

# PROSPECTS FOR HYBRID VENTILATION IN POLAND

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## **ABSTRACT**

Approximately over 90 percent of buildings in Poland are ventilated in a natural manner. The scale of problems in the functioning of ventilation in our opinion is serious.

In about 3 million apartments inhabitants use gas water heaters, burning fuel in an open chamber. Therefore in these types of apartments the use of mechanical exhaust ventilation is forbidden

Experiences in using mechanical ventilation is not always positive (frequent complaints about the excessive noise of the installation and the high consumption of energy by the fans). An interesting alternative could be hybrid ventilation systems.

## **KEYWORDS**

hybrid ventilation, natural ventilation, retrofitting

Poland has nearly 40 million inhabitants. In cities, where there is found two thirds of all apartments building, multifamily buildings dominate, and in smaller cities, individual buildings. Together in Poland there are about 12 million apartments, whereof about 75% were built after the year 1944, and only about 10% were erected after 1988. In the last years there were constructed yearly 60.000-80.000 apartments. In the most intensive period of development 200.000 apartments were built.

In regards to the various age of buildings and the differences in construction technologies used, it is hard to point to a prevailing type of building. However, it is much easier to characterize the ventilation systems used. In apartment buildings, the majority use natural ventilation systems. Indeed there is not given any precise statistical data, but one can estimate that over 90 percent of buildings are ventilated in a natural manner.

In a considerable part of public utility buildings, offices, production and services building, natural ventilation is also used, as far as technological considerations or particular regulations do not require the use of mechanical ventilation.

In about 6 million apartments inhabitants use gas, both for heating as well as for hot water. It is estimated that in half of these apartments gas water heaters are used, burning fuel in an open chamber. In the last years in multifamily buildings there are used individual boilers for

the heating of each apartment. Therefore in these types of apartments the use of mechanical exhaust ventilation is forbidden.

Mechanical ventilation is obligatorily used in such buildings, like those having over 9 stories. Because percentage wise there is not so many, and experiences in using mechanical ventilation is not always positive (frequent complaints about the excessive noise of the installation and the high consumption of energy by the fans), an interesting alternative could be hybrid ventilation systems. In Polish conditions it permits for an exceptionally effective combination expected by investors - the advantages of natural ventilation and the efficiency of the mechanical ventilation.

In apartment buildings in Poland, natural ventilation is used based on the guidelines of the Polish Standard, assuming the free inflow of air through windows and external doors that are not tight and the removal of air from the building through air exhausts located in kitchens, baths, toilets and rooms without windows. In practice, most apartments have 2 or 3 air exhausts ducts. In new buildings (constructed after the year 2000) apartments have individual ducts, whereas in old buildings common ducts are used, in which apartments are connected on every other story.

In practice, air intake takes place in an uncontrolled manner. In spite of the fact that it is mandatory to install elements that bring in air (air inlets) in buildings equipped with tide windows, in practice these recommendations generally are not practical. The obligatory legal system does not also put the direct obligation of approving the installation when the building is opened for use and during its exploitation. That is why in many cases, especially in new buildings and those that are modernized, there occurs defects in the working of the ventilation. The most frequent defects are the inadequate intensity in the exchange of air and the occurrence of back-drafts in the ducts.

The main criteria determining the intensity of ventilating in an apartment or house is the quantity of air removed by the ventilation ducts in each type of room (kitchens, baths, toilets and rooms without windows).

The scale of problems in the functioning of ventilation is not investigated statistically, but from experiences gained by the Polish Ventilation Association and companies working in the ventilation trade, it appears that the problem is serious.

According to our estimations there exists a large potential market, which can be used by delivering appropriate technical solutions in accordance to expectations and informing building owners about the role of the proper use of ventilation.

## **FIRST EXPERIENCES**

The first attempts to introduce to the Polish market hybrid ventilation took place in the year 2003. The first extensive information about how hybrid ventilation works appeared at VENTILATION FORUM 2003, a national meeting of ventilation industry professionals. A seminar was prepared by the Reshyvent Group which enjoyed the exceptional interest of the listeners. Almost simultaneously, the Aereco company began intensive preparations to introduce to the market a VBP low-pressure fan. The VBP helps remove the air in the air exhaust ducts of the natural ventilation. The vacuum produced attains characteristics of natural ventilation. The device can work in a continuous manner or periodically to assist

natural stuck effect in cooperation with sensors examining the prevalent conditions in the air exhaust ducts and in the environment of the building.

The fact that the idea of hybrid ventilation was well received could be seen the following year, at VENTILATION FORUM 2004, where Polish producers also presented their own hybrid ventilation solutions. The Darco company showed the Turbowent chimney cap. The hybrid chimney cap arose on the basis of the traditional Turbowent chimney cap, used for supporting natural stuck effect in air exhaust ducts by the means of the wind. In the Turbowent chimney cap is installed an electric engine synchronized with the main rotary element of the chimney cap. The sensor monitoring the parameters of the stuck effect causes the increase or decrease of motor rotations depending on the existing conditions.

The Uniwersal company designed the Fenko chimney cap. It is a chimney cap which after installing it on the end of the air exhaust ducts allows the ventilation to work in a natural manner. It is equipped with a fan that can be turned on by the user when conditions do not allow obtaining a natural stuck effect in the air exhaust ducts. Its efficiency is adapted to the amount of air removed from a typical apartment.

As usual in the case of new products, an important role is played by the possibility to practically check the use of the solution in Polish conditions. Aereco can be proud of their first accomplishments, as measurements were taken after the installation of the devices.

The investment was realized in the eastern part of Poland. Some buildings, in which commonly appeared draft disturbances in the air exhaust ducts, were modernized. Tenants complained about the lack of stuck or its reversal and the blowing of air through the grills of the air exhaust ducts. Low-pressure VBP fan were installed at the ends of the canals in building with 3 and 5 stories. The air to the apartments was brought in by humidity-controlled inlets in the windows - whose quantity was chosen with regards to the standards needed for air ventilation. Additionally, in the admission values to the air exhaust ducts were installed humidity-controlled air exhaust grills.

In summer conditions (August 2004) the first efficiency measurements were taken for the work effectiveness of the hybrid ventilation. The results of the measurements confirmed the efficiency of the solution used.

In consideration that the research was finished while this publication was being prepared for printing, a detailed description of the investment and the results obtained are on the CD prepared by the Polish Ventilation Association for conference participants.

## **POLISH VENTILATION ASSOCIATION**

The Polish Ventilation Association is a group of professionals associated with the ventilation industry. It is founded by representatives of the Warsaw University of Technology and entrepreneurs dealing with manufacture, import and installation of ventilation systems for building industry.

The mission of the Association is to promote knowledge on modern and effective methods of ventilation for building industry as well as to increase the public awareness on the quality of the air in buildings through providing information on the consequences of invalid ventilation. At the same time, the Association is involved in activities meant for improving the legal system regulating the use of ventilation, and thus the quality of the polish building industry. The Association acts also to fit the ventilation industry for operation after Poland's access to the European Community.

Our objective is to develop and promote initiatives, attitudes and activities encouraging development of ventilation industry. Particular information is available at [www.wentylacja.org.pl](http://www.wentylacja.org.pl)

The Polish Ventilation Association has made an initiative to arrange a meeting of industry professionals - VENTILATION FORUM - to explore the issues of ventilation in the building industry and the operation of ventilation related businesses. The aim of FORUM is to enable exchange of experience and sharing legal and technical knowledge. Two-day cycle of training courses, seminars and discussions are accompanied by an exhibition presenting technologies available on the Polish market. During the FORUM in 2003 and 2004 the idea of hybrid ventilation was presented by the Reshyvent group. More information is available at [www.forumwentylacja.pl](http://www.forumwentylacja.pl)