

# Does the Obligatory Ventilation Control fulfill its Purpose?

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**Abstract.** The regulation “Obligatory Ventilation Control, OVK” has been into practice since 1991 in Sweden. The role of the regulation is to control the ventilation in premises, multi-family houses and single and two-family houses (with certain ventilation systems). The control is done before the ventilation system is taken in operation and after that on regular intervals (except for single and two-family houses). The purpose of the OVK is to secure that the indoor climate is good and that the ventilation system is functioning.

This paper will present results on how the OVK works today, both in theory and in practice and, by stakeholders, identified wished development of the OVK. To get a broad picture of how the OVK works, interviews were carried out with persons related to the OVK; building owners, OVK controllers, administrators at the municipality, legislators, organizations etc. Based on this, suggestions were made for how the OVK could develop to better suit its purpose.

Results from the interviews show that an approved OVK is not a guarantee that the indoor environment is satisfactory, since the current use of the premises isn’t taken into account. Further, the legislation for ventilation is not adapted to new technology such as demand control ventilation, and different authorities’ legislation also differs regarding for example reduced/shut off ventilation. The study also shows that the follow up of the OVK from the municipality often are inadequate. Further, energy-saving measures that should be included in the OVK are handled very differently and the level varies considerably.

**Keywords:** Ventilation Control, OVK, Indoor environment, Energy efficiency, Ventilation.

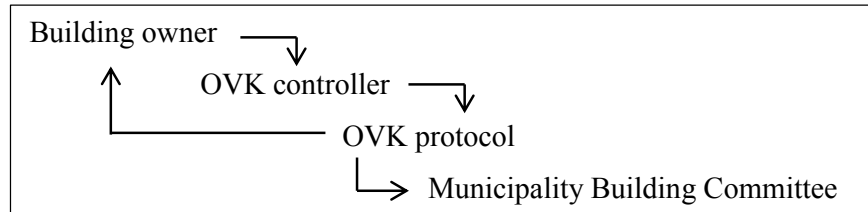
## 1 Background

The Obligatory Ventilation Control, in Swedish called “obligatorisk ventilationskontroll – OVK”, was introduced in Sweden year 1991. The purpose of the OVK is to “show that the indoor climate is good and that the ventilation systems are functioning”. The control must be carried out by an expert performance controller who is certified by an accredited certification body. Every OVK must control that the ventilation system is functioning according to those mandatory provisions that were in force when the system was put into use. [1] In practice, this means that

the OVK controller measures the air flows for supply and exhausts air in ducts and diffusers, and compares those measurements with the design values. The OVK control also includes a visual inspection of the ventilation system for pollutants, this in order to prevent pollutants to spread in the building. The OVK also inspects that instructions and maintenance directions for the ventilation system are easily available. The controller must provide suggestions on how to reduce energy consumption for ventilation, the suggested measures are not allowed to cause poorer indoor environment. The OVK shall investigate the ventilation in every premise and multi-family house before taken into operation and after that on regular intervals of three or six years depending on type of building and ventilation system. Single and two-family houses shall only be inspected before the ventilation system is taken into operation, and some types of ventilation systems are completely exempted from the OVK. [1]

Since the OVK was introduced, the regulation has been revised several times, and in year 2006 an energy efficiency perspective was added to the OVK. This meant that energy-saving measures should be included and noted in the OVK protocol. [1]

The OVK includes many participants/steps, see Fig. 1. The building owner should initiate and order an OVK. A certified OVK controller then carries out the OVK according to the regulation, and writes a protocol containing the results from the OVK. [2] The protocol is then distributed in two copies, one to the building owner and one to the municipality Building Committee. The municipality is responsible for control and supervision, and should ensure that the building owner fulfill their OVK responsibilities.



**Fig. 1.** The participants/steps in the OVK.

However, many studies show that the OVK does not work as intended; many premises have complaints about the ventilation and/or lack an approved OVK. Also, the energy-saving part does not work properly.

During the years the OVK has been in practice, several investigations have been made to figure out how the OVK works, and which improvements to be made [3-9]. However, very few of the proposed changes have been adopted in reality.

Further, since the OVK was introduced, much development has been made within control systems, energy management systems as well as regarding ventilation units, sensors and measuring equipment. The possibilities to follow up how the ventilation works in practice and to improve the standard of the indoor environment have increased significantly etc. Therefore there are opportunities to modernize the OVK. A

well-functioning OVK can warrant a good indoor environment. A well-functioning OVK is especially important in cold climates, in order to secure both a healthy indoor environment and a low energy use.

## **2 Purpose**

The purpose of the project was to gather information of how the OVK works, functions and is perceived within the whole OVK chain. The result will be used to inform legislators and responsible authorities, to give them more support for implementing needed changes.

## **3 Method**

The project was divided into two main parts. The first part consisted of workshops and interviews in order to identify present situation. Workshops were held with a project group to get their view of how the OVK works in theory and in practice. The project group consisted of building owners, property managers, FUNKIS (an organization representing OVK inspectors and municipal OVK administrators) and Swedish Ventilation (an organization representing the ventilation business in Sweden). Additionally, personal interviews were carried out. In total thirteen interviews were conducted, divided on two OVK controllers, two municipal OVK administrators, one private building owner, one representative from the Swedish Property Federation, one Environmental and health inspector, as well as one person each from the Swedish Work Environment Authority, Asthma and Allergy Association, National Board of Housing, The Public Health Agency of Sweden, County government and SKL – the Swedish Association of Local Authorities and Regions.

The interviews were conducted via telephone or Skype, with exception for one interview that was held in person. During the interview, the whole process from ordering an OVK, execution, reporting, actions were gone through. Questions concerning legislation within the area were highlighted, and if there were different interpretations and ambiguities, these were identified. Proposals of changes in the OVK were also discussed.

After this, the second part of the project was initiated to identify the desired development of the OVK. Based on the outcome from the first part of the project, proposals on how the OVK could be developed were formulated. This work was based on the interviews, and later refined during workshops with the project group.

## 4 Results

All the interviewed persons agree that it is important with a well-functioning OVK, in order to maintain a well-functioning ventilation system and also to get an objective control. But when it comes to shortcomings with the current OVK, their views are partially different:

- The building owners highlight flaws in the supervision from the municipality Building Committee, and to some extent the OVK controllers who doesn't always match the desired "quality" in execution.
- The OVK controllers state that the weakest link is the supervision from the Building Committee that isn't working, but there also are building owners who doesn't care. It is perceived frustrating when faults and deficiencies are not rectified, and then it's both the building owner and the municipality that fail and do not follow up on the protocols.
- The administrators at the municipality responsible for the supervision, experience a lack of resources (money) and time in many municipalities in order to work actively with OVK, and the control and supervision therefore becomes inadequate. They consider that an active Building Committee is required that sends reminders etc. for it to work properly, at least for smaller, individual building owners.

Further aspects, that are highlighted by the Swedish Work Environment Authority, The Public Health Agency of Sweden and Asthma and Allergy Association, among others, is that there is a discrepancy between what is considered a satisfactory indoor environment/air quality and what gives an approved OVK. This has earlier been highlighted by an investigation from the National Board of Housing [5], where it was concluded that it is not possible to use the OVK to control if the environmental objective "A Good Built Environment" is fulfilled. Sweden has set up in total sixteen environmental objectives and "A Good Built Environment" is one of them. One of the milestone targets in "A Good Built Environment", was that all premises should have a documented effective ventilation in year 2015. This was meant to be achieved by an approved OVK, however not all premises are included in the OVK and an approved OVK does not equate an effective ventilation. The reason for the difference between actual indoor environment and an approved OVK, can be explained (according to several interview persons) that the OVK does not take into account and controls the actual activity and use in the premise, and this becomes especially clear in schools and kindergartens that often have a changing use of the premise. It is neither done an evaluation of the efficiency of the ventilation, for example air exchange in individual class rooms or how the ventilation is perceived by those staying in the room.

Since year 2006 it is included in the periodic inspections of the OVK to examine which measures that can be made in order to improve the energy efficiency of the ventilation system, this without compromising the indoor climate [10]. The extent and level of the energy efficiency measures that are suggested by the OVK controllers varies a lot. Further, it is not something that the administrators at the municipality attach any importance to because it is not clearly part of their mission. One of the

administrators didn't even know that it was a demand to include energy saving measures in the OVK protocol.

Thus all flaws, most interviewed think that the OVK is a good system and worth building on. The ambiguities are in several instances of the OVK chain, which rules out one simple solution to correct the flaws, and several changes are necessary. Those activities, or improvement proposals proposed in the following, are based on the project group and the interviews. The development proposals have been discussed within the project group and are considered proposals that could address at least some of the shortcomings found in the current OVK. But in order for them to be implemented, a number of legislative changes are necessary, as well as clarification about the legislation. It would also be desirable with research projects that investigate certain topics, such as reduced and shut-off ventilation and its effect on the indoor environment and the building. As well as which ventilation flows are appropriate for different premises.

The following development proposals are set by the project:

- Enable the municipality Building Committee to charge a fee for the control and supervision of OVK, in order to improve the follow-up.
- Develop a uniform OVK protocol to be used, and gather the protocols in a national register with possibility for follow-up and statistics. Preferable an electronic protocol.
- Introduce the possibility that after-inspections is carried out by the OVK controller instead of the municipality.
- Set minimum requirements for the energy-saving measures to be included in the report.
- Take better account of current activities and current indoor environment in the OVK, so that not only the requirements are compared to the legislation in force when the ventilation system was taken into use.
- Review the legislation in the area and make it consistent, and include how, for example demand control and reduced/shut off ventilation should be handled.

These proposals will be presented in a report later on, and be used as a basis in dialogues with National Board of Housing, Swedish Work Environment Authority, The Public Health Agency of Sweden, SKL – the Swedish Association of Local Authorities and Regions, as well as representatives of parliament and government.

## 5 Conclusions

Based on the results, it can be stated that there are clear shortcomings in the OVK. In extension, this may implicate, if the OVK is not changed and the ambiguities are not corrected, that the justification of the OVK is reduced. If the OVK shall be relevant, it must be related to the actual indoor environment, and not just control that the ventilation fulfils the demands when taken into use. Further, energy saving measures must be taken into bigger consideration, in order to maintain and improve the energy performance during the buildings life-span.

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