

Title of the measure:	NOR16 Building regulations 1997 (Byggeforskrift 1997)
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General description

The objective of the plan and building regulations is that planning in accordance to the law will arrange coordination of national, regional and local activities and be a foundation for decisions on use and protection of resources, development, and secure aesthetic considerations. The measure is valid for the whole country without differences between regions. The scope and extent of the regulation is all types constructions and products for constructions. The current law entered into force for the first time 1 July 1986 and was amended in 1997. In February 2008 the regulation was changed to partly implement EU directive 2002/91/EC concerning energy efficiency and energy use in buildings. These changes are described at the end of this description.

§ 8-2 Use of energy

Construction works with installations shall be executed in such manner as to promote a low demand for energy and power, which does not exceed the overall limitations established in this Chapter. The demand for energy and power shall be such as to ensure a justifiable indoor environment.

The construction works and its installations shall be executed in such manner as to minimize the need for cooling and so as to avoid an unnecessary cooling demand.

§ 8-21 Energy and power

Requirements for the need of energy and power for a building may be established in one of the three alternative ways:

- by the use of overall energy limitations adapted to various categories of buildings
- by satisfying requirements for the heat insulating performance of each and every element of the building
- by the use of overall limitations to heat loss based on a redistribution between the different building elements.

The alternatives are given in the following subsections No. 1, 2 and 3.

1. Overall energy limitations

The energy demand of buildings for heating and ventilation shall not exceed the overall limited values resulting from calculations by a recognized method. The overall energy limit is to be given per year and m² of net floor area (NTA) for the heated parts of the building. In the case of more than one temperature zone in the construction works, the overall energy limit shall be calculated for each zone and distributed over the net area of each zone.

Limitations on the energy demand for heating are to be calculated from a given reference temperature, the heat loss of transmission given in No. 2, and heat loss of infiltration. Overall energy limit for the use of ventilation are obtained through the requirements defined for indoor climate. In establishing the overall energy limitation the energy gain obtained in terms of internal heat and solar radiation shall be considered.

The real need for energy in a building is to be calculated on the bases of the different building elements coefficient of heat transfer (U), window areas and their locations, solar factor, air quantities, amount of internal heat, heat capacity, operation periods, etc. applying to the works in question. Where such values are not known, calculations are to be made according to the rules in Norwegian Standard.

2. Thermal insulation

The thermal insulation ability of each part of the works shall be calculated with the coefficient of heat transfer as given in the table below. The tabulated values apply as long as the total area of windows, glass roofs and walls, and exterior doors does not exceed 20% of the net area of the building within 10 m from the external wall, for the heated parts of the construction works. If the construction works is permanently divided into temperature zones, then the relevant parts of the works in each zone shall be thermally insulated relative to the room temperature of the zone.

The effect of thermal bridges caused as a result of poor or non-existent local insulation shall be taken into account in the calculation of the coefficient of heat transfer, U, of building elements and shall be considered in planning the indoor climate.

Table 1: Highest average U-values for exterior building elements

Building element (W/m ² , K)	Indoor temperature and heat transfer coefficient			
	T ≥ 20°C	15°C ≤ T < 20°C	10°C ≤ T < 15°C	0°C ≤ T < 10°C
External walls ¹	0.22	0.28	0.40	0.60
Roofs, floors on ground and toward the open	0.15	0.20	0.30	0.60
Floors toward unheated space	0.30	0.40	0.50	0.60
Windows ² , doors	1.60	2.00	2.50	3.00
Glass walls and glass roofs	2.00	2.00	3.00	3.00

¹ External walls in an unheated basement may have U ≤ 0.8

² Windows in commercial premises may have U = 2.0 for T ≥ 20°C

3. Overall heat loss limitations

The overall heat loss limitations may be established by calculating the total transmission loss of the building using the coefficients of heat transfer in No. 2.

The heat transfer properties and the window area of each building element may be changed relative to the values in the table of No. 2, provided that the transmission loss does not exceed the overall heat loss limitations for the construction works.

§ 8-22 Air tightness

Buildings shall be so impervious that the effect of thermal insulation is not reduced by unintentional flow of air through them.

Moisture shall not be allowed to penetrate and reduce the effect of thermal insulating or worsen the design life of the building.

Buildings shall be so impervious that the indoor climate is not negatively affected and in such manner that unpleasant draught does not occur.

§ 8-23 Materials favourable to energy and the environment

Where it is documented that a building is made from materials requiring low energy consumption in their production and abolishment, and the materials otherwise have good environmental qualities, it may be accepted that the building consumes more energy in its period of operation than what follows from § 8-21 No. 1.

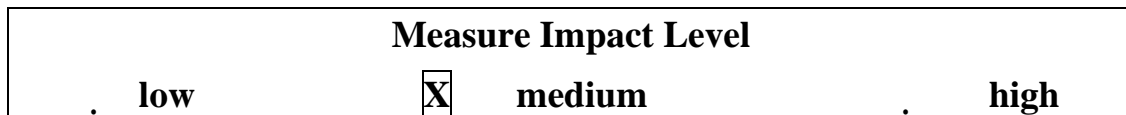
It must be shown as being probable that the total energy consumption for production of materials, operation of the building and abolishment of the materials does not exceed the general level expressed in this Chapter.

Changes implemented 1 February 2008

- All buildings have to have other possibilities than electricity or fossil fuels for heating
- Calculated useful energy demand has to be below the frames of 13 different building categories in kWh/m² heated area
- Alternatively the requirements may be fulfilled by implementing certain energy efficiency measures (e.g. more insulation, better windows, ventilation air heat recovery, more air tight buildings, max ventilation fan capacity, reduced use of air condition (cooling), night/weekend reduction of temperature to 19°C)
- Certain minimum demands concerning U-values may not be exceeded.
 - External walls 0.22 W/m²K
 - Roofs 0.18 W/m²K
 - Floors on ground and toward the open 0.18 W/m²K
 - Windows 1.6 W/m²K
 - Air exchange pr hour with 50 Pa pressure difference 3.0

Impact evaluation (methods and results)

Ex-post evaluation	1995	2000		
direct CO ₂ (kt)				
Energy (TJ) (Fuels/Electricity)				
Ex-ante evaluation	1995	2000	2010	2020
direct CO ₂ (kt)				
Energy (TJ) (Fuels/Electricity)		medium		



Interaction of measures

This measure has mitigating interaction with environmental taxes (NOR3), the EcoBuild programme (NOR21), the improved electricity billing (NOR17), low energy houses (NOR5), grants to electricity savings (NOR14) and energy saving loans (NOR12).

Historical data

The present building regulation replaces the building regulation of 1987 (see NOR4). The main content of the old regulation is presented in the table below. The demand of U-values is to be understood as an overall energy limit. The demand of U-values for each building component may be exceeded if it is compensated for by a lower U-value in other components of the building.

Until 1980 Norway was divided into climatic zones, with higher heating insulation demands in colder parts of the country.

Table 2: Highest average U-values for exterior building elements (building regulations 1987)

Building element (W/m ² , K)	Indoor temperature and heat transfer coefficient		
	T ≥ 18°C	10°C ≤ T < 18°C	0°C ≤ T < 10°C
External walls	0.30	0.60	0.80
External windows	2.40	3.00	-
External doors	2.00	2.60	-
Roofs	0.20	0.40	0.60
Floor – toward outdoor	0.20	0.30	0.40
Floor – toward unheated space	0.30	0.60	0.60
Floor – toward foundation wall	0.30	0.60	0.60

References

Law 1985.06.14 No. 0077:

<http://www.lovdatab.no/cgi-wif/wifldles?doc=/usr/www/lovdatab/all/nl-19850614-077.html&dep=alle&kort+,+titt=bygning&>

Regulation 1997.01.22 No. 0033:

<http://www.lovdatab.no/for/sf/kr/kr-19970122-0033.html>

Changes in the regulation:

<http://www.be.no/PDFs/forskriftSAKTEKendr2007.pdf>