

Kiwa GmbH
TBU
Gutenbergstraße 29
48268 Greven

Tel. +49 (0)2571 9872 0
Fax +49 (0)2571 9872 99
infokiwagreven@kiwa.de
www.kiwa.de

Test Report No. 1.1 / 12531 / 0429.0.1-2017e

General

Issued : 19 July 2017

Order by : **Concrete Canvas Ltd.**
Unit 3, Block A22, Trefforest Ind. Estate
Pontypridd, CF37 5SP, UNITED KINGDOM

Material : Composite of a PVC membrane (black) and a woven with concrete mixture (grey) in between
CC5
(declaration by customer)

Order date : 19 April 2017

Samples delivered : 27 April 2017

Tests	Standard	Issue
1. Environmental safety	M Geok E	2016

The results apply exclusively to the specimens submitted.
The date of testing is reported on the enclosed enclosure/-es.
Results are reported to the accuracy given in the standards. In statistical evaluation, the measured accuracy is taken.

This test report contains 2 pages and one external report.
It may not be published in parts.

Test Report No. 1.1/12531/0429.0.1-2017e page 2

Summary of results


Date / Ref. : 19 July 2017 / cs

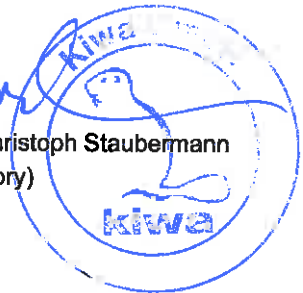
Order by : **Concrete Canvas Ltd., Unit 3, Block A22, Trefforest Ind. Estate
Pontypridd, CF37 5SP, UNITED KINGDOM**

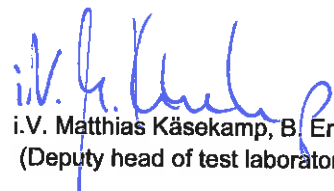
Material : Composite of a PVC membrane (black) and a woven with concrete mixture (grey) in between
CC5
(declaration by customer)

Test	Standard	Unit	Result
Environmental safety*	M Geok E	2016	The material CC5 can be graded as environmentally uncritical following M Geok E.

* The test was performed in an accredited external test laboratory.


i.V. Dipl.-Ing. (FH) Christoph Staubermann
(Head of test laboratory)




i.V. Matthias Käsekamp, B. Eng.
(Deputy head of test laboratory)

Project-nr. 031700226
Order-nr.:
TBU A026/2017

Testreport

Kiwa GmbH - TBU

**Examination of material
on environmental safety
according to M Geok E (2016)**



CC 5

produced by:
Concrete Canvas Ltd.
CF37 5SP Pontypridd
Unit 3, Block A22

project number: 0317000226
order number: TBU A026/2017



Test report

Examination of material

Client: Kiwa GmbH
TBU
Gutenbergstr. 29
D-48268 Greven

Date of order: 2017-04-26

Order number: TBU A026/2017
1.1/12531/0429.0.1-2017

Report number 0317000226 - sample 031 bis 035

Material: **CC 5**
composite of a PVC membrane (black)
and a woven with concrete mixture
in between
produced by:
Concrete Canvas Ltd.
Unit 3, Block A22
Pontypridd
CF37 5SP, UNITED KINGDOM

Date of sample receipt: 2017-05-02

Sample was taken by: client

Date of analysis 02.05.2017 - 14.06.2017

Date of report 2017-06-14

1.analytical methods

Parameters	Methods
eluate	DIN EN 12457 according M-GEOK E-StB (Ausgabe 2016) is the S/V ratio = 1:80
temperature	DIN 38404-C4
pH-value (20 °C)	DIN EN ISO 10523
conductivity	DIN EN 27888-C8
<i>inorganic parameters</i>	
antimony	EN ISO 11885-E22
arsenic	EN ISO 11885-E22
lead	EN ISO 11885-E22
cadmium	EN ISO 11885-E22
chrome	EN ISO 11885-E22
chrome (VI) (as chromate)	DIN 38405-D24
cobalt	EN ISO 11885-E22
copper	EN ISO 11885-E22
molybdenum	EN ISO 11885-E22
nickel	EN ISO 11885-E22
mercury	DIN EN 1483 (E12)
selenium	EN ISO 11885-E22
zinc	EN ISO 11885-E22
tin	EN ISO 11885-E22
cyanides, total	DIN 38405-D13
cyanides, free	DIN 38405-D13
fluoride	DIN 38405-D4
<i>organic parameters</i>	
TOC, Total Organic Carbon	DIN EN 1484 (H3)
TPH (C10-C40)	DIN EN ISO 9377-2, H53
phenols, total	DIN 38409-H16
PCB	DIN 38407-F2
BETX	DIN 38407-F9
LHKW highly volatile halogenated hydrocarbons	EN ISO 10301-F4
Organochlorine pesticides	DIN 38407-F2 (I)
PAK (EPA)	DIN EN ISO 17993

2. results

2.1. DOC

table 1: examination results
Total organic carbon (TOC)

report number		0317000226-031	0317000226-032	0317000226-033	0317000226-034	0317000226-035
sample name		sample from 2017-05-02 2017-05-08 1. eluate	2017-05-09 2. eluate	2017-05-10 3. eluate	2017-05-11 4. eluate	2017-05-12 5. eluate
CC 5 composite of a PVC membrane (black) and a woven with concrete mixture in between						
eluate parameters						
temperature	°C	23,2	23,1	23,5	23,2	23,0
pH-value (20 °C)		10,3	10,6	10,6	10,6	10,3
conductivity	µS/cm	144	220	180	151	109
TOC	mg/l	3,0	-	<1	-	<1

Accordinging of the requirements of M Geok the TOC value must be below 20 mg/l in th 5th eluate. At the same time a significant decrease in the concentration of TOC from the first to the fifth eluate has to be found.

Both required criteria are met.

2.2. parameters BBodSchV



table 2: examination results

organic and inorganic results in the 5th eluate

project 0317000226 - 031-035

		2017-05-12 5. eluate	limit value (1)
temperature	°C	23,0	
pH-value (20 °C)		10,3	
conductivity	µS/cm	109	
<i>inorganic parameters</i>			
antimony	µg/l	<2	10
arsenic	µg/l	<2	10
lead	µg/l	<2	25
cadmium	µg/l	<0,2	5
chrome	µg/l	<1	50
chrome (VI) (as chromate)	µg/l	<3	8
cobalt	µg/l	<10	50
copper	µg/l	<1	50
molybdenum	µg/l	<2	50
nickel	µg/l	<2	50
mercury	µg/l	<0,1	1
selenium	µg/l	<5	10
zinc	µg/l	<20	500
tin	µg/l	<10	40
cyanides, total	µg/l	<10	50
cyanides, free	µg/l	<5	10
fluoride	µg/l	<100	750
<i>organic parameters</i>			
TOC, Total Organic Carbon	mg/l	<1	
TPH (C10-C40)	µg/l	<100	200
phenols, total	µg/l	<10	20
PCB	µg/l	n.n.	0,05
BETX			
benzene	µg/l	<1	
toluene	µg/l	<1	
ethylbenzene	µg/l	<1	
xylene	µg/l	<1	
BETX sum total	µg/l	n.n.	20
LHKW			
trichloromethane	µg/l	<0,1	
1,1,1-trichloroethane	µg/l	<0,1	
dichloromethane	µg/l	<1	
trichloroethene	µg/l	<0,1	
tetrachloromethane	µg/l	<0,1	
bromodichloromethane	µg/l	<0,1	
dibromochloromethane	µg/l	<0,1	
tetrachloroethene	µg/l	<0,1	
tribromomethane	µg/l	<0,1	
LHKW sum total	µg/l	n.n.	10

n.n. = undetectable

table 2: continue examination results

project 0317000226 - 031-035

		2017-05-12 5.eluate	limit value (1)
Organochlorine pesticides	µg/l		
aldrin	µg/l	<0,020	0,1
o,p'-DDE	µg/l	<0,020	
p,p'-DDE	µg/l	<0,015	
o,p'-DDD	µg/l	<0,015	
p,p'-DDD	µg/l	<0,010	
o,p'-DDT	µg/l	<0,015	
p,p'-DDT	µg/l	<0,015	
DDT sum total	µg/l	n.n.	0,1
PAK (EPA)			
acenaphthylene	µg/l	<0,05	
acenaphthene	µg/l	<0,005	
fluorene	µg/l	0,00875	
phenanthrene	µg/l	0,0607	
anthracene	µg/l	0,009	
fluoranthene	µg/l	0,00946	
pyrene	µg/l	<0,005	
benzo(a)anthracene	µg/l	<0,005	
chrysene	µg/l	<0,005	
benzo(b)fluoranthene	µg/l	<0,005	
benzo(k)fluoranthene	µg/l	<0,005	
benzo(a)pyrene	µg/l	<0,005	
dibenzo(ah)anthracene	µg/l	<0,005	
benzo(ghi)perylene	µg/l	<0,005	
indeno(123,cd)pyrene	µg/l	<0,01	
PAK without naphthaline	µg/l	0,088	0,20
naphthaline	µg/l	0,0785	2

n.n. = undetectable

(1) BBodSchV Wirkungspfad Boden- Grundwasser (effectiv path ground-ground water)

The limit values (Prüfwerte) of the Bundes-Bodenschutz und Altlastenverordnung (BBodSchV) are not exceeded for the effectiv path ground - ground water (Wirkungspfad Boden - Grundwasser).

3. evaluation

The results indicate, that the material **CC 5 composite of a PVC membrane (black) and a woven with concrete mixture in between** is **not critical** according to M Geok E (2016).



Kessin, 14.06.2017

i.V. Dipl.-Chem. Kerstin Schubert
head laboratory

report Annex - lab report PB2017001620-1

PB2017001620-1

Kiwa GmbH, Am Weidenbruch 22, 18196 Kessin / Rostock

Kiwa GmbH TBU
Herr Christoph Staubermann
Gutenbergstraße 29
48268 Greven

Kiwa GmbH
Analytik und Umwelt
Am Weidenbruch 22
18196 Kessin / Rostock

Tel. +49 (0)38208 637 0
Fax +49 (0)38208-637 28
www.kiwa.de



Die Akkreditierung gilt für die in der Urkundenanlage
D-PL-11217-03-00 aufgeführten Prüfverfahren.

Applicant: Concrete Canvas Ltd.
Unit 3, Block A22
Pontypridd
CF37 5SP, United Kingdom

Customer Reference Number: A026/2017

Order Date: Apr 26, 2017

Kiwa-ANr.: 031700226

Investigation Order: Investigation pursuant M Geok E-StB

Description of sample: 1.1/12531/0429.0.1-2017, CC5

Numbers of samples: 1

Sample was taken: by the client

Date of sample receipt: May 2, 2017

Date of analysis: May 2, 2017 to Jun 14, 2017



i.V. Kerstin Schubert
Unitmanager
Environmental and Analytical Kessin/Brandenburg

The test results relate only to the above test items. Without the written permission of the testing laboratory a partial duplication of the audit report is not permitted.

Laboratory number 031700226-		0031	0032	0033	0034	0035
Sample description		1.1/1253 1/0429.0. 1-2017, CC5; 1.Eluat vom 08.05.17	1.1/12531 /0429.0.1 -2017, CC5; 2.Eluat vom 09.05.17	1.1/12531 /0429.0.1 -2017, CC5;; 3.Eluat vom 10.05.17	1.1/12531 /0429.0.1 -2017, CC5; 4.Eluat vom 11.05.17	1.1/12531 /0429.0.1 -2017, CC5; 5.Eluat vom 12.05.17
Sample was taken						
Analysis result:		Unit				
temperature	°C	23,2	23,1	23,5	23,2	23,0
pH-value		10,3	10,6	10,6	10,6	10,3
Conductivity	µS/cm	144	220	180	151	109
TOC (total organic carbon)	mg/l	3		<1		<1
Antimony	µg/l					<2
Arsenic	µg/l					<2
Lead	µg/l					<2
Cadmium	µg/l					<0,2
Chrom total	µg/l					<1
Chrom-VI (as Chromat)	µg/l					<3
Cobalt	µg/l					<10
Copper	µg/l					<1
Molybdenum	µg/l					<10
Nickel	µg/l					<2
Mercury	µg/l					<0,1
Selenium	µg/l					<5
Zinc	µg/l					<20
Tin	µg/l					<10
Cyanides, total	µg/l					<10
Cyanides, free	µg/l					<5
Fluoride	µg/l					<100
hydrocarbon oil index	µg/l					<100
Phenols, total	µg/l					<10
Sum 6 PCB	µg/l					0,004
BETX						
Benzene	µg/l					< 1
Toluene	µg/l					< 1
Ethylbenzene	µg/l					< 1
m/p-Xylene	µg/l					< 1
o-Xylene	µg/l					< 1
2-Propylbenzene	µg/l					< 1
Styren	µg/l					< 1
Sum BTEX	µg/l					n.n.
LCKW						
Trichlormethane	µg/l					<0,1
1,1,1-Trichlorethene	µg/l					<0,1
Dichlormethane	µg/l					<1
Trichlorethene	µg/l					<0,1
Tetrachlormethane	µg/l					<0,1
Bromdichlormethane	µg/l					<0,1
Dibromchlormethane	µg/l					<0,1
Tetrachlorethene	µg/l					<0,1
Tribrommethane	µg/l					<0,1
LCKW (Sum)	µg/l					<0,1

Organochlorpestizide (OCP)						
Aldrin	µg/l					<0,020
2,4-DDT	µg/l					<0,015
4,4-DDT	µg/l					<0,015
2,4-DDE	µg/l					<0,020
4,4-DDE	µg/l					<0,015
2,4-DDD	µg/l					<0,015
4,4-DDD	µg/l					<0,010
Summe DDT	µg/l					n.n.
naphthaline	µg/l					0,0785
sum 15 PAK (EPA)						
acenaphthylene	µg/l					<0,05
acenaphthene	µg/l					<0,005
fluorene	µg/l					0,00875
phenanthrene	µg/l					0,0607
anthracene	µg/l					0,009
fluoranthene	µg/l					0,00946
pyrene	µg/l					<0,005
benzo(a)anthracene	µg/l					<0,005
chrysene	µg/l					<0,005
benzo(b)fluoranthene	µg/l					<0,005
benzo(k)fluoranthene	µg/l					<0,005
benzo(a)pyrene	µg/l					<0,005
dibenzo(a,h)-anthracene	µg/l					<0,005
benzo(g,h,i)perylene	µg/l					<0,005
indeno(1,2,3-cd)-pyrene	µg/l					<0,01
sum 15 PAK (EPA)	µg/l					0,088

Overview investigation methods

Parameter	Standard methods	Unit	Detection limit
Pretreatment			
Eluation	DIN EN 12457-2: 2003-01 according M-GEOK E-StB (Ausgabe 2016) is the S/V ratio = 1:80		
Temperature (Labor)	DIN 38404 (C 4): 1976-12	°C	
pH-value	DIN EN ISO 10523 (C 5): 2012-04		
conductivity	DIN EN 27888 (C 8): 1993-11	µS/cm	1
TOC (total organic carbon)	DIN EN 1484 (H3): 1997-08	mg/l	1
Antimony	DIN EN ISO 11885 (E 22): 2009-09	µg/l	2
Arsenic	DIN EN ISO 11885 (E 22): 2009-09	µg/l	2
Lead	DIN EN ISO 11885 (E 22): 2009-09	µg/l	2
Cadmium	DIN EN ISO 11885 (E 22): 2009-09	µg/l	0,2
Chrom total	DIN EN ISO 11885 (E 22): 2009-09	µg/l	1
Chrom-VI (as Chromat)	DIN 38405 (D 24): 1987-05	µg/l	3
Cobalt	DIN EN ISO 11885 (E 22): 2009-09	µg/l	10
Copper	DIN EN ISO 11885 (E 22): 2009-09	µg/l	1
Molybdenum	DIN EN ISO 11885 (E 22): 2009-09	µg/l	2
Nickel	DIN EN ISO 11885 (E 22): 2009-09	µg/l	2
Mercury	DIN EN ISO 12846 (E 12): 2012-08	µg/l	0,2
Selenium	DIN EN ISO 11885 (E 22): 2009-09	µg/l	5
Zinc	DIN EN ISO 11885 (E 22): 2009-09	µg/l	20
Tin	DIN EN ISO 11885 (E 22): 2009-09	µg/l	10
Cyanides, total	DIN 38405 (D 13): 1981-02	µg/l	10
Cyanides, free	DIN 38405 (D 13-2): 1981-02	µg/l	5
Fluoride	DIN EN ISO 10304-1 (D 20): 2009-07	µg/l	100
hydrocarbon oil index	DIN EN ISO 9377-2 (H 53): 2001-07	µg/l	100
Phenols, total	DIN 38409 (H 16-1): 1984-06	µg/l	10
Summe 6 PCB	DIN 38407 (F 2): 1993-02	µg/l	
BETX			
Benzene	DIN 38407 (F9-1): 1991-05	µg/l	1
Toluene	DIN 38407 (F9-1): 1991-05	µg/l	1
Ethylbenzene	DIN 38407 (F9-1): 1991-05	µg/l	1
m/p-Xylene	DIN 38407 (F9-1): 1991-05	µg/l	1
o-Xylene	DIN 38407 (F9-1): 1991-05	µg/l	1
2-Propylbenzene	DIN 38407 (F9-1): 1991-05	µg/l	1
Styren	DIN 38407 (F9-1): 1991-05	µg/l	1
Sum BTEX	DIN 38407 (F9-1): 1991-05	µg/l	
LCKW			
Trichloromethano	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1
1,1,1-Trichlorethane	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1

Dichlormethane	DIN EN ISO 10301 (F 4): 1997-08	µg/l	1
Trichlorethene	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1
Tetrachlormethane	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1
Bromdichlormethane	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1
Dibromchlormethane	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1
Tetrachlorethene	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1
Tribrommethane	DIN EN ISO 10301 (F 4): 1997-08	µg/l	0,1
LCKW (Sum)	DIN EN ISO 10301 (F 4): 1997-08	µg/l	
Organochlorpestizide (OCP)			
Aldrin	DIN 38407 (F 2): 1993-02	µg/l	0,02
2,4-DDT	DIN 38407 (F 2): 1993-02	µg/l	0,015
4,4-DDT	DIN 38407 (F 2): 1993-02	µg/l	0,015
2,4-DDE	DIN 38407 (F 2): 1993-02	µg/l	0,02
4,4-DDE	DIN 38407 (F 2): 1993-02	µg/l	0,015
2,4-DDD	DIN 38407 (F 2): 1993-02	µg/l	0,015
4,4-DDD	DIN 38407 (F 2): 1993-02	µg/l	0,01
Sum DDT	DIN 38407 (F 2): 1993-02	µg/l	
naphthaline	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
Sum 15 PAK (EPA)			
acenaphthylene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,05
acenaphthene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
fluorene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
phenanthrene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
anthracene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
fluoranthene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
pyrene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
benzo(a)anthracene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
chrysene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
benzo(b)fluoranthene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
benzo(k)fluoranthene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
benzo(a)pyrene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
dibenzo(a,h)-anthracene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
benzo(g,h,i)perylene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,005
indeno(1,2,3-cd)-pyrene	DIN EN ISO 17993 (F18): 2004-03	µg/l	0,01
Sum 15 PAK (EPA)	DIN EN ISO 17993 (F18): 2004-03	µg/l	

By an asterisk (*) marked methods are not accredited test methods.

The (**) methods marked with two asterisks have been analyzed by accredited subcontractors

n.n. Value is below the detection limit

Kiwa GmbH
TBU
Gutenbergstraße 29
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www.kiwa.de

Test Report No. 1.1 / 12531 / 0429.0.2-2017e

General

Issued : 28 July 2017

Order by : **Concrete Canvas Ltd.**
Unit 3, Block A22, Trefforest Ind. Estate
Pontypridd, CF37 5SP, UNITED KINGDOM

Material : Composite of a PVC membrane (black) and a woven with concrete mixture (grey) in between
CC8
(declaration by customer)

Order date : 27 July 2017

Samples delivered : 27 April 2017

Tests	Standard	Issue
1. Environmental safety	M Geok E	2016

The results apply exclusively to the specimens submitted.
The date of testing is reported on the enclosed enclosure/-es.
Results are reported to the accuracy given in the standards. In statistical evaluation, the measured accuracy is taken.

This test report contains 2 pages.
It may not be published in parts.

Test Report No. 1.1/12531/0429.0.2-2017e page 2

Summary of results

Date / Ref. : 28 July 2017 / cs

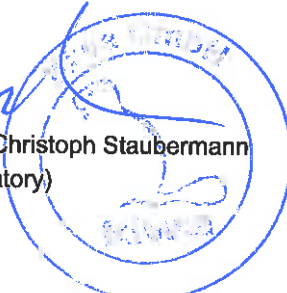
Order by : Concrete Canvas Ltd., Unit 3, Block A22, Trefforest Ind. Estate
Pontypridd, CF37 5SP, UNITED KINGDOM

Material : Composite of a PVC membrane (black) and a woven with concrete mixture (grey) in between
CC8
(declaration by customer)

Test	Standard	Unit	Result
Environmental safety*	M Geok E	2016	The material CC8 can be graded as environmentally uncritical following M Geok E.

* The test was performed in an accredited external test laboratory.
(Source: Test Report No. 1.1/12531/0429.0.1.1-2017e of Kiwa GmbH - TBU, issued on 24 July 2017, test at CC5)

C. Staubermann
i.V. Dipl.-Ing. (FH) Christoph Staubermann
(Head of test laboratory)



M. Käsekamp
i.V. Matthias Käsekamp, B. Eng.
(Deputy head of test laboratory)

Kiwa GmbH
TBU
Gutenbergstraße 29
48268 Greven

Tel. +49 (0)2571 9872 0
Fax +49 (0)2571 9872 99
infokiwagreven@kiwa.de
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Test Report No. 1.1 / 12531 / 0429.0.3-2017e

General

Issued : 28 July 2017

Order by : **Concrete Canvas Ltd.**
Unit 3, Block A22, Trefforest Ind. Estate
Pontypridd, CF37 5SP, UNITED KINGDOM

Material : Composite of a PVC membrane (black) and a woven with concrete mixture (grey) in between
CC13
(declaration by customer)

Order date : 27 July 2017

Samples delivered : 27 April 2017

Tests	Standard	Issue
1. Environmental safety	M Geok E	2016

The results apply exclusively to the specimens submitted.
The date of testing is reported on the enclosed enclosure/-es.
Results are reported to the accuracy given in the standards. In statistical evaluation, the measured accuracy is taken.

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Test Report No. 1.1/12531/0429.0.3-2017e page 2

Summary of results

Date / Ref. : 28 July 2017 / cs

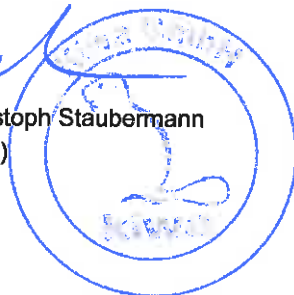
Order by : Concrete Canvas Ltd., Unit 3, Block A22, Trefforest Ind. Estate
Pontypridd, CF37 5SP, UNITED KINGDOM

Material : Composite of a PVC membrane (black) and a woven with concrete mixture (grey) in between
CC13
(declaration by customer)

Test	Standard	Unit	Result
Environmental safety*	M Geok E	2016	The material CC13 can be graded as environmentally uncritical following M Geok E.

* The test was performed in an accredited external test laboratory.
(Source: Test Report No. 1.1/12531/0429.0.1.1-2017e of Kiwa GmbH - TBU, issued on 24 July 2017, test at CC5)

i.V. Ch. Staubermann
i.V. Dipl.-Ing. (FH) Christoph Staubermann
(Head of test laboratory)



i.V. M. Käsekamp
i.V. Matthias Käsekamp, B. Eng.
(Deputy head of test laboratory)