

Building and ductwork airtightness in Estonia: national trends and requirements

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FOREWORD

The AIVC is preparing a series of VIP on national regulations and trends in airtightness for various countries (numbered VIP 45.XX), detailing for both building and ductwork airtightness:

- the national requirements and drivers (regulations, incentives, justifications and sanctions)
- whether it is taken into account in the energy performance calculations and how;
- the test protocol (testers qualifications, national guidelines, requirements on measuring devices);
- the tests already performed and whether there is a results database;
- key documents.

This presentation focuses on the airtightness trends in Estonia, more information can be found in the VIP 45.1.

BUILDING MARKET

Estonia is a country of 1.3M inhabitants. According to the Estonian Building Registry, the number of private houses of known area taken into use before 2000 (included) is 155.150, their total floor area amounting to 19.998.000 m². The number of apartment buildings of known floor area taken into use before 2000 (included) is 22.600, their total area amounting to 28.378.000 m². The Building Registry includes 375.000 non-residential buildings that are in use and have been taken into use before 2000 (included). Their total floor area amounts to 62M m². As illustrated in Figure 1, there are non-residential buildings with climate control (office, educational and commercial buildings, etc.) and without climate control (ancillary buildings of residential buildings, agricultural buildings, pumping stations, etc.). There are around 32.000 such buildings with a total floor area of 28M m². Most of the Estonian residential buildings are under private ownership. According to the population and housing census of 2011, 97% of dwellings were under private ownership. State or local authorities owned just 2% of dwellings.

In recent years, about 10.000 building permits and 6.400 use permits have been issued annually (see Figure 2). The difference between the number of the building and use permits is because not every building permit has been subject to realization and the permit for use has not always been applied for.

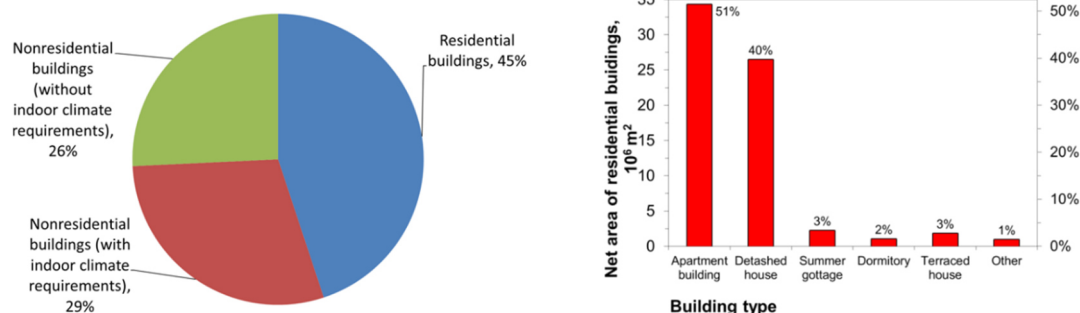


Figure 1: Division of all buildings (top) and residential buildings (bottom) in Estonia constructed before 2011.

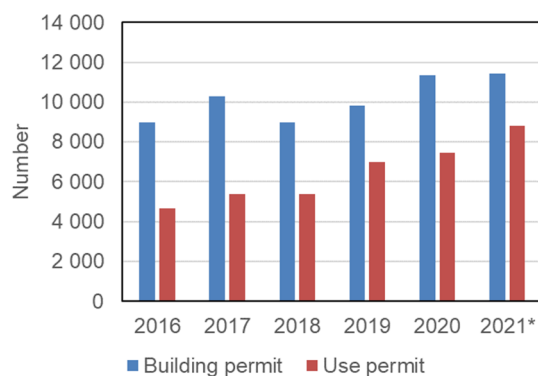


Figure 2: Annual building permits and building use permits issued

BUILDING AIRTIGHTNESS

Year after year, the airtightness of the building envelope has become an increasingly important issue in Estonia. As expected, the median air leakage (q_{EA50}) of older buildings between 11 and 14 $\text{m}^3/(\text{h}\cdot\text{m}^2)$ has decreased to 1.1 $\text{m}^3/(\text{h}\cdot\text{m}^2)$ after the minimum requirements for energy performance have taken effect (see table 1) in 2008. The increasing prices in the building market make it harder to use the base values of air leakage rate which tend to overestimate the actual air leakages and need to be compensated by improving other elements of the building. The overall knowledge and quality of workmanship related to airtightness has increased in the market and this trend is expected to continue.

Table 1: Effect of different factors on air leakage rate and its distribution

Please see more in detail from: Hallik, J., Kalamees, T. 2019. Development of Airtightness of Estonian Wooden Buildings. Journal of Sustainable Architecture and Civil Engineering https://doi.org/10.5755/j01.sace.24.1.23231	Number of buildings	Air leakage rate q_{EA50} , m ³ /(h·m ²)		
		median	mean	$q_{50,base}$
		All wooden buildings		
<1945	97	11	13	18
1946 – 1994	7	14	17	27
1995 – 2008	72	3.2	5.2	9.5
>2009	137	1.1	1.8	3.0

DUCTWORK AIRTIGHTNESS

Ductwork airtightness is an insufficiently researched and poorly regulated field in Estonia. To change the situation, the first thing that could be done is to study the current situation of ductwork airtightness. Some scientific research could certainly help to raise awareness on this problem. At the moment, there is no plan to update standards or regulations of ductwork airtightness. In the following years, it is planned to update the quality requirements for ventilation installation. The requirements for the airtightness of the ventilation ductwork can also be added to the guidance manual of quality requirements for ventilation installation.

KEYWORDS

Building airtightness, ductwork airtightness, regulation, trends, Estonia

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