



# Crosland Hill Sandstone

## Technical Data Sheet

### Crosland Hill Sandstone

Wellfield Quarry, near Huddersfield

Crosland Hill, Huddersfield, West Yorkshire. HD4 7AB

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Grid Reference : SE 117 145

Compiled September 1997 and updated in September 1999 and May 2000

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 and updated in September 1999 and May 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, Transport and the Regions and Johnson Wellfield Quarries Ltd and does not represent an endorsement of the stone by BRE.

### General

The quarry is huge. Originally there were three separate quarries, Wellfield, Waterholes and Moorfield. Now the quarry boundaries have been broken through to form one vast quarry. There are extensive reserves of stone. The quarry has been worked by the present owners since 1938. Block sizes of up to 3500 x 1750 x 1500 mm are available along with veneers and paving material up to a maximum of 5.2 m<sup>2</sup> ranging from 30 – 100 mm in thickness. There are large reserves of material.

### Petrography

Crosland Hill Hard York Stone is from the Millstone Grit of Carboniferous age. It is a fine- to medium-grained stone, buff in colour. The top 3 to 9m of stone are crushed for aggregate. The depth of the face below this varies around the quarry from 7.5 to 9m. The average depth of stone on bed is from 750mm to 900mm with an average length of 2.85m.

### 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. Sandstones from the Millstone Grit series 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. Crosland Hill sandstone appears to be a durable stone that is not effected by acid rain or air pollution. In addition, the low weight lost in the saturated sodium sulphate crystallisation test indicates good resistance to salt damage (for example in coastal locations or from de-icing salts. The resistance to frost result indicates that the stone is not affected by the action of freeze thaw and in conjunction with the saturated sodium sulphate crystallisation test indicates that the stone should have good frost resistance. The compressive and flexural strength of the stone is towards the top of the range for UK sandstone. The abrasion resistance is comparable with other York paving stones and should be suitable for use in heavily trafficked areas.

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

**Test Results – Crosland Hill Sandstone**

<b>Safety in Use</b>		
Slip Resistance <small>(Note 1)</small>	75-83	Values > 40 are considered safe.
Abrasion Resistance <small>(Note 1)</small>	19.6 mm	Values <23.0 are considered suitable for use in heavily trafficked areas
<b>Strength under load</b>		

1) Compression <sup>(Note 2)</sup>	132 MPa	Loaded perpendicular to the bedding plane ambient humidity
2) Bending <sup>(Note 1)</sup>	15.0-18.9 MPa	Loaded perpendicular to the bedding plane ambient humidity
	Not determined	Loaded parallel to the bedding plane ambient humidity
<b>Porosity and Water Absorption</b>		
1) Porosity <sup>(Note 3)</sup>	8.6 – 9.2%	
2) Saturation Coefficient <sup>(Note 3)</sup>	0.60 – 0.68	
3) Water Absorption	2.4% (by wt)	
4) Bulk specific gravity	2416-2430kg/m <sup>3</sup>	
<b>Resistance to Frost</b>		

Flexural strength after Freeze/Thaw Test <sup>(Note 1)</sup>	14.3 MPa	Loaded perpendicular to the bedding plane ambient humidity
<b>Resistance to Salt</b>		
Sodium Sulphate Crystallisation Test <sup>(Note 3)</sup>	0.83% Mean wt loss	
Sodium Sulphate Crystallisation Test <sup>(Note 3)</sup> (saturated solution)	11.3% Mean wt loss	
<b>Resistance to Acidity</b>		
Acid Immersion Test <sup>(Note 4)</sup>	Pass	

(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