what stone?

finishes | properties | tolerances

the natural selection
and various treatments

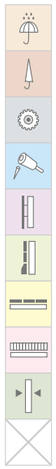
what stone | finishes

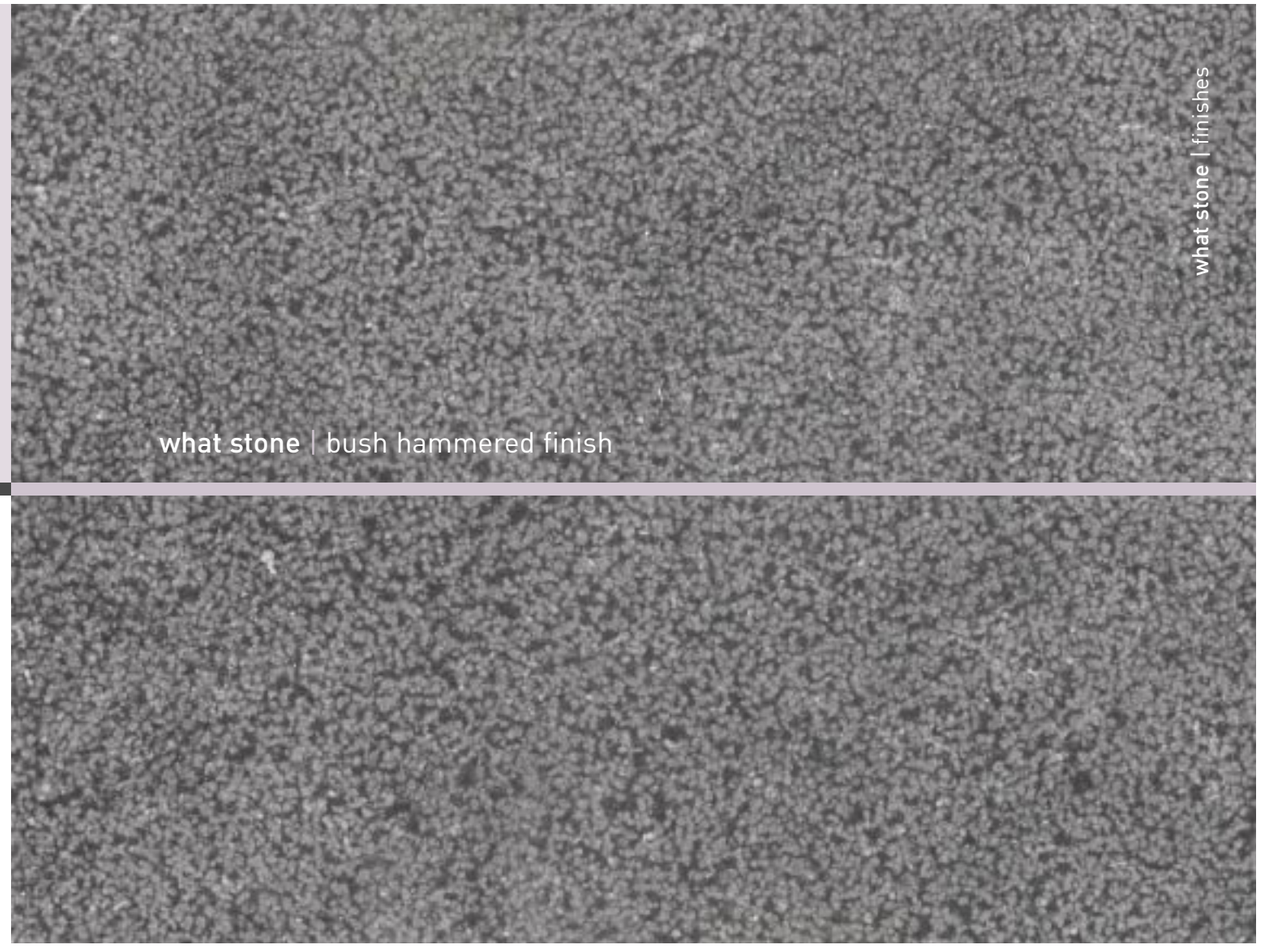
Irish Blue Limestone has been used for centuries as the material of choice for the construction of prestige buildings. It can be worked to provide colours that range from deep blue black to subtle blue grey and surface textures ranging from silky smooth to positively aggressive.

In the hands of a skilled architect, designer or mason the combination of colours and textures can bring the most mundane structure to life or produce stunning variations with the interplay between light and texture.

As with all materials there are some limitations on limestone thickness for the textured finishes. In a similar way some of the mechanically produced textures cannot be applied to the edges of the blocks. Polished and honed finishes generally do not perform well out of doors.

The icons associated with each finish provide a quick guide to the application and minimum thickness of the finished stone.





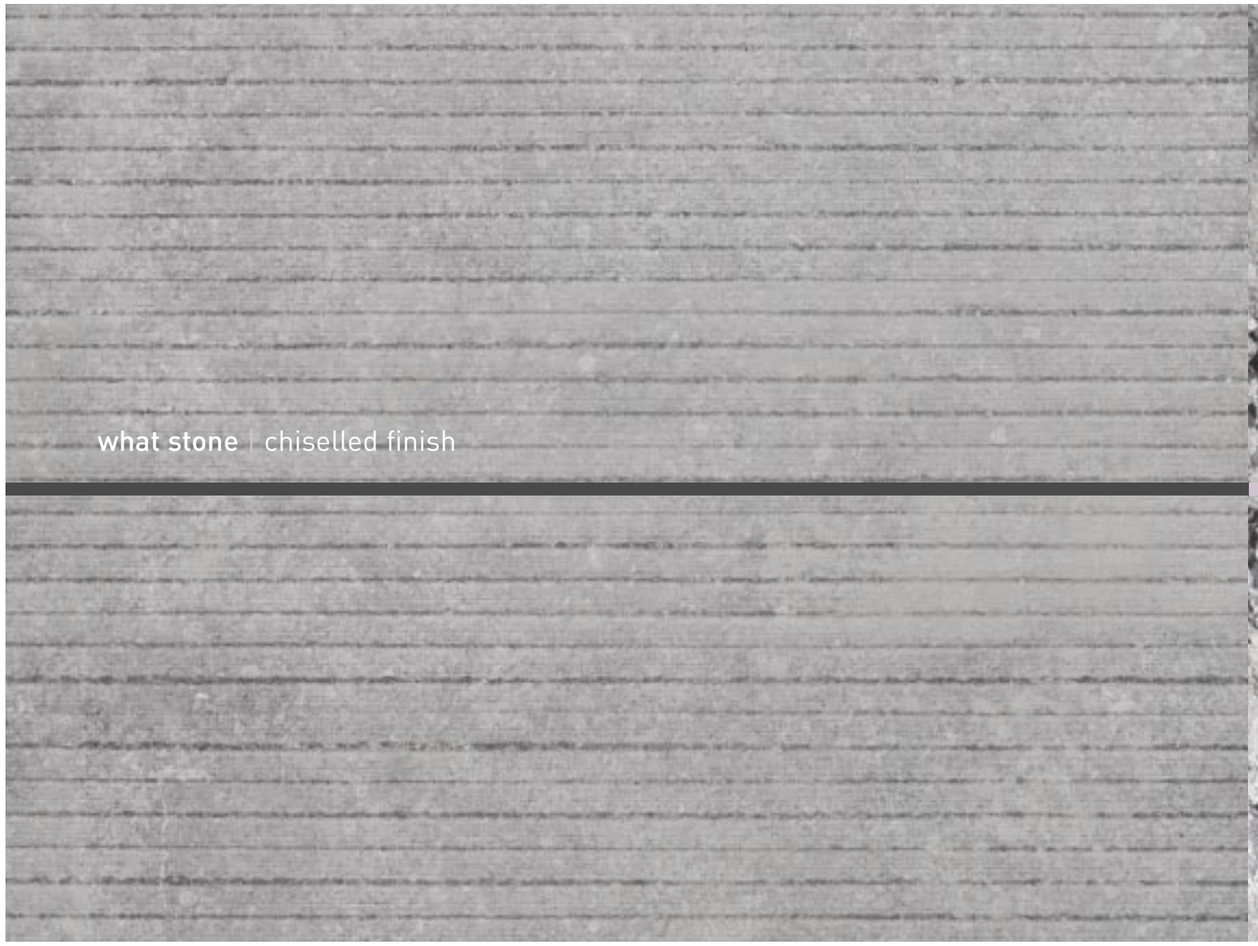
what stone | bush hammered finish

Colour

Bush Hammered finish has a dark blue-grey background with randomly distributed, closely spaced, contrasting paler blue-grey spots.

Finish

The surface has a smooth background with a closely spaced, randomly distributed pattern of fine dimples. Very little of the underlying limestone texture is visible but larger crinoids and white lines may show up as slightly paler areas. The appearance will vary slightly depending on the interplay of light and shadow on the surface.



Colour

Chiselled finishes are a pale blue-grey colour with thin sharply contrasting dark grey to black parallel lines. Crinoids will form a randomly distributed pattern of paler grey flecks.

Finish

The surface has a series of smooth parallel incised curved surfaces separated by thin lines of darker limestone. These will have minor imperfections where the calcite crystals or crinoid traces have fractured during the machining. The appearance will vary depending on the orientation of the grooves and the interplay of light and shadow on the surface.

Colour

The colour can be highly variable ranging from dark blue-grey to pale brown-green depending on the beds being extracted. There can also be extensive development of white calcite.

Finish

The surface is produced by the various lithification processes during the transformation of the lime mud into the limestone and may often have slightly brown colouration due to the presence of clay minerals within the calcite. There may be considerable variations in the actual thickness of the finished material.

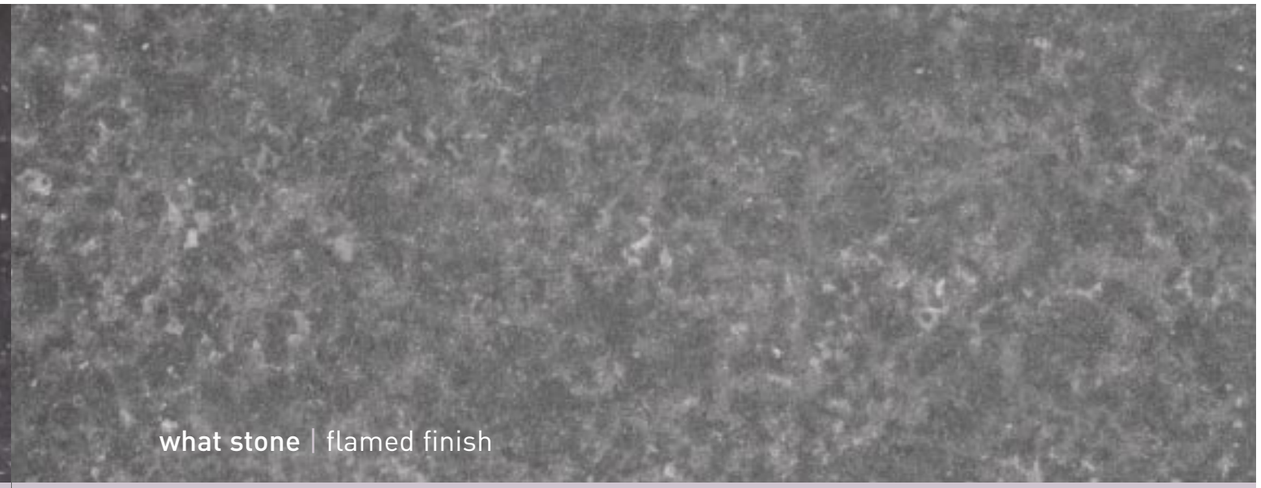
what stone | flamed and brushed finish

Colour

Flamed faces have a translucent mottled grey colour. The tonal variations are randomly developed and very little of the underlying calcite grain structure is discernable. Crinoids will show as paler flecking.

Finish

The surface has a smooth glassy texture with an irregular overlay of minor pits and peaks.



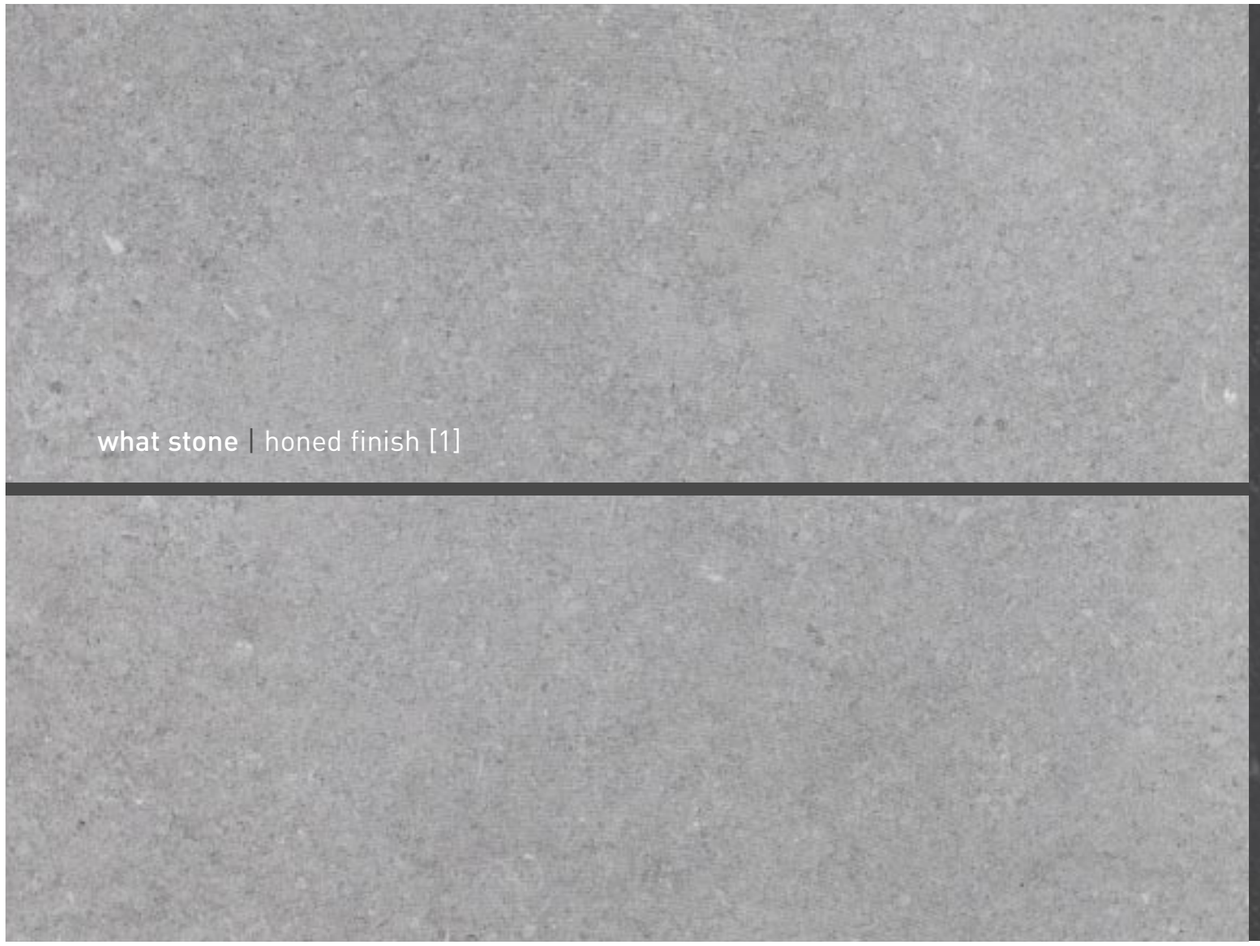
what stone | flamed finish

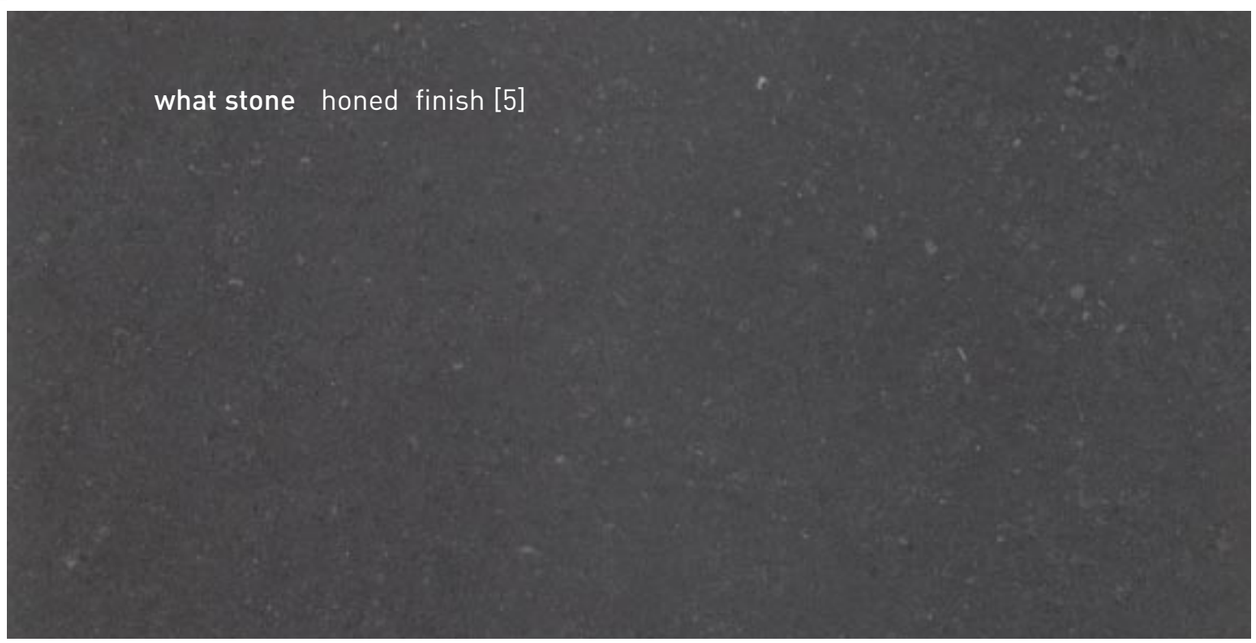
Colour

Flamed faces have a slightly translucent mottled grey colour with slightly paler areas. The tonal variations are randomly developed and very little of the underlying calcite grain structure is discernable. Crinoids will show as paler flecking.

Finish

The surface has a smooth slightly dusty appearance with an irregular overlay of minor pits, peaks and flakes.





Colour

Honed finishes can be produced using a range of grits. The coarsest grit (1) will give a pale blue-grey colour and the finest (5) a dark blue-grey to black. There will be subtle variations between different beds in any quarry. Most quarries have a limited number of beds that yield an even colour but where crinoids are present they will show as well defined surface mottling. Shell beds honed with a fine grit are often black with a spectacular white contrast provided by the brachiopods.

Finish

The surface produced by the coarser grits (1) is smooth and matt with a faint pattern of circular scores. Finer grits (3 & 5) produce a smooth matt texture with no obvious tool marks .

what stone | polished finish

Colour

Polished finishes vary from intense dark blue-grey to black but some beds may have a very slight brownish tint. The crystal structure of the calcium carbonate and the crinoids will be obvious. The white brachiopods in the shell or fossil beds will form a startling contrast to the dark even finish on these materials.

Finish

The surface has a smooth glossy texture which appears to have depth. This illusion is due to the light reflecting from the back faces of the calcium carbonate crystals forming the finished surface.

what stone | sanded finish

Colour

Sanded faces will normally have a pale blue-grey colour with crinoids and the calcite grain structure giving minor tonal variations.

Finish

The ground faces are flat with a faint fine pattern of scores.

what stone | split finish

Colour

Split face will normally have a dark blue-grey colour with random paler flecks where crinoids are present. The technique often fractures the calcium carbonate crystals giving small reflective planes that make the surface sparkle.

Finish

Splitting produces an irregular surface which may have quite high relief. Humps, hollows and pits will be randomly developed on the surface and may extend across the block edges. Ashlar traditionally had a chisel dressed edge applied to the exposed face. It will be necessary to dress areas of split stone using a point to remove the visible sawn edges.

what stone | matrix

Finishes								
Brush Hammered	●	●	●	●	●	●	●	●
Chiselled	●	●	●		●	●		●
Crust	● *	●	●					
Honed 1	●	●	●	●	●	●	●	●
Honed 3	●	● *	●	●	● *	●	●	*
Honed 5	●	*	●	●	*		●	*
Flamed & Brushed	●	●	●		●	●	●	●
Flamed	●	●	●		●	●	● *	●
Polished	●	*	●	●	*	*	●	
Sanded	●	●	●	●	●	●	●	●
Split	*	●	●	●		●		●

* Not recommended but could be used

The Irish Blue Limestone is a natural material and every single piece is unique and carries the marks of its geological history. The producers all operate strict quality control procedures to make sure that the material supplied is suitable for the purpose. The stone will however have certain features that are characteristic of the material and cannot be avoided.

The lithification process results in the formation of stylolites. These appear as fine black slightly crenulated lines on the surface of the stone and will only become apparent when the stone is viewed from less than three metres. The presence and width of the stylolites form part of grading criteria used by the producers when they select stone for any application.

Where honed or polished finishes are specified only very fine stylolites will be acceptable. Similar criteria apply to the selection of monumental grade stone. Cladding and ashlar may have slightly more apparent stylolites but the quality control will make sure they will not cause the surface to degrade in use.

A second consequence of the transformation of the lime mud into the Irish Blue Limestone, is the formation of fine white calcite veins and masses within the stone. Provided the calcite is completely bonded to the surrounding blue limestone it will not affect the durability of the stone. Fine white calcite veins and small white calcite masses can be found in all grades of the limestone and, in the case of fossil limestone, they are part of the attraction of the stone. In terms of the grading criteria, the more expensive monumental grade stone will have the least number of fine white lines and masses. Stone used for ashlar and cladding will always have some white lines and masses.

Fossils are a characteristic feature of the Irish Blue Limestone and their distribution can give rise to subtle variations in the colour. Uniformity of colour and appearance only forms part of the grading criteria for monumental stones. The subtle variations in fossil content is part of the attraction of Irish Blue Limestone when used in a project.

	Typical Value	Range
Apparent Density	2690 kg m^{-3}	2680-2700 kg m^{-3}
Porosity by Volume	0.31%	0.15% - 0.51%
Compressive Strength	110-126 N mm^{-2}	
Modulus of Elasticity	751 kN mm^{-2}	740-760 kN mm^{-2}
Flexural Strength	14.7 N mm^{-2}	13.3-15.8 N mm^{-2}
Thermal Expansion	0.01 mm m-$1K^{-1}$	
Thermal Conductivity	2.5-3.1 W m-$1K^{-1}$	
Ultrasonic Velocity	5416 ms^{-1}	5180-5785 ms^{-1}

The stone is frost resistant and will not be affected by normal levels of atmospheric pollution.

The results given above are based on samples tested in accordance with the following specifications:

Apparent Density	ASTM C97-82; NBN B15-22
Porosity	BRE PD85/75
Compressive Strength	NBN B05-21
Modulus of Elasticity	NBN B15-203
Flexural Strength	NBN B15-214
Ultrasonic Velocity	NBN B15-229

what stone | tolerances | irish blue limestone

The processes involved in the conversion of a 20 tonne block of limestone extracted from the quarry into cladding, ashlar, tiles or any of the myriad of other products used in construction will inevitably introduce errors in the final sizes and thicknesses. This can be further complicated by the type of finish applied to the component. By continued investment in the latest cutting and finishing equipment the Irish Blue Limestone producers endeavour to supply material as close to the specified sizes as possible. The current operating tolerances are set out below.

Sawn Slab	
Area	Maximum regular rectangle that could be cut from Slab There is a 20 mm allowance on length and width for subsequent processing losses
Thickness	± 2.0 mm
Bow & Twist	± 2.0 mm per 600 mm of length

Finished Stone **Contra-pass & Sawn Ashlar**	
Length & Width	± 1.0 mm for dimensions up to 600 mm ± 2.0 mm for dimensions equal to or greater than 600 mm
Thickness	± 2.0 mm
Squareness	± 1.5 mm for lengths less than or equal to 600 mm ± 2.0 mm for lengths greater than 600 mm

Cladding	
Length & Width	± 1.0 mm for dimensions up to 600 mm ± 2.0 mm for dimensions equal to or greater than 600 mm
Thickness	± 2.0 mm
Squareness	± 1.5 mm for lengths less than or equal to 600 mm ± 2.0 mm for lengths greater than 600 mm
Bow & Twist	+/- 2.0 mm per 600 mm of length.

Split & Dressed Ashlar	
Length & Width	± 4.0 mm for dimensions up to 600 mm ± 5.0 mm for dimensions equal to or greater than 600 mm
Thickness	± 10 mm

Curved Ornate or Complex Ashlar	
Length & Width	± 4 mm with butting faces matched as appropriate
Thickness	± 10 mm

Rustic Paviors & Setts	
Length & Width	Sawn Sides ± 3.0 mm Guillotined Sides ± 7.5 mm
Thickness	± 10 mm

Tiles	
Length & Width	± 1.0 mm
Thickness	± 2.0 mm

Monumental Limestone	
Length	+ 6.0 mm/ -3.0 mm
Thickness	± 3.0 mm
Posts	± 3.0 mm

The tolerances outlined in this section do not include allowable tolerances on applied labours such as chamfered, bullnose & bevel edges, rebates, etc. Details of these should be checked with the individual producers when the specification is being prepared.