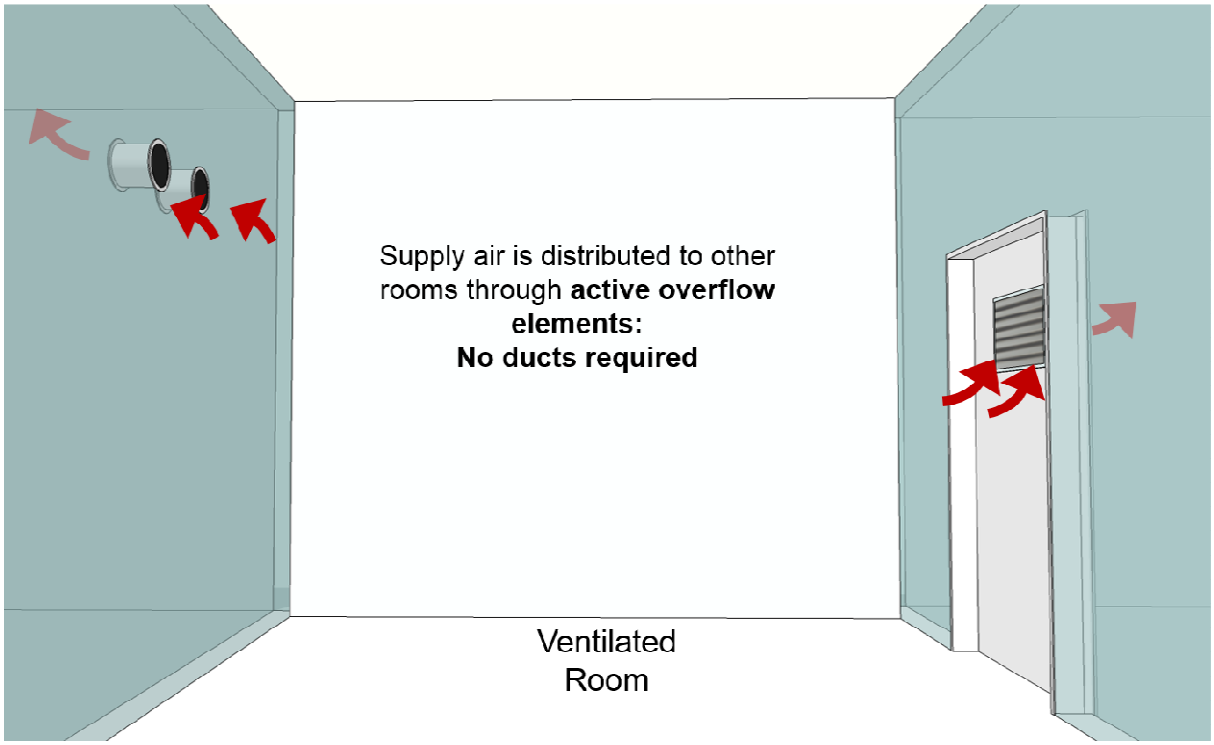
EuroPHit

D5.1.9_Active_overflow_ventilation_system



INTELLIGENT ENERGY – EUROPE II

Energy efficiency and renewable energy in buildings

IEE/12/070

EuroPHit

[Improving the energy performance of step-by-step refurbishment and integration of renewable energies]

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Author(s)	Kristin Bräunlich
Co-author(s)	
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Abstract

This document is a guideline for the ventilation industry interested in developing new products for the Passive House standard. Although this is focused on the needs of step-by-step renovation, the identified areas for product development are mostly valid also for 1-step renovations or new buildings.

The product briefs discuss in more detail the demand of these new products. Similar products and products in development are given as examples to make the case as clear as possible.

It is now up to the manufacturer to gain market advantages through innovations.

1 Active overflow ventilation systems

- Placement: door integrated/ in the indoor wall over the door
- Type of building: residential, non-residential
- Climatic conditions: Cold, warm

1.1 Description

Active overflow elements are interesting new air distribution systems, which are especially suitable for dwellings with one hall and several rooms connected to the hall by doors.

The idea behind this concept is to ventilate only one central room (hall or living area) with fresh air. Active overflow elements distribute the supply air into neighbouring rooms e.g. over the door. Passive air transfer elements are sufficient for the backflow to the hall. The only ducts required are the extract air ducts in bath and kitchen transferring the extract air flow back to the ventilation device.

1.2 Advantages

- No fresh air ducts necessary
- Easy installation
- Rooms can be equipped step-by-step

1.3 Risks

- Geometry of building: appropriate for certain flour plans
- Noise: noise transfer from corridor and from overflow element itself must be avoided by appropriate measures

1.4 Demands

Depending on the specific use (non-residential e.g. classroom ventilation or residential for single rooms) different requirements should be fulfilled, which are further described in following tables.

Table 1. Active overflow elements for large volumes (e.g. for classrooms)

	Requirements
Air flow range	300 – 1000 m³/h?
Concept for air circulation	A concept for a passive air circulation back to the hall under consideration of sound protection and fire protection is required
Comfort criterion	No draft risk in the living zone (1 m behind the door)
Efficiency	Max. 0,03 Wh/m³
Acoustic	max. 30 – 35 dB(A)
Sound reduction index	To be measured to provide adequate design values. Guide value: 20 dB

Table 2. Active overflow elements for small volumes (e.g. for providing single residential rooms with fresh air)

	Requirements
Air flow range	40 – 70 m³/h
Concept for air circulation	A concept for a passive air circulation back to the hall (e.g. Grid in the door) is required
Comfort criterion	No draft risk in the living zone (1 m behind the door)
Efficiency	Max. 0,03 Wh/m³
Acoustic	max. 25 dB(A)
Sound reduction index	To be measured in order to provide adequate design values. Guide value: 20 dB

1.5 New products

- Active overflow ventilation units for large volumes (300-600m3/h)
- Active overflow ventilation units for small volumes (40-70 m3/h)

1.5.1 Similar solutions for large volumes

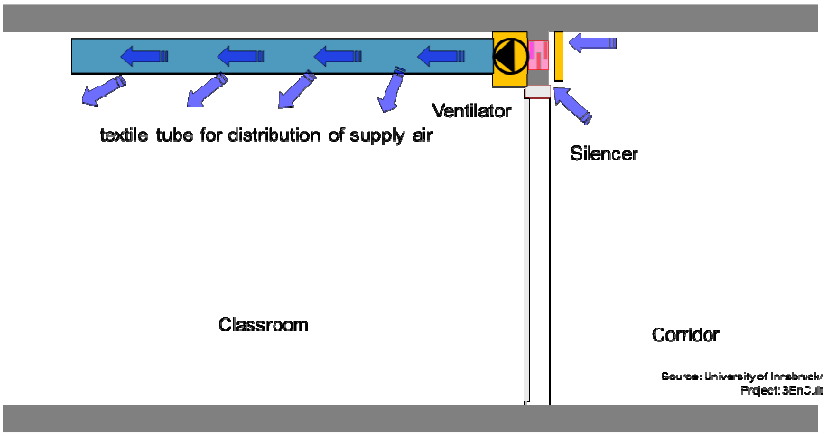

Figure 1: Principle of active air transfer for non-residential buildings from corridor to class [Source: University of Innsbruck/ 3EnCult]

1.5.2 Similar solutions for small volumes

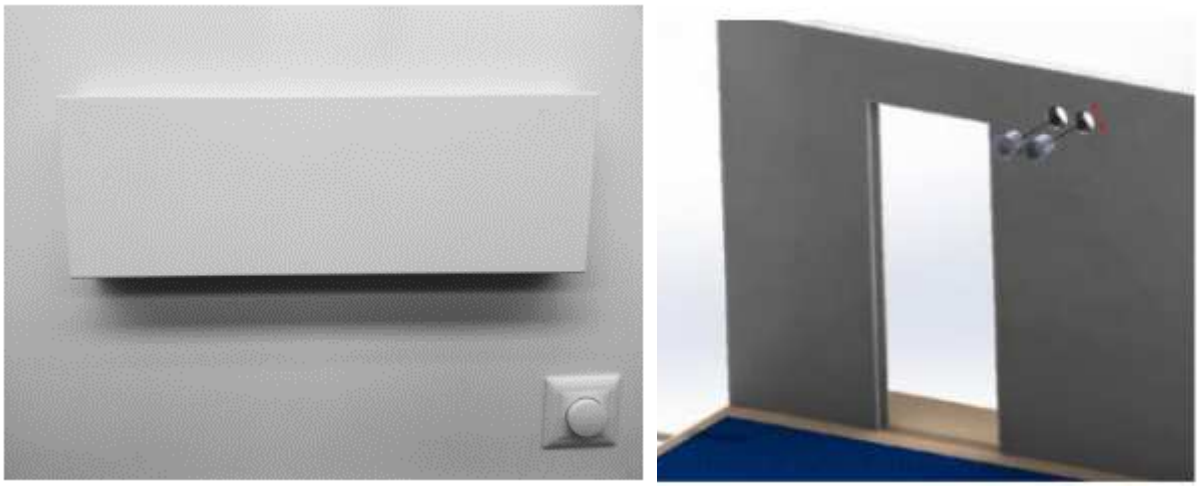

Figure 2: Active overflow ComfoDuct attivo from Zehnder Switzerland