

Title of the measure:	LV 37 Energy Performance of Buildings (2002/91/EC) – minimum thermal insulation standards
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General description

The Latvian Construction Standard LBN 002-01 “Thermotechnics of Building Envelopes” [1] came into force 1st January 2003. The Amendments adopted in June 2006 had introduced the requirements of the Directive 2002/91/EC on Energy Performance of Buildings. The Amendments adopted in November 2010 had defined the provision to comply with the Guidelines for European Technical Approval of External Thermal Insulation Composite Systems ETAG 004 if the construction is financed by EU or national (state, municipal) financial sources.

The described below version of the Standard was in force up to 22th April 2014. In 22th April 2014 the new 2014 Version of the Standard [2] came into force which introduced the requirements of the recast Directive 2010/31/EU on Energy Performance of Buildings (*see the MURE database Household Sector measure HOU-LV32*).

The purpose of the given Standard had been to reduce final energy consumption in buildings by increasing energy efficiency. The Construction Standard determines the requirements for boundary thermotechnics for new buildings and buildings under renovation/reconstruction as well as for new heating premises to be installed in already built buildings, the temperature in which during the heating season is maintained at 8°C and higher. Energy efficient construction elements promoting energy efficiency and limiting CO₂ emissions shall be provided for in the building design and construction.

The Standard sets two types of values for heat penetrability coefficients for different building's construction elements (see Table 1). At first, the normative values are used in the building design when calculation of the heat loss coefficient for the building is performed. The real heat penetrability coefficients of built building may be higher than defined normative values however shall not exceed the defined maximum values. The value of k for Latvia residential houses varies in the range 0.95 (Liepaja city) – 1.09 (Aluksne) depending on the climate zone.

Table 1. Normative and Maximum Values of Heat Transmittance Coefficients for the Construction Elements $U_{RN}W/(m^2 \times K)$ and for the Linear Thermal Bridge $\Psi_{RN}, W/(m \times K)$.

The presented version of values was in force up to 22.04.2014

No.	Construction elements	Residential houses, homes for the elderly, hospitals and kindergartens	Public buildings, except homes for the elderly, hospitals and kindergartens	Industrial buildings
1.	Roofs and coverings which are in contact with outdoor air	normative 0,2 * k maximum 0,25*k	normative 0.25 *k maximum 0.35 * k	normative 0.35* k maximum 0.5*k
2.	Floors on the ground	normative 0.25* k maximum 0.35 * k	normative 0.35* k maximum 0.5 * k	normative 0.5* k maximum 0.7 * k
3.	Walls:			
3.1.	at weights less than 100 kg/m ²	normative 0.25* k maximum 0.3*k	normative 0.35 *k maximum 0.4 * k	normative 0.45* k maximum 0.5 * k
3.2.	at weights 100 kg/m ² and over	normative 0.3 *k maximum 0.4 * k	normative 0.4 *k maximum 0.5 * k	normative 0.5 *k maximum 0.6 * k
4.	Windows, doors and glazed walls	normative 1.8 * k maximum 2.7 * k	normative 2.2 * k maximum 2.9 * k	normative 2.4 * k maximum 2.9 * k

No.	Construction elements	Residential houses, homes for the elderly, hospitals and kindergartens	Public buildings, except homes for the elderly, hospitals and kindergartens	Industrial buildings
5.	Thermal bridges R, Ψ_{RN}	normative 0,2 * k maximum 0.25 * k	normative 0.25 *k maximum 0.35 * k	normative 0.35 *k maximum 0.5 * k
<p>Note: k – the temperature factor, the coefficient is calculated according the formulae $k = 19 / (T_i - T_{oe})$, where T_i - the normative in-door temperature (°C), in accordance with the Annex 4 of the Latvian Construction Standard LBN 211-98 „Multi-storey Multi-apartment residential houses”, or other construction standards regulating the relevant type of buildings, T_{oe} - the average out-door temperature (°C) during the heating season in conformity with the Latvian Construction Standard 003-01 „Construction Climatography”, or the temperature in the next room, if the calculation of a construction element between two adjacent premises is performed.</p>				

Impact evaluation (methods and results)

One can see (Table 2, [3]), specific annual energy consumption for heating might decreased by ~ 35 kWh/m² if the requirements of 2003-2013 Construction Standard had been fulfilled. Latvia residential buildings' total area constitutes ~ 87 mill.m², however only 5% of residential buildings' area had been built after year 2003 [3]. Based on these figures, the yearly impact of fulfilment of the 2003-2013 Construction Standard may be evaluated up to ~ 0.15 TWh (~ 0.55 PJ) in year 2013.

In year 2009 (i.e., before the start-up of multi-apartment residential buildings' renovation programme supported by ERDF) total final energy consumption with climate correction in Latvian household sector constituted 65.3 PJ, final energy consumption for space heating with climate correction – 44.5 PJ [4]. Thus the impact of the measure (Construction Standard) corresponds to ~ 1% of total energy consumption for heating and ~ 0.8% of the total final energy consumption in residential sector.

However such level of savings might be reached if all new building had fully performed the requirements of the 2003 Standard. As noted by [3], the full performance of requirements was not always ensured due to both low quality of construction works and mistakes in building projects. Thus semi-qualitative evaluation of the impact may be attributed as “medium”.

Interaction of measures

The Construction Standard of year 2003 set the minimum of legislative/normative requirements for the renovation of multi-apartment residential houses. See the description of the financial programmes for renovation of residential buildings by support of ERDF in the financial programming period of years 2007-2013:

- HOU-LV41 “Increasing Heat Energy Efficiency in Multi Apartment Buildings”, and
- HOU-LV33 “Increasing Heat Energy Efficiency in Social Apartment Buildings”

For actual version of the Construction Standard (year 2014) see the MURE database Household sector measure HOU-LV32.

Historical data

Table 2 presents development of the normative requirements for thermotechnics of building envelopes from the year 1979.

Table 2.

Normative Values of Heat Transmittance Coefficients for the Construction Elements of Residential Houses Related to Specific Energy Consumption (Table 11 of [5]).

Construction Elements		1980	1992	2003
Roofs and coverings which are in contact with outdoor air	$W/$ $(m^2 \cdot K)$	0.90	0.25 – 0.40	0.2 k
Floors on the ground		-	0.5	0.25 k
Walls at weights less than 100 kg/m ²		1.1	0.33 – 0.50	0.25 k
Walls at weights 100 kg/m ² and over				0.3 k
Windows, doors		2.4	1.9 – 2.4	1.8 k
Thermal bridges		-	-	0.2 k
Specific annual energy consumption for heating	kWh/m ² annually	150 – 200	100 – 130	70 – 90

References

1. Governmental Regulations No 495 „Regulations Regarding Latvian Construction Standard LBN 002-01 “Thermotechnics of Building Envelopes” “ (*Ministru kabineta noteikumi Nr.495 "Noteikumi par Latvijas būvnormatīvu LBN 002-01 "Ēku norobežojošo konstrukciju siltumtehnika"* ”), adopted 27 November 2001, in force 01 January 2003, published in Latvian: “Latvijas Vēstnesis” 174 (2561), 30.11.2001. Amendments adopted (i) 27 July 2004 (Governmental Regulations No621), (ii) 26 September 2006 (Governmental Regulations No791) and (iii) 23 November 2010 (Governmental Regulations No1064). The historical version (up to 22.04.2014) in Latvian: http://m.likumi.lv/saistitie.php?id=56049&saistitie_id=7. English translation of basic version (the amendments adopted in years 2006 and 2010 not included) available http://m.likumi.lv/saistitie.php?id=56049&saistitie_id=7
2. Governmental Regulations No. 189 „Amendments to the Governmental Regulations No495 Regarding Latvian Construction Standard LBN 002-01 “Thermotechnics of Building Envelopes””, (*Ministru kabineta noteikumi Nr.189 "Grozījumi Ministru kabineta 2001.gada 27.novembra noteikumos Nr.495 "Noteikumi par Latvijas būvnormatīvu LBN 002-01 "Ēku norobežojošo konstrukciju siltumtehnika"")*), adopted 08 April 2014, in force 22 April 2014, published in Latvian: „Latvijas Vēstnesis”, 77 (5137), 17.04.2017, <http://likumi.lv/doc.php?id=265703>
3. Ministry of Economics. Informative Report on Financial Settlement for Buildings’ Renovation (*Informatīvs ziņojums par ēku renovācijas finansēšanas risinājumiem*), reviewed by the Government 04.06.2013, <http://www.mk.gov.lv/lv/mk/tap/?pid=40267991>, pages 4-9, in Latvian.
4. Ministry of Economic & Central Statistical Bureau of Latvia. “Latvia Energy in Figures”, Riga, 2013, pages 62-63.
5. Ministry of Economics. Long-Term Strategy for Building Renovation. http://ec.europa.eu/energy/sites/ener/files/documents/2014_article4_en_latvia.pdf

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