Woodkirk Sandstone – Brown

Technical Data Sheet
Woodkirk Sandstone – Brown
Britannia Quarries
Rein Road, Morley, Leeds, LS27 0SW
Contact : Mike Durkham Britannia Quarries
Tel. 0113 253 0464 Fax. 0113 252 7520
Email: woodkirkstone@britanniaquarry.freeserve.co.uk
Grid Reference: SE 268 263
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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 February 2000 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 and Woodkirk Stone Ltd and does not represent an endorsement of the stone by BRE.

General

The quarry is just to the north of the point at which the A6029 crosses the M62 motorway to the south of Morley. Stone has been quarried in this area since the 18th century. This particular quarry has been worked since the 1930s.The quarry is large with a number of faces and also a number of different beds. There are plenty of reserves. The stone is used for walling and paving. The depth of the stone varies between beds but most are between 1200mm and 2400mm in blocks weighing up to 12 tonnes.

Petrography

Woodkirk sandstone is from the Coal Measures of Carboniferous age. It is a fine-grained stone, grey- buff to light brown in colour but it tends to darken to a richer colour as it ages.

Expected Durability and Performance

It is important that the results from the sodium sulphate crystallisation tests are not viewed in isolation. They should be considered with the results from the porosity and water absorption tests and the performance of the stone in existing buildings. Carboniferous Sandstones are traditionally acknowledged as generally being a very durable building and paving stone and have been used extensively in many towns and cities in the UK. Woodkirk appears to be a durable stone but its failure in the acid immersion test indicates limited resistance to acid rain or air pollution. The results of the crystallisation test indicate that it should have good resistance to salt under normal conditions but the high weight loss in an earlier

harsh saturated sodium sulphate crystallisation test indicates susceptibility to salt damage (for example in coastal locations or from de-icing salts). Like most sandstones it is seems to have good frost resistance. The compressive strength of the stone is typical of the range for sandstones and is comparable with the strongest UK limestones.

The stone has a good slip resistance and the abrasion resistance for the harder stone indicates that it should be suitable for use in intensively trafficked locations.

Overall, Woodkirk Buff should be suitable for use in most aspects of load bearing masonry, cladding and paving but should not be used in areas where it will be subjected to acidic conditions or locations with high salt concentrations.

Test Results – Woodkirk Brown (Britannia Quarries)

Safety in Use		
Slip Resistance (Note 1)	74	Values > 40 are considered safe.
Abrasion Resistance (Note 1)	21.1	Values <23.0 are considered suitable for use in heavily trafficked areas
	25.1	(Two different types tested)
Strength under load		

1) Compression[Note 2]	98 MPa	Loaded perpendicular to the bedding plane ambient humidity
2) Bending [Note 1]	13.4 MPa	Loaded perpendicular to the bedding plane ambient humidity
Porosity and Water Absorption		
1) Porosity [Note 3]	14.87%	
2) Saturation Coefficient [Note 3]	0.69	
3) Water Absorption	4.45% (by wt)	
4) Bulk specific gravity	2313kg/m^3	
Resistance to Frost		
Flexural strength after Freeze/Thaw Test [Note 1]	10.8 MPa	Loaded perpendicular to the bedding ambient humidity

Resistance to Salt		
Sodium Sulphate Crystallisation Test (Note 3)	-0.66% Mean wt loss	
Resistance to Acidity		
Acid Immersion Test(Note 4)	Fail	

(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 1999-2000. n.d. = not determined