

Wienerberger Technical Guidance

DIMENSIONS AND TOLERANCES

European Standard Size Tolerances

The European Standard for clay masonry units, BS EN 771-1 applies to the manufacture of all Wienerberger clay bricks. The work size dimensions of a standard UK brick remain at 215 x 102.5 x 65mm, but the European Standard applies a different test method (to that in the former British Standard BS3921) to determine the size tolerance.

The European Standard distinguishes between different brick types; it has long been thought that a different tolerance is appropriate depending on the nature of the product. Tighter tolerances can often be achieved for more regular extruded or wirecut products than with handmade and stock bricks.

It must also be remembered that brick sizes in mainland Europe differ from the UK, and therefore a formula has been developed based on specific work sizes. For the UK brick size, this translates into the **Tolerance** categories shown below.

TABLE 1: BS EN 771-1 TOLERANCE CATEGORIES

Dimensions	Work Size (mm)	Tolerance Categories		
		T2	T1	Tm
Length	215	± 4mm	± 6mm	Option for manufacturer to declare own limits
Width	102.5	± 3mm	± 4mm	
Height	65	± 2mm	± 3mm	

To determine the tolerance applicable, measurements are taken for length, width and height of **10 individual bricks** (*randomly sampled from the consignment*). The **mean** figure is calculated by addition of each specific measurement, divided by 10. This figure should not deviate from the work size by the +/- tolerance category guaranteed for the particular product. For example, for a product of **T2** tolerance (*the tightest tolerance*), when referring to the stretcher length of work size 215mm, the **mean** figure should fall between 211 and 219mm.

With the measurement of individual bricks, the European Standard is able to apply a **Range** category, to determine the difference between the smallest and largest bricks within the sample of 10 units. There are again different tolerances for range and the following table indicates the categories:

TABLE 2: BS EN 771-1 RANGE CATEGORIES

Note: The tables 1 & 2 are separate, in that a product in Tolerance T2 will not necessarily achieve a range of R2.

Dimensions	Work Size (mm)	Range Categories		
		R2	R1	Rm
Length	215	4mm	9mm	Option for manufacturer to declare own limits
Width	102.5	3mm	6mm	
Height	65	2mm	5mm	

The procedure for measurement in the European Standard refers to the use of long jaw callipers which are appropriate for laboratory testing but not suitably robust enough for on-site measurement. Consequently, the British Standards Institute (BSI) published a Publicly Available Specification (PAS) 70, which provides both guidance on appearance, and a practical on-site size test method using a conventional retractable steel rule.

PAS 70 includes two procedures to determine Tolerance and Range. Although 10 bricks are again required as a sample, the PAS 70 method involves the overall linear measurement of bricks as shown below. This overall dimension is divided by 10 to provide a mean figure.

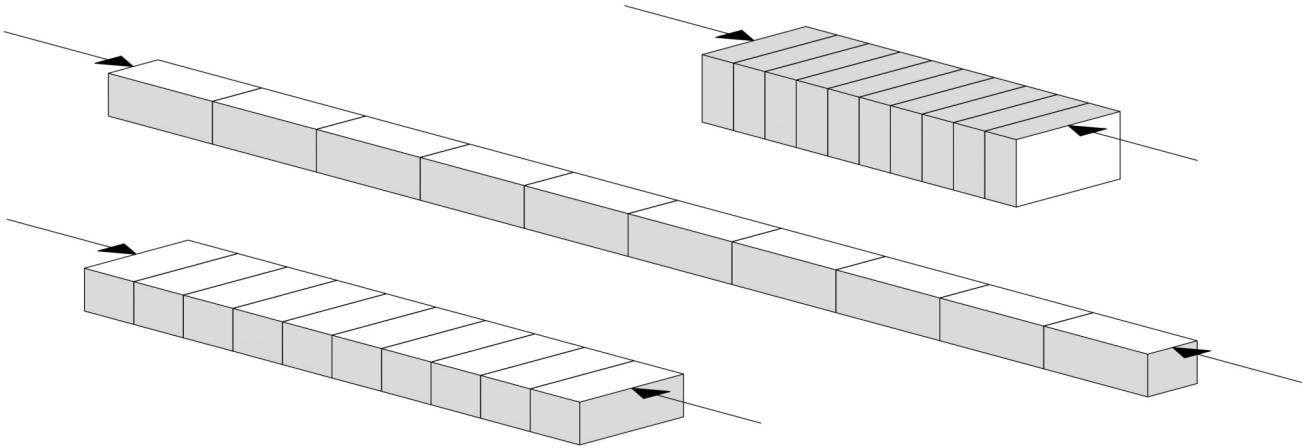
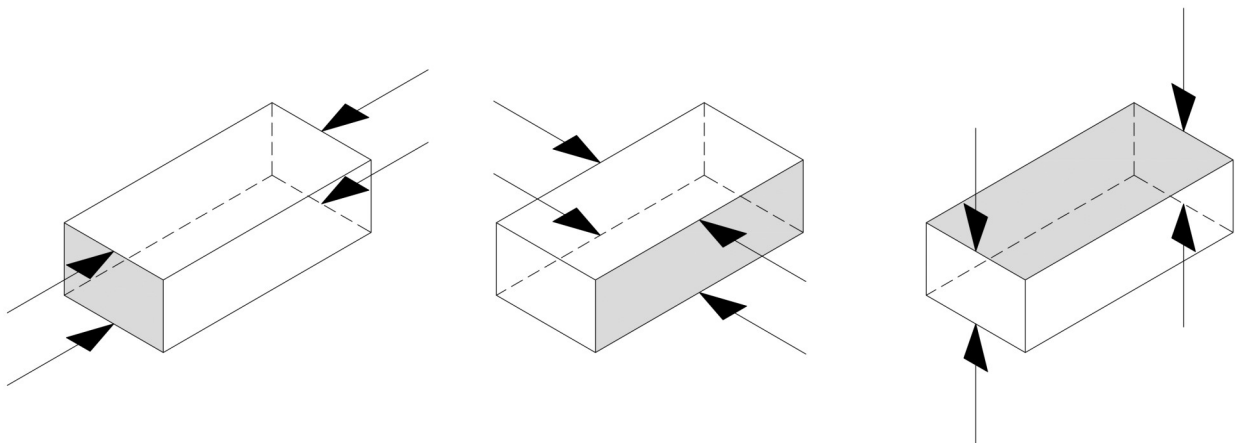


TABLE 3: PAS 70 TOLERANCE CATEGORIES

Dimensions	Work Size (mm)	Tolerance Categories		
		T2	T1	Tm
Length	215	± 3mm	± 5mm	Option for manufacturer to declare own limits
Width	102.5	± 2mm	± 3mm	
Height	65	± 1mm	± 2mm	

The individual figures in PAS 70 are **1mm less** than the European Standard for each category and appear to be more stringent than the declared categories for a given product. This allows for the recording of whole millimetres using a tape measure, but provides sufficient confidence that the categories indicated by the site test would be confirmed by the more detailed measurement procedure in the European Standard.

To determine the Range dimension on site, the PAS 70 procedure involves the mean of two measurements for each dimension of each individual brick, as illustrated:



The difference between the smallest and largest units identified is compared with the range category (see Table 4). As with tolerance, the individual range figures in PAS 70 are 1mm less than those in BS EN 771-1 in each case, and for classification the product must meet all requirements for the stated category.

TABLE 4: PAS 70 RANGE CATEGORIES

Note: The tables 1 & 2 are separate, in that a product in Tolerance T2 will not necessarily achieve a range of R2.

Dimensions	Work Size (mm)	Range Categories		
		R2	R1	Rm
Length	215	3mm	8mm	Option for manufacturer to declare own limits
Width	102.5	2mm	5mm	
Height	65	1mm	4mm	