

The Role of Ventilation
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**Domestic Ventilation with Variable Volume
Flows**

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LUNOS

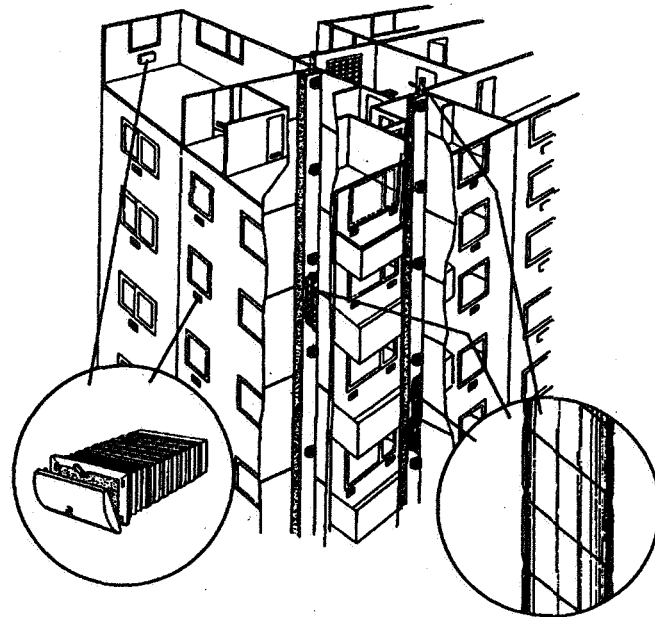
Decentralized Apartment Ventilation with the One-Pipe Ventilation System



by Dr. (Engr.) K. Ulrich Kramm

The system of decentralized apartment ventilation has been successfully used for several years in multiple-story apartment construction in the Federal Republic of Germany. With this tried and tested system, the individual apartments are vented into a common exhaust shaft with decentralized apartment ventilating fans. The special designs of the individual fans ensure a constant volume flow of the outgoing air in the individual apartments, in spite of the large pressure variations into the outgoing air conduits. Non-return flaps prevent a back flow of the outgoing air. An extensive standardizing work safeguards the exactly defined installation conditions. /1/ /2/ Special fireproofing equipment prevents the spreading of fire longwise through the evacuation air ducts between the stories of the building. /3/

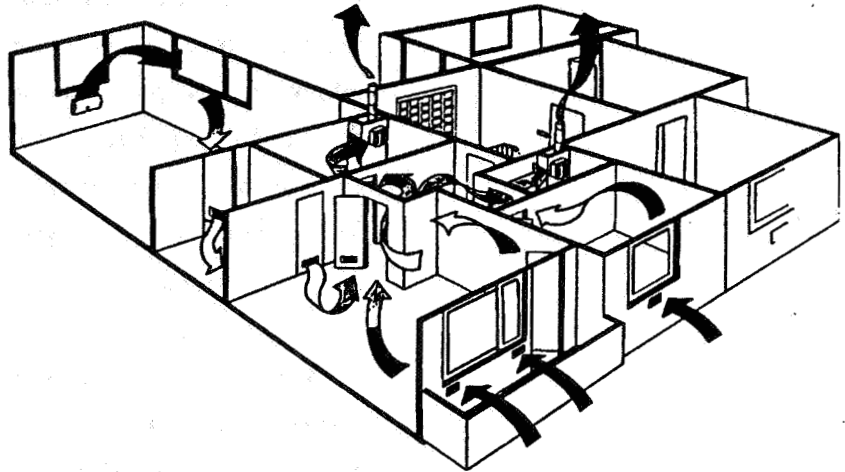
The additional air flows through the wind-pressure controlled outside air openings into the individual apartments. The air with pollutants is enriched there and comes into the central air evacuation duct through the individual fans. A building with the installed one-pipe system is depicted in Illustration 1.



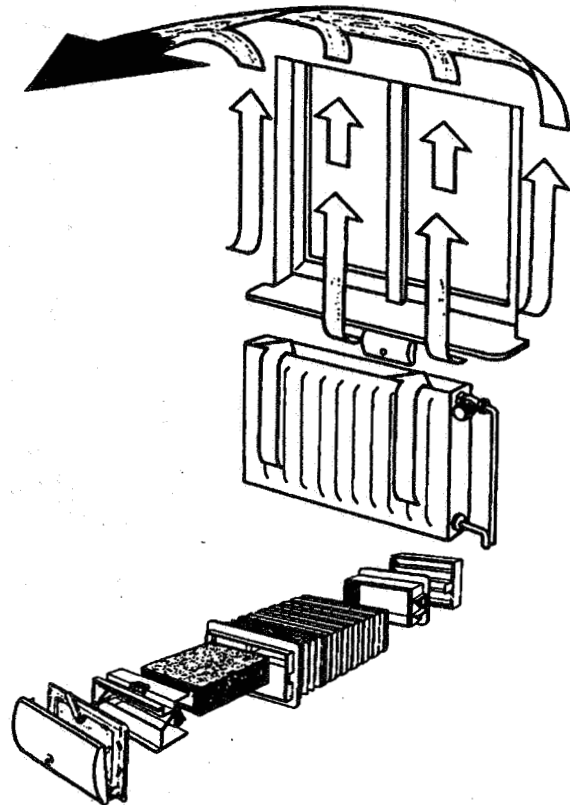
Illus. 1: Diagrammatic view of decentralized apartment ventilation

In Illustration 2, the air path in an apartment is depicted. The fans produce a slight under-pressure in the apartment. The fresh air flows into the apartments through the outside air openings.

The control units contained in the outside air openings ensure an additional air volume flow independent of the wind pressure. The additional air is filtered. The thermal insulation in the air inlet conduits prevents the formation of condensation in the air inlet element. Special installations bring about effective acoustic insulation.



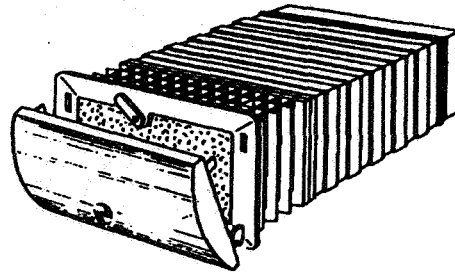
Illus. 2: Air currents with the decentralized apartment ventilation. The outside air openings are installed over the heating radiators. The warmed air flows to the ceiling and mixes with the additional air.



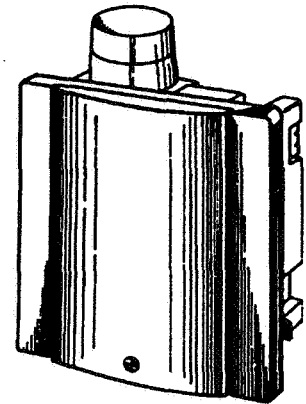
Illus. 3: ALD - Outside Air Opening Element
(ALD from the German)

The occurrence of drafts is not possible. The flow speed in the outside air opening and to the outflow openings is very small. A comfortable and healthy living climate ensues.

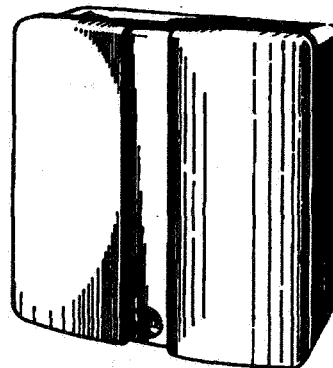
In Illustration 4, the devices belonging to the fan family are depicted. The Sapphire fan type is simply mounted on the wall with its housing (surface-type fan).



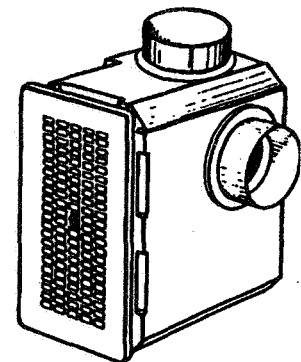
Type ALD



Type Scalar



Type LRK-2

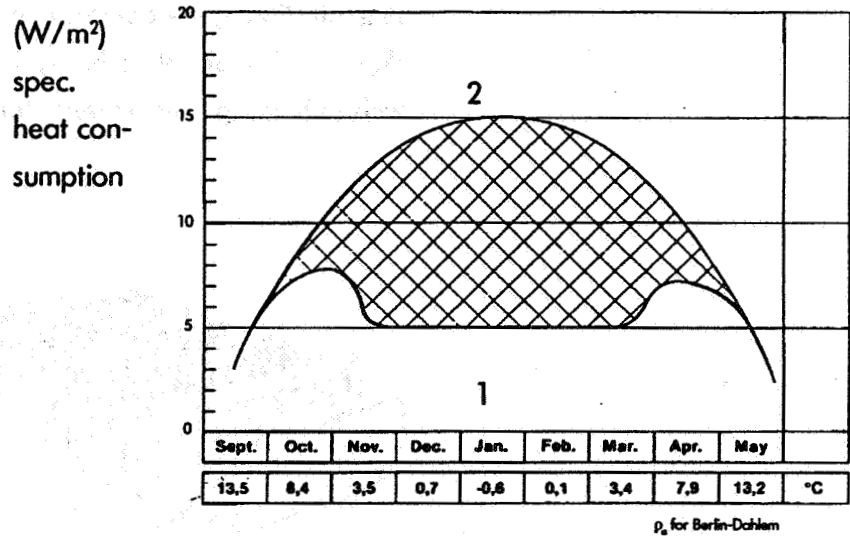


Type Sapphire

Illus. 4: The new generation of fans for surface and flush mounting

The Scalar fan type was developed for flush mounting. The back side is mounted countersunk in the air shaft, so that only the flat and beautifully designed upper part projects into the room. Both fans can be delivered as moisture controlled fans. The control input Air Moisture controls the volume flow sucked off. The LRK2 fan type was developed for the simultaneous ventilation of two independent rooms. The ALD type outside air opening rounds out the program of delivery.

Heating energy savings through demand-controlled apartment ventilation



 = saved ventilation heat consumption

1 = Ventilation heat consumption with demand controlled apartment ventilation

2 = Ventilation heat consumption with an 0.8-fold change of air

Illus. 5: Heating energy savings

It is known that substantial heating cost savings result with a demand-controlled apartment ventilation. / 4/

The surface represented with hatching in Illustration 5 describes the saved ventilation heat consumption. Even larger savings result with respect to uncontrolled window ventilation.

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