



Portland
Whitbed
Limestone

Technical Data Sheet

Portland Whitbed Limestone

Coombefield Quarry, Isle of Portland

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

General

The Coombefield Quarry is one the a group currently being worked on Portland by Bath and Portland Natural Stone. At present only Whit Bed is available from here.

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 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 Coombefield 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 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 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 Coombefield Whitbed Limestone

Safety in Use		
Slip Resistance ^(Note 1)	Wet: 80	Values > 40 are considered safe
Abrasion Resistance ^(Note 1)	23.4	Values <23.0 are considered suitable for use in heavily trafficked areas
Strength under load		
1) Compression ^(Note 2)	39.0 MPa	Loaded perpendicular to the bedding – ambient humidity
2) Bending ^(Note 1)	7.6 MPa	Loaded perpendicular to the bedding – ambient humidity
Porosity and Water Absorption		

1) Porosity ^(Note 3)	18.7%	
2) Saturation Coefficient ^(Note 3)	0.60	
3) Water Absorption	5.0% (by wt)	
4) Bulk specific gravity	2198 kg/m ³	
Resistance to Frost		
Freeze/Thaw Test ^(Note 1)	Not determined	
Resistance to Salt		
Sodium Sulphate Crystallisation Test ^(Note 3)	Mean: 1.1% 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 1996