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Trends in building and ductwork airtightness in Latvia

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1 Introduction on the building market in Latvia

Latvia is a country with currently about 1.9 million inhabitants. In 2021, 3087 residential building permits were delivered, (which is about the same number as the previous year) with about two thirds for single dwellings and one third for multi-family dwellings[1].

According to the European Construction Industry Federation (FIEC) annual report[2] "Construction of non-residential buildings (offices, hotels, factories, schools, hospitals etc.) contributes to around 45% of the total construction activity. Growth in this segment is mainly linked to the 0% income tax on reinvested earnings adopted in 2018."

As illustrated in **Error! Reference source not found.**, the total investment in building construction reached € 1.2 billion in 2019, with 23% (287 M€) for residential buildings (14% for new buildings and 9% for renovation & maintenance) and 77% (945 M€) for non-residential buildings.

Per cent variation of investment in real terms

investment Mln. € fixed prices

Sectors	2019a	2016	2017	2018	2019a	2020b
Building	1,232	-2.5	12.1	19.9	9.7	NA
1.1. Housebuilding	287	2.1	-10.1	32.2	6.0	NA
1.1.1. New	174	10.6	13.7	3.6	7.1	NA
1.1.2. R&M	113	-8.6	-46.6	126.0	4.3	NA
1.2. Non residential (c)	945	-4.1	20.5	16.4	10.8	NA
1.2.1. Private	NA	NA	NA	NA	NA	NA
1.2.2. Public	NA	NA	NA	NA	NA	NA

a: estimate - b: forecast - c: incl. R&M

Figure 1: Construction activity in Latvia (FIEC annual report)

2 Building airtightness

2.1 Introduction

The attention to building airtightness in Latvia started in 2010 when the European Union (EU) started to require blower door tests for buildings renovated with EU funds.

In 2015, Latvian Construction Standard (LBN 002-01) on thermal insulation and airtightness was modified and became stricter, as described in paragraph §2.3.1.

[1] https://tradingeconomics.com/latvia/building-permits

[2] https://fiec-statistical-report.eu/latvia

In 2021 the government recommended to provide air tightness tests for the commissioning of all public buildings larger than 5000 m^3.

2.2 Airtightness indicator

The airtightness indicator used in Latvian standards is q_{50} ($m^3/(h.m^2)$) at 50 Pa. The reference surface is the total envelope area, including all floors, walls and ceilings bordering the internal volume, as defined in ISO 9972. For some projects, customers additionally ask to fit n_{50} (1/h) specific requirements.

2.3 Requirements and drivers

2.3.1 Building airtightness requirements in the regulation

From 2001 to 2015 the requirements about building airtightness were the following [1]:

- $q_{50} \leq 3,0$ $m^3/(h.m^2)$ for dwellings, hospitals, kindergartens, homes for the elderly;
- $q_{50} \leq 4,0$ $m^3/(h.m^2)$ for other public buildings;
- $q_{50} \leq 6,0$ $m^3/(h.m^2)$ for industrial buildings.

It was also required that buildings with an airtightness indicator q_{50} below 3,0 $m^3/(h.m^2)$ should be equipped with mechanical air handling units. This requirement was cancelled in 2015 with the update of the national standard.

Since then, the following requirements are in force for residential houses, homes for the elderly, hospitals, kindergartens, and public buildings:

- $q_{50} \leq 3,0$ $m^3/(h.m^2)$ for buildings with natural ventilation (airing);
- $q_{50} \leq 2,0$ $m^3/(h.m^2)$ for buildings with mechanical ventilation;
- $q_{50} \leq 1,5$ $m^3/(h.m^2)$ for buildings with mechanical ventilation equipped with a heat recovery system;
- $q_{50} \leq 4,0$ $m^3/(h.m^2)$ for industrial buildings.

The updated regulation regarding construction standard [2], that was published in 2019 and is currently into force, includes the same requirements.

2.3.2 Incentive for Building airtightness

As mentioned above, air tightness tests are recommended for the commissioning of all public buildings larger than 5000 m^3 since 2001.

Moreover, at the present time and since January 2022, the city of Riga (capital of Latvia) gives a 90% discount on property taxes for[3]:

- newly built detached houses classified as near-zero energy buildings (for a period of 5 years from the commissioning of the building) (para.3.26)
- apartment in multi-family buildings for which the insulation of all facades has been performed after its commissioning (as energy retrofit), and provided that the energy efficiency class specified for the building is better than class C (para 3.19). The discount is applied throughout the period of validity of the energy certificate, with a maximum of 10 years.

The conditions to obtain the 90% discount on property taxes will evolve in the next years[4]. In particular, from 2024 it will also be granted to newly constructed or fully renovated BREEAM certified buildings (still in Riga only).

2.3.3 Building airtightness justifications

Airtightness tests are still not mandatory, so there are no sanctions in case a building does not comply with the requirements. Only the owner/developer or construction regulator can initiate and write requirements to perform

[3] Rīgas domes 2021. gada 15. decembra saistošie noteikumi Nr. 109 "Par nekustamā īpašuma nodokļa atvieglojumu piešķiršanas kārtību Rīgā" ("On the procedure for granting real estate tax relief in Riga"). https://likumi.lv/ta/id/329190

[4] https://pip.riga.lv/visi-pakalpojumi/nin-atvieglojumi/

airtightness tests for new projects. Usually, these requirements are described initially in the project documentation.

2.4 Building airtightness in the energy performance calculation

The building airtightness is an input of the energy calculation. Default values are the ones provided in the Latvian construction standard LBN 002-19 and listed in paragraph §2.3.1. It is possible to use lower air permeability values in case an airtightness test is performed.

The idea behind is that requirements should be met, so the maximum allowed air leakage rates can be used as default values. There is however no control to ensure that it is truly the case and these rather favourable default values are not encouraging airtightness testing.

2.5 Building airtightness test protocol

2.5.1 Qualification of Airtightness testers

There is no national qualification scheme for airtightness testers.
Currently there are approximately:

- 8 persons qualified by the manufacturer program Retrotec;
- 1 person qualified by FLiB (German Association for Airtightness)
- 2 persons qualified by the Air Tightness Testing & Measurement Association (ATTMA)

Only some of them are testing building airtightness as their main activity.

2.5.2 National guidelines

There are no national guidelines, requirements or recommendations to perform airtightness tests, including regarding the testing equipment.

It is specified in the LBN 002-19 Latvian construction standard that building airtightness tests should be performed in accordance with the standard LVS EN 9972:2016 [3], and the building should be prepared according to the Method 2 of this European standard: “by closing all the windows, doors, hatches in the building”.

2.6 Building airtightness tests performed

There is no official data available on the percentage of buildings tested. The authors estimate that there are approximately:

- 70-80% of public buildings (new or renovated) that are tested;
- 5-10% of industrial buildings;
- 5-15% of dwellings (single-family houses and multi-apartment buildings).

There is no database collecting the field data, so it is not possible to get the evolution of the airtightness level over time.

2.7 Guidelines to build airtight

There are no specific guidelines/standards developed in Latvia to build airtight.

2.8 Conclusion

The awareness on building airtightness in Latvia is slowly growing but there are still very few buildings that are tested. Currently, the airtightness testing is stimulated by the reduction on taxes for nearly zero-emission buildings. Changes can be expected in the next years regarding building airtightness regulation in Latvia, but the authors estimate that it will have to be initiated by European regulations.

3 Ductwork airtightness

If awareness on building airtightness is emerging in Latvia, the ductwork airtightness is not really taken into account so far. There are no national regulations or guidelines on this subject, so there are no requirements on the airtightness level of ductworks.

The reference document is the European standard LVS EN 12237, with the airtightness classes ranging from A (the leakiest) to D (the most airtight).

There are only rare cases in which customers initiate a ductwork airtightness test. There are no data collected on these tests to quantify them and follow their evolution with time.

The authors do not foresee progress about ductwork airtightness in the next years.

4 Key documents

[1] Regulations Regarding the Latvian Construction Standard LBN 002-01, Thermotechnics of Building Envelopes, section IV (para. 22-24), 2001 https://likumi.lv/ta/id/56049-noteikumi-par-latvijas-buvnormativu-lbn-002-01-eku-norobezojoso-konstrukciju-siltumtehnika

[2] Regulations Regarding the Latvian Construction Standard LBN 002-19, Thermotechnics of Building Envelopes, section IV (para. 20-24), 2019 https://likumi.lv/ta/id/307966-noteikumi-par-latvijas-buvnormativu-lbn-002-19-eku-norobezojoso-konstrukciju-siltumte

[3] LVS EN 9972:2016, Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method (https://www.lvs.lv/)

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