



Ham Hill Lower
Bed Limestone

Technical Data Sheet

Ham Hill Lower Bed Limestone

Ham Hill Stone Company Ltd

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This data sheet was compiled by the Building Research Establishment (BRE). Where possible, data collected in earlier surveys has been used to help interpret the test results. The data sheet was compiled in September 1997 using the results of tests carried out to the proposed European Standards. The work was carried out by BRE as part of a Partners in Technology Programme funded by the Department of the Environment, Transport and the Regions and The Ham Hill Stone Company Ltd and does not represent an endorsement of the stone by BRE.

General

The Ham Hill Stone Company quarry is located on the summit of Ham Hill, close to the village of Stoke-sub-Hamdon on the edge of the Ham Hill Country Park. Stone has been quarried on Ham Hill for more than 500 years with the present quarry being reopened in 1984. The quarry's reserves have been measured at well over one million tonnes.

Petrography

1. Macroscopic

The stone is a medium to coarse grained shelly limestone from the top of the Toarician Stage of the Upper Lias Age (Lower Jurassic Series). The stone consists of a well cemented mass of shells, crystalline calcite and iron minerals which gives it a distinctive colour.

2. Microscopic

Ham Hill stone is classified as an allochemical rock consisting largely of fragments of Brachiopoda and Echinodermata. Although the stone is coarse-grained, thin laminae of finer-grained fragments do occur throughout the rock. The laminae tend to contain small concentrations of sand grains (grain diameter about 30 microns) and on occasions they can form features on a macro scale. Sand grains are also found throughout the stone but at a low concentration. The

original cement between the grains was probably sparry calcite but it now has a micritic fabric.

In addition to calcite, the matrix contains relatively large quantities of goethite (iron hydroxide). This takes the form of diffuse spheres of the mineral, up to about 20 microns across. It is this mineral that gives the stone its colour. (Based on Jefferson 1996)

The Hard White is a creamy coloured stone of uniform texture with very little shell. The depth of this bed is around 3.0m with individual quarry blocks around 2000mm x 1000mm x 500mm on bed.

Expected Durability and Performance

It is important that the results from the from individual tests are not viewed in isolation. They should be considered together and compared to the performance of the stone in existing buildings and other uses. Limestones from the Jurassic series have been used extensively in many towns and cities in the UK.

Ham Hill limestone appears to be a durable stone that will weather well. In addition, the very low weight lost in the sodium sulphate crystallisation test indicates good resistance to salt damage (for example in coastal locations or from rising salts); the stone is expected to have good frost resistance. The compressive strength of the stone is towards the lower end of the range for comparable limestone but the flexural strength is towards the upper end of the range. The abrasion resistance is seems quite low but the stone should be suitable for use in lightly trafficked areas.

Overall, the stone should be suitable for use in most aspects of construction including flooring, lightly trafficked paving, load bearing masonry and cladding including areas where a long service life is needed or where high salt concentrations are expected.

Test Results – Ham Hill Lower Bed Limestone

Safety in Use		
Slip Resistance ^(Note 1)	N.D.	Values > 40 are considered safe

<p>Abrasion Resistance (Note 1)</p>	<p>28.5</p>	<p>Values <23.0 are considered suitable for use in heavily trafficked areas</p>
<p>Strength under load</p>		
<p>1) Compression^(Note 2)</p>	<p>33.9 MPa</p>	<p>Loaded perpendicular to the bedding plane ambient humidity</p>
<p>2) Bending^(Note 1)</p>	<p>9.8 MPa</p>	<p>Loaded perpendicular to the bedding plane ambient humidity</p>
	<p>N.D.</p>	<p>Loaded parallel to the bedding plane ambient humidity</p>
<p>Porosity and Water Absorption</p>		
<p>1) Porosity^(Note 3)</p>	<p>11.11%</p>	
<p>2) Saturation Coefficient^(Note 3)</p>	<p>0.57</p>	

3) Water Absorption	2.6 % (by wt)	
4) Bulk specific gravity	2442kg/m ³	
Resistance to Frost		
Freeze/Thaw Test ^(Note 1)	N.D.	
Resistance to Salt		
Sodium Sulphate Crystallisation Test ^(Note 3)	-0.15% Mean wt loss	

(Test methods Note 1 = EN1341, Note 2 = EN 1342, Note 3 = EN 1341 /BRE 141, Note 4 = BRE 141)

Tests were carried out at BRE in 1997. N.D. = not determined