



Dr. Philipp Plathner
ift Rosenheim

Ventilation with windows and facades

Centralised and decentralised ventilation with windows – ift-guidelines provide comparability and planning reliability

1 Basic principles

The fact that buildings must constantly be supplied with fresh air for health reasons, and in order to maintain the building substance, is uncontested by experts and the public alike. A series of technical solutions that fulfil the building physics and hygienic requirements have been available on the market for several years: mechanical systems can provide for a sufficient, controlled exchange of air using a combination of ventilators and air ducts. Equally, opening windows at regular intervals is another means of ensuring sufficient ventilation.

2 Ventilation and moisture problems

The subject “indoor air hygiene and moisture protection” is more topical than ever and has become a frequent subject of public discussion. A study held in Germany in the year 2000 that covered more than 5000 housing units showed that moisture damage occurred in Germany in more than approx. 22 % of the flats inspected. This is equivalent to approx. 8,3 million housing units.

Insufficiently ventilated flats have a 60 - 70 % higher risk of moisture damage. 66 % of housing units in the survey were not equipped with technical ventilation systems and had to rely entirely on opening windows. (Source: Ehrenfried Heinz, Tagungsband Rosenheimer Fenstertage 2004.)

3 Causes

This alarming conclusion with regard to moisture problems in Germany can be explained as follows:

- 1 In recent years, the requirements for energy efficiency of buildings in Germany have become more and more stringent. The result is buildings with increasingly tighter facades and windows.
- 2 Due to the lack of ventilation technology, two thirds of the flats must be ventilated by the occupants opening the windows; however the ventilation habits of the users have not been adapted to the different conditions generated by the tighter building envelope.
- 3 Technical solutions that help provide the user with sufficient ventilation have not been fully accepted and are not made compulsory by law.

4 Lack of acceptance of technical solutions

User-independent ventilation would eliminate the most frequent cause of mould — insufficient and inappropriate ventilation — and would prevent most cases of damage. In particular when old buildings are renovated and there is no specialist planner available to give advice, the problem of ventilation is still frequently ignored.



One of the reasons for this is that consumers and also the window manufacturer, who frequently ends up taking planning responsibility, do not have sufficient knowledge to deal with the complex theme of "ventilation." In addition to the purely technical aspects of ventilation (primary function), there are other important secondary functions that play a significant role, e.g. sound insulation, thermal insulation, fire protection, serviceability etc.

5 ift-guidelines

The window industry must concentrate on bringing the ventilation competency back to where it belongs – to the window – in order to avoid clients not replacing windows for fear of mould. The following is required for this:

- Products accompanied by specific information about their performance characteristics,
- Comprehensible specialist information and practical examples for professional window manufacturers and laypeople.

In order to achieve the two above-mentioned goals, the ift has formed a project group "window ventilation devices," which has set itself the task of creating two guidelines:

- ift guideline LU 01 window ventilation devices Part 1: Performance characteristics, and
- ift guideline LU 02 window ventilation devices Part 2: Recommendations for use

The goal of the completed and published guideline "LU 01/1 Part 1: Performance characteristics" is to provide a means of evaluating these products in depth by compiling the relevant standards and guidelines and by establishing a simplified practice for an integrated evaluation of these products. Using this guideline, the manufacturer can determine the performance characteristics of his product and present them clearly. In addition, this uniform presentation of the performance characteristics of window ventilation devices enables consumer, architects and specialists to compare the product characteristics. The details for the determination of characteristics can be found in the appropriate section of the guideline LU 01/1 Part 1.

6 Classification tables

The result of the evaluation of the window ventilation devices is the representation of the performance profile of the product in a classification table, differentiating between ventilation elements

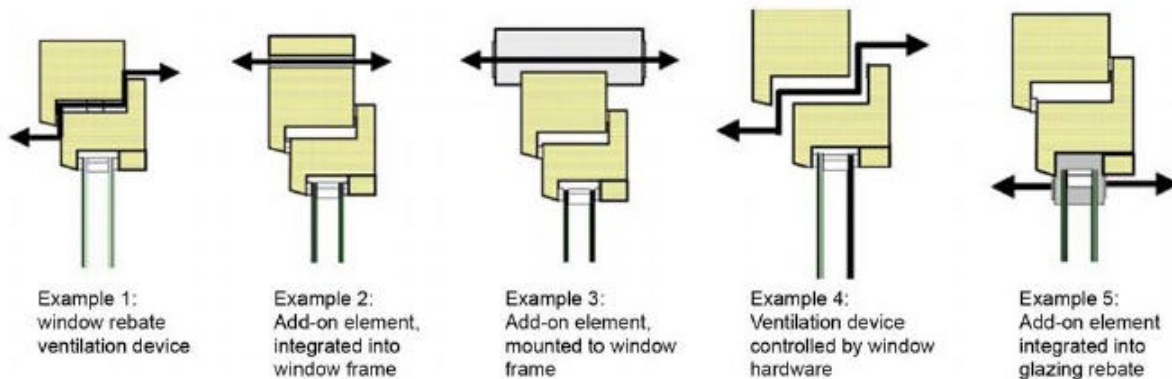


Figure 1 Examples for window rebate ventilation devices and add-on elements



and ventilation units with fan-supported driving mechanisms. (See tables 1 and 2).

In future, the ift guideline "LU 02/1 Part 2: Recommendations for use," which is based on the calculation methods of the future German standard DIN 1946-6: 2006 and the compiled classification tables from LU 01/1 Part 1, will help to determine the necessary requirements.

An overview of the performance characteristics using the classification tables helps:

- In the selection of suitable and necessary products for specific ventilation requirements, and
- In the integrated comparison of products and productsolutions for essential characteristics such as sound insulation, watertightness, serviceability etc.

Table 1 Classification of the performance characteristics of ventilation elements

No	§ No	Description	Classification												
			2 Pa		4 Pa		6 Pa		8 Pa		10 Pa		20 Pa		
1	3.1.1	Air flow rate (volume) in m ³ /h *	Supply air												
			Exhaust air												
2	3.2	Air permeability when closed	1		2		3		4						
3	3.3	Watertightness													
		open Test pressure (Pa)	npd	1 10		2 20		3 50		4 100		5 150		6 >150	
		closed unprotected (A) Test pressure (Pa)	npd	1A 0	2A 50	3A 100	4A 150	5A 200	6A 250	7A 300	8A 450	9A 600			
4	3.4.1	Airborne sound insulation R _w (C; C _r) in dB for windows with ventilation device	open					closed							
		D _{ne,w} (C; C _r) in dB for add-on elements	open					closed							
5	3.11	Burglar resistance	npd	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6						

npd = no performance determined / -
* Pressure steps may change due to revision of DIN 1946-6



Table 2 Classification of the performance characteristics of fan-driven ventilation devices

No	§ No	Description	Classification											
			0 Pa					8 Pa						
1	3.1.2	Air flow rate (volume) in m ³ /h	Supply air											
			Exhaust air											
2	3.2	Air permeability when closed	1	2		3		4						
3	3.3	Watertightness												
		open test pressure (Pa)	npd	1	2	3	4	5	6					
				10	20	50	100	150	> 150					
		closed unprotected (A) test pressure (Pa)	npd	1A	2A	3A	4A	5A	6A	7A	8A	9A		
				0	50	100	150	200	250	300	450	600		
4	3.4.1	Airborne sound insulation R _w (C; C _{tr}) in dB for windows with ventilation device	open					closed						
		D _{ne,w} (C; C _{tr}) in dB for add-on elements	open					closed						
5	3.4.2	Residual noise level L _N in dB(A)	> 45	= 45	= 40	= 35	= 30	= 25						
6	3.5	Efficiency of heat recovery												
7	3.11	Burglar resistance	npd	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6					
8	3.12	Energy consumption in Wh/m												

npd = no performance determined



**Dr. Philipp Plathner,
BSc, PhD**

Born October 23, 1972 in Munich, Germany

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| 1992 | Abitur (A-level), Gymnasium Starnberg |
| 1992 – 1994 | Zivildienst (Community service) |
| 1994 – 1997 | Reading University, England |
| 1997 | Graduated BSc (Physics) |
| 1997 – 1998 | Research assistant, University of Westminster, London |
| 1998 – 2001 | Research assistant, Building Research Establishment (BRE), England |
| 2001 | Graduated PhD at the University of Westminster, title of the thesis: "Airborne movement of moisture in dwellings" |
| since 2001 | Member of staff at ift Rosenheim in the building physics group

Responsibilities:
measurement and calculation of luminous and solar characteristics, solar protection in buildings, consultancy, standardisation work |
| since 2005 | Head of ift service center for standardisation |