Portland Whit Bed Limestone

Technical Data Sheet
Portland Whit Bed Limestone
Bowers Quarry, Isle of Portland
Contact : Albion Stone Quarries
Ltd Tel. 01737 771 772 Fax. 01737 771 776
email: sales@albionstonequarries.com
website : www.albionstonequarries.com
Grid Reference: SY 684 722
Compiled September 1997

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 Albion Stone Quarries Ltd and does not represent an endorsement of the stone by BRE.

General
The entrance to the quarry is Wide Street in Easton. There are plentiful reserves.

Petrography
The stone is an open textured oolitic limestone from the Portlandian formation (Jurassic). The stone is formed from micrite (fine grained calcium carbonate) ooids with a small quantity of micrite occurring as matrix. The shell fragments are elongated to rounded and are typically about 5 mm across. The stone generally appears to be moderately compacted although the degree of compaction is variable. Most of the areas exhibit a fairly high intergranular porosity with interlinking of adjacent pores. In some areas ooids are fused or are surrounded by a sparse carbonate matrix. (Examination carried out on Whit Bed from the nearby Independent Quarry by Stangers 05/07/91)

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. Stone from the Portland Whitbed is traditionally acknowledged as generally being a very durable building stone and it has been used extensively in many towns and cities in the UK. Comparing the results for the Whitbed Stone from Bowers Quarry to those collected from buildings, exposure trials and tests on quarry samples collected by BRE during the last 70 years shows that this stone compares very well with the traditional view of Portland Whitbed. Previous

research at BRE has shown that Portland limestone which has a low saturation coefficient (<0.72), a low microporosity (<11.0 of the stone by volume) and an open oolitic structure generally performs well over long periods when used on buildings. The results summarised on these sheets show that the limited number of samples tested meet seem to meet these criteria. The crystallisation test results show the stone to be Class B-C which BRE Report 141 suggests is suitable for most uses includin where exposure conditions are to be more severe, for example high concentrations of sulphur dioxide or severe frosts, or where a long life is required (for example >50years). In all cases it is important that the detailing of the stonework is designed to offer the maximum protection from rainwater and rainwater runoff. Based on current research it seems likely that the stone would weather at a rate of between 1 and 2 mm per 100 years but it could be greater in severe exposures.

Test Results – Portland Bowers Whit Bed Limestone

Safety in Use		
Slip Resistance (Note 1)	Wet: 83	Values > 40 are considered safe
Abrasion Resistance(Note 1)	22.8	Range 21.0-24.5 Values <23.0 are considered suitable for use in heavily trafficked areas
Strength under load		
1) Compression(Note 2)	42 MPa	Range 38 – 47

		Loaded perpendicular to the bedding – ambient humidity
2) Bending (Note 1)	7.1 Mpa	Range 6.2 – 8.0. Loaded perpendicular to the bedding – ambient humidity
Porosity and Water Absorption		
1) Porosity (Note 3)	21.5%	Range 20.8 – 22.1%
2) Saturation Coefficient (Note 3)	0.63	Range 0.62 – 0.64
3) Water Absorption	6.3% (by wt)	Range 6.2 – 6.5
4) Bulk specific gravity	2128 kg/m^3	Range 2110 – 2146
Resistance to Frost		
Freeze/Thaw Test (Note 1)	Not determined	

Resistance to Salt		
Sodium Sulphate Crystallisation Test (Note 3)	Mean: 8.0% wt loss	

(Test methods Note 1 = prEn1341, Note 2 = prEN 1342, Note 3 = prEn 1341 /BRE 141, Note 4 = BRE 141)

Tests were carried out at BRE between 1995 and March 1997.