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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

SI Concrete Systems

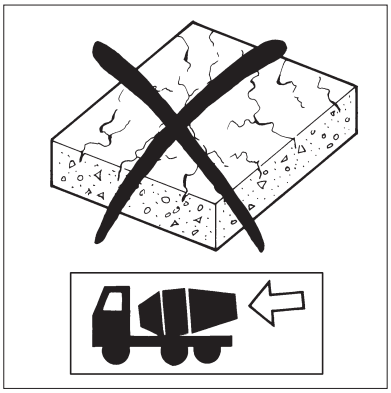
STEALTH (0.9 kgm^{-3})

Certificate No 92/2857

DETAIL SHEET 3

*Fourth issue**

Product



- *THIS DETAIL SHEET RELATES TO STEALTH (0.9 kgm^{-3}), 12 mm POLYPROPYLENE FIBRES PRODUCED FROM MULTIFILAMENT YARN.*
- *This Detail Sheet covers its use in concrete at an addition rate of 0.9 kgm^{-3}.*
- *Stealth (0.9 kgm^{-3}) was formerly known as Stealth 6922 (0.9 kgm^{-3}).*

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the product, and the Conditions of Certification.

Note: Certain words have a precise definition as given in section 8.6 of the Front Sheets.

Technical Specification

1 Description

Stealth (0.9 kgm^{-3}) consists of 12 mm polypropylene fibres, manufactured from multifilament yarn and is used to control the extent of plastic shrinkage cracking and plastic settlement in concrete. It may be used in all situations where a critical surface finish is necessary.

Technical Investigations

The following is a summary of the technical investigations carried out on Stealth (0.9 kgm^{-3}).

2 Tests

2.1 All tests were conducted using the mix design given in Table 1.

Table 1 Test mix design[1]

Component	Mix quantity (kgm^{-3})
Portland cement (to BS 12, class 42.5 N)	317[2]
water	212
sand (5 mm)	827
gravel (5 mm to 20 mm)	1070
Stealth (0.9 kgm^{-3})	0.90

(1) Plain concrete control mix was the same but did not include the fibres.

(2) Typical cement content used in concrete floor slab construction.

2.2 At the rate of addition covered by this Detail Sheet, a test mix met BS 5075-2 : 1982 (Issue 2, 1997) for freeze/thaw requirements.

2.3 Results of the plastic and hardened concrete tests, conducted by an independent laboratory with BBA approval, are summarised in Tables 2 and 3.

Table 2 Plastic concrete test results

Test (units)	Method[1]	Results	
		Stealth (0.9 kgm^{-3}) concrete	Plain concrete
Air content (%)	BS 1881-106	1.3	1.1
Slump (mm)	BS 1881-102	50	65
Compacting factor	BS 1881-103	0.94	0.93
Distribution of fibres	Visual examination	well distributed	not applicable
Bleeding rate (ml cm^{-2})	ASTM C 232-71	1.20	2.69
Flow (mm)	BS 1881-105	360	410
Change in height (%)	ASTM C 827-87	–0.591	–1.01
Resistance to plastic cracking of rings (mean crack width) (mm)	FCB (Trondheim, Norway) test specification	0.34	2.59
Resistance to plastic cracking of slabs (crack area) (mm^2)	Modified Kraai test specification	10	219

(1) Test documents are detailed in the *Bibliography*.

Table 3 Hardened concrete test results

Test (units)	Method[1]	Mix design	Results	
			Stealth (0.9 kgm^{-3}) concrete	Plain concrete
Initial surface absorption test (mlm^{-2}s^{-1}):	BS 1881-5 (65 mm thick slab non-crazed area)	1		
air dried				
10 min			1.0	0.87
120 min			0.39	0.41
water cured				
10 min			0.53	0.56
120 min			0.19	0.12
Permeability of cores (mlm^{-2}s^{-1})	Covercrete Absorption Test (Dundee University Specification)	1	0.70	0.86
Water absorption (%)	BS 1881-122	1	3.82	3.88
Impact resistance (blows to first crack)	ASTM D 1557-87	1	15 (28 days)	9 (28 days)
Distribution of fibres	microscopic examination	1	well distributed	not applicable
Flexural strength (Nmm^{-2}) (beams):	BS 1881-118	1	Mean	Mean
1 day			2.4	2.3
3 days			3.9	3.5
7 days			4.8	4.6
28 days			5.2	5.1
Compressive strength (Nmm^{-2}) (equivalent cube method):	BS 1881-119	1	Mean	Mean
1 day			16.5	16.0
3 days			25.5	24.5
7 days			35.0	35.0
28 days			44.0	39.5
Cube compressive strength (Nmm^{-2}):	BS 1881-116	1	Mean	Mean
1 day			17.0	14.5
3 days			29.0	27.5
7 days			36.0	36.0
28 days			44.0	44.5
Freeze/thaw resistance[2] (after 100 cycles):	BS 5075-2	see footnote (2)		
% change in length			0.042	0.404
flexural strength (Nmm^{-2})			0.7	0.4
compressive strength (Nmm^{-2})			48.3	45.0
Surface hardness	BS 1881-202 (rebound hammer)	1	29	28
Abrasion resistance:	A'Court	1		
reduction in rate of abrasion (%)	BS 784		11	—

(1) Test documents are detailed in the *Bibliography*.

(2) Mix design to specification given in BS 5075-2 : 1982.

Bibliography

BS 12 : 1991 *Specification for Portland cement*

BS 784 : 1953 *Methods of test for chemical stoneware*

BS 1881-5 : 1970 *Testing concrete — Methods of testing hardened concrete for other than strength*
BS 1881-102 : 1983 *Testing concrete — Methods for determination of slump*
BS 1881-103 : 1993 *Testing concrete — Method for determination of compacting factor*
BS 1881-105 : 1984 *Testing concrete — Method for determination of flow*
BS 1881-106 : 1983 *Testing concrete — Methods for determination of air content of fresh concrete*
BS 1881-116 : 1983 *Testing concrete — Method for determination of compressive strength of concrete cubes*
BS 1881-118 : 1983 *Testing concrete — Method for determination of flexural strength*
BS 1881-119 : 1983 *Testing concrete — Method for determination of compressive strength using portions of beams broken in flexure (equivalent cube method)*
BS 1881-122 : 1983 *Testing concrete — Method for determination of water absorption*
BS 1881-202 : 1986 *Testing concrete — Recommendations for surface hardness testing by rebound hammer*

BS 5075-2 : 1982 *Concrete admixtures — Specification for air-entraining admixtures*

ASTM C 232-71 *Standard Test Methods for Bleeding of Concrete*

ASTM C 827-87 *Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures*

ASTM D 1557-87 (Reapproved 1990) *Standard Test Methods for Moisture Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Rammer and 18 in (457 mm) Drop*

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date of Fourth issue: 14th November 2002

Chief Executive

**Original Detail Sheet issued 5th July 1993. This amended version includes change of Certificate holder and product name, and a correction to the information on freeze/thaw testing.*

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