

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

 <p>Accredited to ISO/IEC 17025:2005</p>	<h3>Sandberg LLP</h3>	
	<p>Issue No: 046</p>	<p>Issue date: 16 September 2011</p>
	<p>40 Grosvenor Gardens London SW1W 0EB</p>	<p>Contact: Mr P Tate Tel: +44 (0)20 7565 7000 Fax: +44 (0)20 7565 7101 E-Mail: tate@sandberg.co.uk Website: www.sandberg.co.uk</p>
<p>Testing performed by the Organisation at the locations specified below</p>		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
<p>5 Carpenters Place Clapham High Street London SW4 7TD</p> <p>Tel: +44 (0)20 7565 7000 Fax: +44 (0)20 7565 7101</p>	<p>Geology: Mr D Ellis ellis@sandberg.co.uk</p> <p>Aggregates & Concrete: Mr R Rogerson rogerson@sandberg.co.uk</p> <p>Chemistry: Mr G Mayers mayers@sandberg.co.uk</p> <p>Geomaterials Mr M Eden eden@sandberg.co.uk</p>	A
<p>40 Grosvenor Gardens London SW1W 0EB</p> <p>Tel: +44 (0)20 7565 7000 Fax: +44 (0)20 7565 7101</p>	<p>Contact: Mr S Morris</p> <p>Email: morris@sandberg.co.uk</p>	C

Site activities performed away from the locations listed above:

Location details	Activity	Location code
<p>All sites suitable for the activities listed</p> <p>Tel: +44 (0)20 7565 7000 Fax: +44 (0)20 7565 7101</p>	<p>Contact: Mr R Rogerson rogerson@sandberg.co.uk</p> <p>Sampling and testing of concrete structures, floors and other paved surfaces.</p>	D



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DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
AGGREGATES	Water-soluble chloride salt content	BS EN 1744-1:1998	A
	Sulphate content of a 2:1 water/aggregate extract	BS EN 1744-1:1998	A
	Total sulfur content	BS EN 1744-1:1998	A
	Total sulphate content by acid extraction	BS EN 1744-1:1998	A
	Acid soluble sulfides	BS EN 1744-1:1998	A
	Acid-soluble material content	BS 812-119:1985	A
	Potential reactivity (chemical method)	ASTM C289-01	A
	Petrographic examination of aggregates for concrete	ASTM C295-03	A
	Qualitative and quantitative petrographic description of aggregates	BS 812-104:1994	A
	Petrographic description	BS EN 932-3:1997	A
	Identification of type and variety, mineralogical composition, particle characterization, weathering and alteration, potential alkali-silica and alkali-carbonate reactive ingredients	Documented In-House Method No TP/G1/3 using optical microscopy and polarized light techniques	A
	Aggregate crushing value - particle size 10 mm and greater	BS 812-110:1990	A
Aggregate crushing value - particle size smaller than 10 mm	BS 812-110:1990	A	



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AGGREGATES (cont'd)	Ten per cent fines value - dry - particle size 10 mm and greater	BS 812-111:1990	A
	Ten per cent fines value - soaked - particle size 10 mm and greater	BS 812-111:1990	A
	Ten per cent fines value - dry - particle size smaller than 10 mm	BS 812-111:1990	A
	Ten per cent fines value - soaked - particle size smaller than 10 mm	BS 812-111:1990	A
	Particle density and water absorption for aggregate all larger than 10 mm	BS EN 1097-6:2000 BS 812-2:1995	A
	Particle density and water absorption for aggregate between 40 mm and 5 mm	BS EN 1097-6:2000 BS 812-2:1995	A
	Particle density and water absorption for aggregate between 10 mm nominal size and smaller	BS EN 1097-6:2000 BS 812-2:1995	A
	Particle size distribution - washing and sieving	BS EN 933-1:1997 BS 812-103 Section 103.1:1985	A, A
	Particle size distribution - dry sieving	BS 812-103 Section 103.1:1985	A
	Flakiness index	BS EN 933-3:1997 BS 812-105 Section 105.1:1989	A, A
	Shell content	BS EN 933-7:1998 BS 812-106:1985	A
	Moisture content/water content - oven drying method	BS EN 1097-5:2008 BS 812-109:1990	A A



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AGGREGATES (cont'd)	Aggregate abrasion value	BS 812-113:1990 BS EN 1097-8:2009 Annex A	A
	Drying shrinkage	BS 812-120:1989 BS EN 1367-4:1998	A
	Soundness	BS 812-121:1989	A
	Magnesium sulphate soundness	BS EN 1367-2:2009	A
	Resistance to fragmentation by the Los Angeles method	BS EN 1097-2:2010	A
	Gel-pat test for the detection of opaline silica	BS 7943:1999 Annex B	A
AGGREGATES for railway ballast	Modified Los Angeles method	BS EN 13450:2002	A
AIR-COOLED BLASTFURNACE SLAG AGGREGATE for use in construction	Stability - 'Falling' or 'dicalcium silicate' unsoundness	BS 1047:1983 Clause A.3.2	A
CLAY BRICKS	Soluble salt content	BS 3921:1985	A
	Petrographic examination	Documented In-House Method TP/G29 based on ASTM C856	A
	Compressive strength	BS 3921:1985	A
	Water absorption	BS 3921:1985	A
CLAY PAVERS and COMPLEMENTARY FITTINGS for flexible paving	Polished paver value	BS 7932:2003 DD ENV 12633:2003	A
	Unpolished paver value	BS 7932:2003 DD ENV 12633:2003	A



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CEMENT	Loss on ignition	BS EN 196-2:2005	A
	Gravimetric determination of sulphate	BS EN 196-2:2005	A
	Residue insoluble in hydrochloric acid and sodium carbonate	BS EN 196-2:2005	A
	Chloride content	BS EN 196-2:2005	A
	Alkali content	BS EN 196-2:2005	A
	Chemical analysis of Portland cement	Documented In-House Method No. 11.1 based on BS 4550-2:1970	A
	Compressive strength of concrete cubes	BS 4550-3 Section 3.4L1978	A
	Compressive strength	BS EN 196-1:2005	A
	Standard consistence	BS 4550-3 Section 3.5:1978	A
	Setting times	BS 4550-3 Section 3.6:1978	A
	Soundness	BS 4550-3 Section 3.7:1978	A
	Standard consistence	BS EN 196-3:2005	A
	Setting time	BS EN 196-3:2005	A
	Soundness	BS EN 196-3:2005	A
	Fineness - air permeability (Blaine) method	BS EN 196-6:1992	A
Density	BS EN 196-6:1992 National Annex C	A	



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PULVERISED - FUEL ASH	Chloride	BS EN 196-2:2005	A
	Calcium oxide content	BS EN 196-2:2005	A
	Sulphuric anhydride	BS EN 196-2:2005	A
	Loss on ignition	BS EN 196-2:2005	A
	Initial setting time	BS EN 196-3:2005	A
	Soundness	BS EN 196-3:2005	A
	Particle density	BS EN 196-6:1992	A
CONCRETE - hardened	Cement and aggregate content	BS 1881-124:1988	A
	Chloride content	BS 1881-124:1988 and Documented In-House Method 14.8.1 based on BS 1881-124:1988	A
	Sulphate content	BS 1881-124:1988	A
	Sodium oxide and potassium oxide	BS 1881-124:1988	A
	Alumina and iron oxides	BS 1881-124:1988 and Documented In-House Method 34.1	A
	Chemical analysis and aggregate content	Documented In-House Method 14.0	A
	Bulk chloride diffusion of concrete cores	Documented In-House Method No TP/F/18, Jan 2009	A
	Type of cement	BS 1881-124:1988 Clause 8.3	A
	Air-void content - by modified point count method	ASTM C457-06	A
	Petrographic examination	ASTM C856-04 APG-SR2 using SEM	A



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CONCRETE - hardened (cont'd)	Equivalent water/cement ratio by microporosity assessment	Documented In-House Method No TP/G8 using optical microscopy with UV illumination and fluorescent dyes	A
	Depth and degree of carbonation	Documented In-House Method No TP/G7/1 using chemical staining, optical microscopy and polarized light	A
	Compressive strength of cubes - including curing	BS 1881-116:1983 BS 1881-111:1983	A
		BS EN 12390-1:2000 BS EN 12390-2:2009 BS EN 12390-3:2009	A
		Compressive strength of cores	BS 1881-120:1983 BS EN 12504-1:2009
	Density	BS 1881-114:1983 BS EN 12390-7:2009	A
	Water absorption	BS 1881-122:1983	A
	Aggregate grading	BS 1881-124:1988	A
	Thermal coefficient of linear expansion	Documented In-House Method No. TP/F/4, Feb. 2009	A
	CONCRETE STRUCTURES	Carbonation	BRE Information Paper IP 6/81
Surface hardness by rebound hammer		BS EN 12504-2:2001	D
Coring		BS EN 12504-1:2000	D
Sampling of concrete by dust drilling		Documented In-House Method No. TP/F/11	D
Location of reinforcement		BS 1881-204:1988	D
Half -cell potential of uncoated reinforcing steel in concrete		ASTM C876-91 (99)	D



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MORTAR for bricklaying, plastering and rendering	Chemical analysis	BS 4551:2005	A
	Mix proportions	Documented In-House Method No 34.1	A
CONCRETE PAVING FLAGS	Dimensions	BS EN 1339:2003	A
	Transverse strength	BS EN 1339:2003	A
	Water absorption	BS EN 1339:2003	A
	Abrasion Resistance	BS EN 1339:2003 Annex G	A
PRECAST CONCRETE KERB UNITS	Unpolished slip resistance value	BS EN 1339:2003 Annex I	A
	Abrasion Resistance	BS EN 1340:2003 Annex G	A
PAVED SURFACES, FLOORS and FLOOR COVERINGS	Unpolished slip resistance value	BS EN 1340:2003 Annex I	A
	Slip resistance (pendulum tester)	BS EN 1341:2000 BS EN 1342:2001 BS EN 14231:2003	A, D
PAVED SURFACES, FLOORS and FLOOR COVERINGS (Terrazzo tiles for internal use)	Abrasion Resistance	BS EN 13748-1:2004	A
	Unpolished slip resistance value	BS EN 13748-1:2004	A
PAVED SURFACES, FLOORS and FLOOR COVERINGS (Terrazzo tiles for external use)	Abrasion Resistance	BS EN 13748-2:2004	A
	Unpolished slip resistance value	BS EN 13748-2:2004	A
PRECAST CONCRETE PAVING BLOCKS	Polished paver value	BS 7932:2003 DD ENV 12633:2003	A
	Unpolished paver value	BS 7932:2003 DD ENV 12633:2003	A
	Slip resistance value and coefficient of friction	BS 7976-2:2002	A, D
	Abrasion Resistance	BS EN 1338: 2003 Annex G	A



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PRECAST CONCRETE PAVING BLOCKS (cont'd)	Unpolished slip resistance value	BS EN 1338:2003 Annex I	A
GLASS	Glass fracture and inclusions	Documented In-House Method: TP-G-31, Oct 2010 using SEM	A
ROCK	Description and classification	BS 5930:1999 Section 44	A
	Petrographic description	ISRM Suggested Methods - Rock Characterization Testing and Monitoring, Ed. E T Brown-1981	A
	Microcrack dye testing of granite	Documented In-House Method TP/G27-01	A, D
CRUSHED ROCK FILL	Petrographic analysis and semi-quantitative analysis of crushed rock	Documented In-House Method: TP-G-30, Sept 2010 using SEM	A
ROOFING SLATES	Sulphuric acid immersion	BS 680-2:1971 BS 5642-1:1978 (Appendix A)	A
	Water absorption	BS 680-2:1971	A
	Wetting and drying	BS 680-2:1971 BS 5642 -1:1978 (Appendix B)	A
	Modulus of rupture	ASTM C120-06	A
SLATE AND STONE PRODUCTS for discontinuous roofing and cladding	Petrographic examination (excluding X-ray diffraction)	BS EN 12326-2:2000:clause17	A
	Failure load in bending	BS EN 12326-2:2000:clause 10	A
	Length and width	BS EN 12326-2:2000:clause 5	A
	Edge deviation	BS EN 12326-2:2000:clause 6	A
	Rectangularity	BS EN 12326-2:2000:clause 7	A
	Thickness	BS EN 12326-2:2000:clause 8	A
	Flatness deviation	BS EN 12326-2:2000:clause 9	A
	Freeze thaw resistance	BS EN 12326-2:2000:clause 12	A
Thermal cycling	BS EN 12326-2:2000:clause 16	A	



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SLATE AND STONE PRODUCTS (cont'd)	Water absorption	BS EN 12326-2:2000:clause 11	A
	Sulfur dioxide exposure (CaCO ₃ <= 20%)	BS EN 12326-2:2000:clause 5.1	A
BUILDING STONE	Compressive strength	ASTM C170-90 (1999)	A
	Flexural strength	ASTM C880-06	A
	Modulus of rupture	ASTM C99-87 (2006)	A
	Acid immersion	Durability Tests for Building Stone (BRE Report BR141:1983)	A
	Crystallisation	Durability Tests for Building Stone (BRE Report BR141:1983)	A
	Saturation coefficient and porosity	Durability Tests for Building Stone (BRE Report BR141:1983)	A
	Absorption and bulk specific gravity	ASTM C97-02	A
	Abrasion resistance	ASTM C241-90 (2005)	A
	Microporosity (water)	Documented In-House Method No. TP/G24/1 based on BRE Report - The Building Limestones of the British Isles:1983	A
	MASONRY UNITS	Compressive strength	BS EN 772-1:2011
Apparent density and open porosity		BS EN 772-4:1998	A
Real density and total porosity		BS EN 772-4:1998	A
Water absorption coefficient by capillarity		BS EN 772-11:2011	A
Dimensions		BS EN 772-16:2011	A
NATURAL STONE (natural stone products for building purposes)	Dimensions	BS EN 1341:2001 BS EN 1342:2001 BS EN 1343:2001	A
	Petrographic description	BS EN 12407:2007	A



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NATURAL STONE (natural stone products for building purposes) (cont'd)	Flexural strength under concentrated load (3 point loading method)	BS EN 12372:2006	A
	Flexural strength under constant moment	BS EN 13161:2008	A
	Compressive strength	BS EN 1926:2006 BS EN 1342:2001	A
	Breaking load at dowel hole	BS EN 13364:2002	A
	Abrasion resistance	BS EN 1341:2001 Annex C BS EN 1342:2001 Annex B BS EN 14157:2004 Method A (wide wheel)	A
	Resistance to salt crystallisation	BS EN 12370:1999	A
	Water absorption coefficient by capillarity	BS EN 1925:1999	A
	Water absorption at atmospheric pressure	BS EN 13755:2008 BS EN 1341:2001 BS EN 1342:2001 BS EN 1343:2001	A
	Real density and total porosity	BS EN 1936:2006	A
	Apparent density and open porosity	BS EN 1936:2006	A
	Frost Resistance	BS EN 12371: 2010	A
	Frost resistance	DIN 52 104:1982 Method A	A
	Frost resistance	Documented In-House Method No. TP/G19/6 based on BS EN 12371:2010	A
	Resistance to ageing by thermal shock	BS EN 14066:2003	A
Unpolished slip resistance (pendulum tester)	BS EN 1341:2000 BS EN 1342:2001 BS EN 14231:2003	A, D	



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NATURAL STONE (natural stone products for building purposes) (cont'd)	Dynamic modulus of elasticity (by fundamental resonant frequency)	BS EN 14146:2004	A
	Static elastic modulus	BS EN 14580:2005	A
	Linear thermal expansion coefficient (Method A)	BS EN 14581:2004	A
	Sensitivity to changes in appearance produced by thermal cycles	BS EN 16140:2011	A
	Sound speed propagation	BS EN 14579:2004	A
	Polished paver value	BS 7932:2003 DD ENV 12633:2003	A
	Unpolished paver value	BS 7932:2003 DD ENV 12633:2003	A
PAINT and AIR FILTERS used in air monitoring	Lead content	Documented In-House Method No 40.3 using atomic absorption spectrophotometry	A
SALT for spreading on highways for winter maintenance	Matter insoluble in water	BS 3247:2011	A
	Chloride content	BS 3247:2011	A
	Soluble sulphate compounds	BS 3247:2011	A
	Moisture content	BS 3247:2011	A
	Grading by sieve analysis	BS 3247:2011	A
WATER for making concrete	Suitability	BS EN 1008:2002	A
	Compressive strength of cubes	BS EN 1008:2002 BS 3148:1980	A
	Initial setting time	BS EN 1008:2002 BS 3148:1980	A



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METALS, ALLOYS and METAL PRODUCTS	Tensile strength	BS EN ISO 6892-1:2009	C
	Vickers hardness	BS EN ISO 6507-1:2005	C
	Charpy impact testing up to 300 joules at 77 K and from 233 K to ambient temperature	BS EN 10045-1:1990	C
	Micrographic determination of the grain size of steel (comparative method only)	BS EN ISO 643:2003	C
	Micrographic determination of the morphology of graphite in cast iron	BS EN ISO 945:1994 (withdrawn)	C
METALS & ALLOYS: ferrous and non-ferrous	Metallographic examination and identification of materials	Documented In-House Method MS/LG/TP M/26 using acid etching and light microscopy	C
WELDMENTS	Tests designated in specified welding codes - as detailed below:- Bend, Fracture, Hardness, Impact, Tensile, Visual-examination, Macro-examination, Micro-examination	BS EN 287-1:2004 BS EN ISO 9606-2:2004 BS EN ISO 15614-1:2004 BS EN ISO 15614-2:2005 BS EN 875:1995 BS EN 876:1995 BS EN 895:1995 BS EN 910:1996 BS EN 1043-1:2002 BS EN 1320:1997 BS EN 1321:1997	C
REINFORCING STEELS	Tensile strength up to 32 mm diameter	BS 4449:2005	C
	Tensile properties	BS 4482:2005 BS 4483:2005	C
	Weld test	BS EN ISO 17660-1:2006 clause 14 BS EN ISO 17660-2:2006 clause 14	C
	Bond strength	BS 4449:1997 clause 9.3 (withdrawn)	C



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STEEL COUPLERS for use in working scaffolds and falsework	Slipping force (RA, SW, SF)	BS EN 74-1:2005 Clause 7.2.1	C
	Failure Force (RA, SW) Pull apart force (RA)	BS EN 74-1:2005 Clause 7.2.2 BS EN 74-1:2005 Clause 7.3	C
	Pull apart force (SW)	Documented in-house method MS/LG/TP/M/29	C
FASTENERS - bolts only	Tensile strength	BS 3692:2001 (2007) BS 4395-1:1969 (2004)	C
	Proof loading	BS 4395-2:1969 (2004) BS 4604-1:1970 (withdrawn)	
	Slip factor	BS 4604-2:1970 (withdrawn) BS EN ISO 3506-1:1998 (withdrawn)	
END			