Portland Cap Limestone

Technical Data Sheet
Portland Cap Limestone
Bowers Quarry, Isle of Portland
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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 Albion Stone Quarries Ltd and does not represent an endorsement of the stone by BRE.

General

The quarry is situated off Wide Street in Easton on the Isle of Portland. The quarry also produces Whit Bed, Base Bed and Hard Blue

Petrography

The stone is an creamy-white limestone which ranges from fine grained to open textured. It is an 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 Cap Bed is a very new product to the building industry but the results and its record of use in sea defences suggest it is very durable and is comparable with Whitbed. It is difficult to compare the results for the Cap Stone from Bowers Quarry to those collected from buildings and exposure trials as the stone has not been used in building construction. However, the overall test results suggest that the stone is strong and of good durability. The crystallisation test results show the stone to be Class A which BRE Report 141 suggests that it is suitable for all uses. The abrasion results indicate that the stone would be hard wearing even in heavily trafficked areas.

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 most of the samples tested meet these criteria.

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 Cap Limestone

Safety in Use		
Slip Resistance (Note 1)	Wet: 60	Values > 40 are considered safe
	Dry: 67	
Abrasion Resistance(Note 1)	24.3	Values <23.0 are considered suitable for use in heavily trafficked areas
Strength under load		
1) Compression(Note 2)	165 Mpa	Loaded perpendicular to the bedding – ambient humidity

2) Bending (Note 1)	12.5 Mpa	Loaded perpendicular to the bedding – ambient humidity
Porosity and Water Absorption		
1) Porosity (Note 3)	15.3%	
2) Saturation Coefficient (Note 3)	0.53	
3) Water Absorption	3.6% (by wt)	
4) Bulk specific gravity	2280 kg/m^3	
Resistance to Frost		
Freeze/Thaw Test (Note 1)	Not determined	
Resistance to Salt		
Sodium Sulphate Crystallisation Test (Note 14	Mean: 0.0	

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

All tests were carried out at BRE in July 1996)