a maintenance-free, compact and lightweight unit available with a variety of control options and finishes to suit all industrial and most commercial applications. The ventilator side panels are reinforced by internal longitudinal sections. The unit is made from corrosion-resistant aluminium alloy, AlMg3. The louvres are controlled by a pneumatic cylinder fitted with special permanent lubrication or by an electric motor. In the event of fire the thermal release system triggers automatically and independently of all other control mechanisms. The louvre blades can be made of glass, polycarbonate or aluminium. Due to the variable unit dimensions and the adaptor flange range, the SMOKEJET can be easily installed in all customary roof and wall constructions, also as a natural ventilation and smoke extraction system.

Advantages:
• Ideal for use on Northlight roofs and roofs with an inclination of 30° to 90°, as well as in walls
• Individual customisation for all roof openings up to 5.71 m²
• Suitable for everyday ventilation (full ventilation at a louvre position of 90°)
• Only one drive per unit necessary
• The pneumatic or electric drive is completely hidden inside the frame
• Only one control cable necessary
• Good aerodynamic efficiency
• Channels in the louvre blades conduct rainwater into a lateral drainage channel and prevent it from entering the building

The SMOKEJET complies with DIN EN 12101-2 and VdS 2159 (depending on the specification). The EC declaration of conformity is delivered with the product.

Field of application:
• Flat roofs
• Skylight systems
• Northlight roofs

Illustration: SMOKEJET with polycarbonate louvre blades integrated in a glass skylight.
Sealing brushes or EPDM seals reduce the leakage of warm air to a minimum. The louvre hinges are made of aluminium and pivot in UV resistant nylon bushes.

Louvre blades:
- A1 – Single-skin aluminium louvre blade
- A2 – Double-skin aluminium louvre blade
- GL – Single-skin LSG glass louvre blade
- PC – Polycarbonate louvre blade

Sizes:
The units can be produced in all widths and defined lengths up to 2,226 x 2,966 mm. The length results from the width of the individual louvre blades: 133 mm (Length = number of louvre blades x 133 mm + 40 mm for the frame).
**MULTIJET**

The MULTIJET is an all-weather version of the SMOKEJET, the difference being the modified frame with lateral ventilation flaps (comparable with MEGAPHENIX and MEGASTAR), which provide for good ventilation even in bad weather. The lateral flaps are also opened pneumatically or electrically as soon as the upper louvre blades close due to rain. The closing mechanism consists of two springs. The MULTIJET also serves as natural smoke and heat exhaust ventilator. It is the only officially approved multi-purpose ventilator for use not only on horizontal roofs, but also on inclined roofs such as Northlight roofs.

As is the case for all the other systems, the MULTIJET complies with DIN EN 12101-2 and VdS 2159 (depending on the specification). The EC declaration of conformity is delivered with the product.

**Field of application:**
- Flat roofs
- Arched skylights
- Northlight roofs

**Model versions:**
The same louvre blades are available for the MULTIJET as for the SMOKEJET. The inner flaps are generally 160 mm high and 120 mm long.

**Sizes:**
The MULTIJET can be produced in widths and defined lengths up to 1,926 x 2,966 mm. As is the case for the SMOKEJET, the lengths are determined by the louvre width of 133 mm. (Length = number of louvre blades x 133 mm + 40 mm for the frame.)
Roof mounting (frame/plinth)

Together with the customer we choose the correct material, the mounting system and the unit height depending on the roof design and the operating conditions. On a flat roof, for example, stand-alone units have to be mounted on a plinth. Roof lights are also mounted on a frame, which due to its length has to be reinforced by stiffening bars at specified intervals. Units that are mounted, for example, on a Northlight roof or on the ridge of a gable roof are, however, mounted using customised flanges.

Installation using a EUROSOCKEL (plinth) / EUROZARGE (frame)

Principally, there are two main versions; the EUROSOCKEL for installing on flat roofs and the EUROZARGE for installing on continuous skylight systems and integrated systems. The plinths and frames are designed to allow an 80 mm external insulation layer, which can be applied by the roofer using foil, bituminous sheets or sheet metal. The standard height of the EUROSOCKEL and EUROZARGE units is 350 mm. However, depending on the type of installation and the drainage characteristics of the roof, plinth heights between 150 and 500 mm are possible.

Advantages:

- Adaptable to all types of roofs
- Non-combustible as part of preventive fire prevention measures
- Available in different heights
- Available in different material thicknesses depending on the structural requirements
- Available in a screw or a latch version
- Thermally insulated or thermally separated depending on the version
- Direct mounting on a truss-and-purlin roof
- Simple mounting, as no additional surrounding frames are necessary
- Powder coating allows individual choice of colours

Installation using a flange

When installed on Northlight roofs, gable roofs or in a vertical position, the units can be fitted directly to the roof without problem due to the favourable installation situation. Five different flange versions are available. If none of these versions is suitable, a custom design can be realised.

Fall-through protection

All NSHEVs, plinths and frame constructions can be fitted with fall-through protection. These fall-through-safety grids are either ready mounted or are fitted to the EUROSOCKEL.

Further information on these subjects can be found in our brochure „Roof-mounting & Fall-through-safety Systems”!

Illustration: Phoenix NSHEV with an integrated fall-through-safety grid.