Portland Fancy Beach Base Bed Limestone

Technical Data Sheet
Portland Base Bed Limestone
Fancy Beach Quarry
Isle of Portland
Contact : Portland Unit, Easton
Tel. 01305 820 207 Fax. 01395 820 275
email: sales@bath-portland.co.uk
website : www.hanson-quarryproducts.com
Grid Reference: SY689 703
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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, Regions and Transport and Hanson Bath and Portland Stone and does not represent an endorsement of the stone by BRE.

General

The Fancy Beach Quarry is one the a group currently being worked on Portland by Hanson Bath and Portland Stone. Both the Whit Bed and the Base Bed are available.

Petrography

The stone is an open textured oolitic limestone from the Portlandian formation (Jurassic). The stone is formed from ooliths in a micrite (fine grained calcium carbonate) matrix.

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 Basebed is traditionally acknowledged as being less durable than Whitbed but it has been used extensively where a faster rate of weathering is acceptable or where its working qualities were required. It is possible to compare the results for the Basebed Stone from Fancy Beach Quarry to those collected from buildings, exposure trials and tests on quarry samples collected by BRE during the last 70 years. This shows that the stone compares well with the traditional view of Portland Basebed. Previous research at BRE has shown that Portland limestone which has a low saturation coefficient

(>0.72), a high microporosity (>11.0 of the stone by volume) and an increased amount of micritic matrix will weather more rapidly than Whitbed when used on buildings. The results summarised on these sheets show that most of the samples tested are of this type. Where more severe exposure conditions are expected, for example high concentrations of sulphur dioxide or severe frosts, or where a long life is required then it may be desirable to use a more durable stone (e.g. Portland Whitbed). When using Fancy Beach Basebed it is especially important that the detailing of the stonework is designed to offer the maximum protection to rainwater and rainwater runoff. Based on current research it seems likely that the stone would weather at a rate of between 3 and 4 mm per 100 years but it could be greater in severe exposures or on the edges of stonework.

Test Results – Portland Fancy Beach Base Bed Limestone

Safety in Use		
Slip Resistance (Note 1)	N.D.	Values > 40 are considered safe
Abrasion Resistance (Note 1)	N.D.	Values <23.0 are considered suitable for use in heavily trafficked areas
Strength under load		
1) Compression (Note 2)	62.7 MPa	Loaded perpendicular to the bedding plane ambient humidity

2) Bending (Note 1)	8.2 MPa	Loaded perpendicular to the bedding plane ambient humidity
Porosity and Water Absorption		
1) Porosity (Note 3)	20.9%	
2) Saturation Coefficient (Note 3)	0.70	
3) Water Absorption	7.1 % (by wt)	
4) Bulk specific gravity	2144kg/m^3	
Resistance to Frost		
Freeze/Thaw Test (Note 1)	N.D.	
Resistance to Salt		
Sodium Sulphate Crystallisation Test (Note 3)	16.2% Mean 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 in 1997. N.D = not determined