



Building Regulations for Windows in European Countries

The attached tables summarise the Building Regulations requirements for the thermal performance of windows in all the EU countries, and in several other European countries outside the EU.

The information has been compiled principally from members of the glass industry working in each of these countries. An additional source of information is the report “A comparison of Thermal Building Regulations in the European Union”, published as part of the EU MURE project, April 1998. More recently, an EU SAVE project called ENPER was set up to study energy codes and regulations throughout Europe, and this provided further useful information.

In some countries there may be a range of U-value requirements, depending for example on climatic zone, building type or design internal temperature. However, there is invariably one U-value which is far more commonly required in practice than the others, and that is the one appearing on the large table.

Where the word “volumetric” appears, the Regulation does not prescribe a window U-value, but rather an aggregate heat loss figure for the whole building envelope. In the Netherlands, the requirement is based on a calculation of total energy consumption; EPC (energy performance coefficient), which includes lighting and hot water.

The recent EU Directive “Energy Performance of Buildings” requires every Member State to develop a standard methodology for calculating the total energy performance of a building, and to base its Building Regulations on an energy target defined by that methodology. Therefore we will increasingly see far fewer requirements for individual elemental performance in Building Regulations in the future.

The third column of the large table lists the standard glazing specification occurring in new build, notwithstanding the Regulatory requirement, based again on information from industry contacts in those countries. Occasionally, standard practice is considerably in excess of the Regulatory requirement. Low E double glazing, and in some Nordic countries triple glazing, is standard practice in the majority of the countries surveyed.

The final column of the large table shows what - if any - improvements to Regulations have been announced.

In a few countries, the Building Regulations have requirements for existing buildings, when refurbishment takes place. These are indicated in the small table.

Please regard this as a living document, which will be regularly updated.





Building Regulations for new build

Country	Window U-Value	Current Standard Practice	Future Developments
Austria	1.9	Low E double glazing and argon.	Working towards the development of a national building code by 2005 (currently the provinces have autonomy). Likely to be a total energy consumption requirement.
Baltic States	-	Triple Glazing or Low E double glazing.	Currently writing Regulations. Likely to match Scandinavian standards.
Belgium	3.5 (2.5 in Brussels Region)	Ordinary double glazing (Low E double glazing in Brussels Region).	Flanders Region intend to move to U2.0.
Denmark	1.8	Low E double glazing	From Jan 2006 the requirement for new build will be based on Total Energy Performance. U1.5 will be required for extensions and major refurbishments.
Finland	1.4	Triple (2 + 1), many with Low E and argon.	
France	Total energy consumption, with U-value limits (2.9 in the case of windows), or 2.2-2.4 if following the elemental option. There are also requirements to minimise solar gain in summer.	New Regs came into effect June 2001, leading to Low E double glazing becoming common practice.	Government is working on making improvements from Dec 2005, and every five years thereafter. Will include requirements for solar protection.
Germany	Volumetric, but lower limit elemental values	Low E double glazing and argon.	
Greece	2.5 in the north, 3.0 in the south	Double glazing, increasingly moving to low E.	
Ireland	2.2	Low E (hard coat) double glazing.	
Italy	Volumetric	Ordinary double glazing in the north, single in the south.	U2.4 to 5.5 (depending on climatic zone) currently being proposed for new build and replacement windows.
Luxembourg	2.0	Low E double glazing	



Netherlands	Total energy consumption (EPC), with U-value limits	Low E double glazing	U1.2 being proposed by government. EPC to be improved every year.
Norway	1.6	Low E double glazing and argon.	U1.5 being proposed for 2006.
Poland	2.6	Low E double glazing	Preliminary talk of moving to U2.0 or lower.
Portugal	Volumetric	Double glazing	Heat loss requirement to be tightened by about 40%. Should lead to some double glazing in colder climatic zones.
Russia	1.8*	Low E double glazing or triple clear glazing	
Slovakia	2.0 (for large bldgs)	Low E double glazing	
Slovenia	1.6		
Spain	Volumetric	Double glazing	Regulations under review. New standards in 2005
Sweden	Volumetric	Triple glazing, often with Low E and argon.	Parliamentary review of energy performance of buildings initiated in 2002, to report in 2005. Likely to result in improved regulations in 2006, including provisions for existing buildings.
Switzerland	Volumetric	Low E double glazing	
UK	Window U = 2.2 (metal windows) and 2.0 (non-metal).	Low E (hard coat) double glazing	Government have announced that new Regulations will be published July 2005.

* This is the requirement for Moscow, but throughout Russia the required U value is related to the local degree-days. For example Novosibirsk's is 1.5 and Yakutsk's is 1.3. In the far north it is as low as 1.1. Furthermore, the Russian method of calculating U values involves more severe temperature differences and surface coefficients than the CEN method, so a Russian U value of 1.8 might be equivalent to a value of 1.5 under CEN.

Additional notes:-

Japan - The requirements for new buildings in Japan (introduced in 1999) depend on climatic zone. There are four window U values, namely 2.33, 3.49, 4.65 and 6.51.

United Arab Emirates – Where 40% or more of a façade is glazed, the glass U value must be 2.25 or better.



China – Has just adopted standards for residential windows. The required U value (and shading coefficient) varies according to the % glazing. Also, there are 5 climatic zones. Requirements for non-residential are being developed (expected 2005).

India – In the process of developing regulations (but the emphasis will be on cooling). Expected 2005.



Building Regulations for existing buildings

Country	Window U-value	Conditions
Denmark	1.8	Any window which is replaced, (when a building permit is required).
Germany	1.7 (whole window) 1.5 (glass)	When 20% or more of windows in any façade are replaced.
Poland	2.6	Any window which is being replaced.
UK	2.2 (metal windows) 2.0 (non-metal windows)	Any window which is being replaced.
Ireland	2.2	Any window which is being replaced in houses.

Note; the EU Directive “Energy Performance of Buildings” will require, from January 2006, all buildings over 1,000m², when undergoing major refurbishment, to install all available practical and economic energy-efficiency improvements at the same time.