



Plumpton Red
Lazonby
Sandstone

Technical Data Sheet

Plumpton Red Lazonby Sandstone

Lazonby Fell Quarry, near Penrith

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Grid reference : NY 517 380

Compiled July 1997 – updated March 2000

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 July 1997 using the results of tests carried out to the proposed European Standards. It was updated in March 2000. 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 Cumbria Stone Quarries Ltd and does not represent an endorsement of the stone by BRE.

General

Lazonby Fell Quarry is situated at the end of a long track in the woods off the B6413 between Plumpton and Lazonby, near Penrith, Cumbria. The area is full of old quarries that were worked from the early 19th century. There appear to be virtually limitless reserves of stone as long as planning permission continues to be obtained. The current quarry has been worked since 1980. There are three or four beds of stone up to 750mm deep providing stone of 600mm on bed. Long, wide blocks are available up to 3m x 1m are available. The depth of the face is about 5.4m although there is thought to be stone below the present level of the quarry face giving a total depth of 30m of stone.

Petrography

1. Macroscopic

Plumpton Red Lazonby is from the New Red Sandstone of Permian age. It is a fine- to medium grained stone, pale red or dark pink in colour and it has a sparkle due to the presence of quartz grains. A pale pink stone and a white stone are also available but these are only used locally.

2. Microscopic

Mature sub-arkose, moderately well sorted with a porosity ~10-15%

The thin section is dominated by fine to medium grained quartz grains which have a bi-modal distribution; 1.0 -0.5 and 0.25-0.025. All the grains are coated

with a thin layer of iron oxide which accumulated during deposition. Around the original grain there is a quartz overgrowth which are in optical continuity. Where the quartz over-growth occurs in a pore it has a flat surface as though there was something there; which has since been lost. The quartz grains and overgrowths account for 75-85% of the mineralogy. In addition to quartz there are a few granitic or gneissose grains, feldspar, corundum and mica grains together with opaques (haematite and magnetite).

Expected Durability and Performance

It is important that the results from the individual tests are not viewed in isolation. They should be considered together and compared to the performance of the stone in existing buildings and other uses. Sandstones from the New Red Sandstone series are traditionally acknowledged as generally being a very durable building and paving stone and have been used extensively in many towns and cities in the UK. Plumpton Red Lazonby sandstone appears to be a durable stone that is not effected by acid rain or air pollution. In addition, the low weight lost in the harsh saturated sodium sulphate crystallisation test indicates good resistance to salt damage (for example in coastal locations or from de-icing salts); the stone seems to have good frost resistance. The compressive strength of the stone is typical of the range for comparable with sandstone. The flexural strength is towards the lower end of the range for sandstones and if used for paving then the units may need to be thicker than those for some other sandstones. The abrasion resistance is comparable with York paving stones and should be suitable for use in heavily trafficked areas.

Overall, should be suitable for use in most aspects of construction including flooring, paving, load bearing masonry and cladding including areas where a long service life is needed or where high salt concentrations are expected.

Test Results – Red Lazonby

Safety in Use		
Slip Resistance ^(Note 1)	Wet: 76- 80	Values > 40 are considered safe.

Abrasion Resistance (Note 1)	18.4 – 19.6	Values <23.0 are considered suitable for use in heavily trafficked areas
Strength under load		
1) Compression ^(Note 2)	93 – 118 MPa	Loaded perpendicular to the bedding plane ambient humidity
2) Bending ^(Note 1)	3.6 – 5.9 MPa	Loaded perpendicular to the bedding plane ambient humidity
	3.5 MPa	Loaded parallel to the bedding plane ambient humidity
Porosity and Water Absorption		
1) Porosity ^(Note 3)	10.3 – 13.1%	
2) Saturation Coefficient ^(Note 3)	0.48 – 0.51	

3) Water Absorption	2.2 – 2.7% (by wt)	
4) Bulk specific gravity	2300- 2376kg/m ³	
Resistance to Frost		
Flexural strength after Freeze/Thaw Test <small>(Note 1)</small>	3.6 MPa	Loaded perpendicular to the bedding ambient humidity
Resistance to Salt		
Sodium Sulphate Crystallisation Test <small>(Note 3)</small>	0.23% Mean wt gain	
Sodium Sulphate Crystallisation Test <small>(Note 14)</small> (saturated)	5.1% Mean wt loss	(Note: earlier tests give values around 25% weight loss and this is probably more typical of the stone)
Resistance to Acidity		

Acid Immersion Test ^(Note 4)	Pass	All samples passed the test with no splitting or delamination
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(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 between July and September 1996 and in 1999)