



Portland  
Independent  
Whit Bed  
Limestone

## Technical Data Sheet

### Portland Whit Bed Limestone

Independent 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 entrance to the quarry is in Grove Road. The quarry was formerly known as Convicts Quarry and following a period of abandonment work restarted in 1982. There are good reserves of stone.

### 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 Independent 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. The crystallisation test results show the stone to be Class C – D which BRE Report 141 suggests is suitable for most uses. 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) then the best stone should be selected. 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 Independent Whit Bed Limestone

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

		Loaded perpendicular to the bedding – ambient humidity
2) Bending <sup>(Note 1)</sup>	7.1 Mpa	Range 6.2 – 8.0. Loaded perpendicular to the bedding – ambient humidity
<b>Porosity</b> and Water Absorption		
1) Porosity <sup>(Note 3)</sup>	21.5%	Range 20.8 – 22.1%
2) Saturation Coefficient <sup>(Note 3)</sup>	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 <sup>3</sup>	Range 2110 – 2146
<b>Resistance to Frost</b>		
Freeze/Thaw Test <sup>(Note 1)</sup>	Not determined	

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

Tests were carried out at BRE between 1993 and March 1997, results from other laboratories have been included in the calculation of means and ranges.)