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REPORT

GEOSYNTHETICS TEST REPORT

REPORT REFERENCE: BS-K114/a

Report Date 05/09/2014
Client Stratus Environmental Ltd, Thorpe Park, Leeds, LS15 8GB
Contact Andrew Coxon
Contract Reference Hafod Landfill Site {Cell 3 Sidewall}
Client PO/Ref No 669/CE1005/A Everson

Material Tested Geotextile
Date Received 14/08/2014
Sample ID FGD/01 & FGD/02

Tests Requested Tensile Properties - BSEN ISO 10319:2008
Puncture Resistance - BSEN ISO 12236:2006
Characteristic Opening Size - BSEN ISO 12956:2010
Water Flow Under Constant Head - BSEN ISO 11058:2010

If you have any questions or require additional information, please do not hesitate to contact us.

Report Authorisation:

Ryan Hackney
Laboratory Manager
05/09/2014

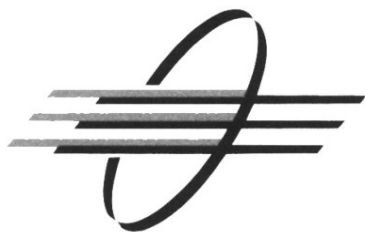


Tests Marked with an asterisk (*) in this report are not UKAS accredited, and therefore are not included in the UKAS Accreditation Schedule for our laboratory.

Tests marked # have been subcontracted and are UKAS accredited. Tests marked F are accredited under the company's UKAS Flexible Scope.

This test report is in a condensed format, complete test details available upon request.

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GEOSYNTHETICS TEST RESULTS

STRATUS ENVIRONEMNTAL LTD

P.O NO: 669/CE1005/A Everson

Contract Ref: Hafod Landfill Site {Cell 3 Sidewall}

Material: Geotextile

Sample ID: FGD/01

Report Ref No: BS-K114/a

BICS Labs ID: 01

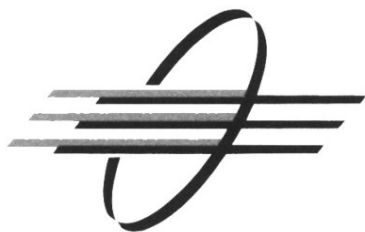
Dates Tested: 14/08-05/09/2014

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Tensile Properties (BSEN ISO 10319:2008)												
Tensile Strength kN/m (MD)	7.46	7.64	9.73	8.17	7.34						8.07	0.98
Tensile Strength kN/m (CD)	10.41	9.40	8.68	8.75	7.84						9.01	0.96
Tensile Strain % (MD)	32.1	36.3	33.0	34.5	35.2						34.2	1.7
Tensile Strain % (CD)	42.4	39.7	44.4	38.6	39.2						40.9	2.4
Puncture Resistance (BSEN ISO 12236:2006)												
Puncture Force kN	1.64	1.20	1.24	1.20	1.21						1.30	0.19
Puncture Displacement mm	41.0	45.5	39.4	39.1	43.8						41.8	2.8
Characteristic Opening Size (BSEN ISO 12956:2010)												
O ₉₀ µm	89										89	-
Waterflow 50mm Constant Head (BSEN ISO 11058:2010)												
l/s/m ²	48	50	46	43	50						47	3

Atmospheric Conditions at Test / Conditioning : 21 ± 2 ° C, Relative Humidity : 65 ± 5 % RH

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GEOSYNTHETICS TEST RESULTS

STRATUS ENVIRONEMNTAL LTD

P.O NO: 669/CE1005/A Everson

Contract Ref: Hafod Landfill Site {Cell 3 Sidewall}

Material: Geotextile

Sample ID: FGD/02

Report Ref No: BS-K114/a

BICS Labs ID: 02

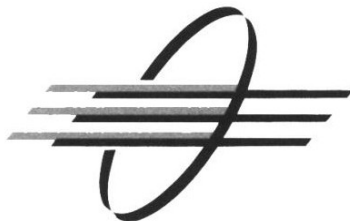
Dates Tested: 14/08-05/09/2014

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Tensile Properties (BSEN ISO 10319:2008)												
Tensile Strength kN/m (MD)	9.42	9.77	9.30	9.25	9.78						9.50	0.26
Tensile Strength kN/m (CD)	8.07	8.03	7.90	8.45	8.25						8.14	0.21
Tensile Strain % (MD)	7.4	11.7	10.4	9.3	10.1						9.8	1.6
Tensile Strain % (CD)	5.0	8.5	6.5	7.9	7.5						7.1	1.4
Puncture Resistance (BSEN ISO 12236:2006)												
Puncture Force kN	1.40	1.32	1.45	1.28	1.32						1.35	0.07
Puncture Displacement mm	38.3	36.4	36.0	39.0	38.0						37.5	1.3
Characteristic Opening Size (BSEN ISO 12956:2010)												
O ₉₀ µm	117										117	-
Waterflow 50mm Constant Head (BSEN ISO 11058:2010)												
l/s/m ²	10	11	10	11	11						11	1

Atmospheric Conditions at Test / Conditioning : 21 ± 2 ° C, Relative Humidity : 65 ± 5 % RH

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REPORT

GEOSYNTHETICS TEST REPORT

REPORT REFERENCE: BS-K115/a

Report Date 03/09/2014
Client Stratus Environmental Ltd, Thorpe Park, Leeds, LS15 8GB
Contact Adam Everson
Contract Reference Hafod Landfill Site {Cell 3 Sidewall}
Client PO/Ref No 669/CE1005?A Everson

Material Tested Geocomposite
Date Received 14/08/2014
Sample ID GCD 101 & GCD 102

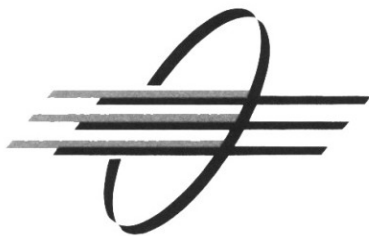
Tests Requested
Thickness - BSEN ISO 9863:2005
Tensile Strength - BSEN ISO 10319:2008
Puncture Resistance - BSEN ISO 12236:2006
In Plane Water Flow - BSEN ISO 12958:2010
Water Flow Under Constant Head - BSEN ISO 11058:2010
Characteristic Opening Size - BSEN ISO 11058:2010

If you have any questions or require additional information, please do not hesitate to contact us.

Report Authorisation:

Clifford Butt
Managing Director
03/09/2014





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GEOSYNTHETICS TEST RESULTS STRATUS ENVIRONMENTAL LTD P.O NO: 669/CE1005/A Everson

Contract Ref: Hafod Landfill Site {Cell 3 Sidewall}
Material: Geocomposite
Sample ID: Roll No. GCD 101, Roll 3

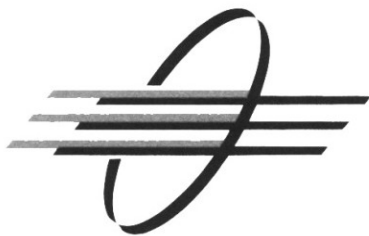
Report Ref No: BS-K115/a
BICS Labs ID: 01
Dates Tested: 02-03-09-2014

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Thickness (BSEN ISO 9863:2005)												
mm	6.80	6.78	6.70	6.90	7.09	6.76	6.68	6.89	6.92	7.00	6.85	0.13
Tensile Properties (BSEN ISO 10319:2008)												
Tensile Strength kN/m (MD)	16.6	15.4	17.8	17.9	18.5						17.3	1.2
Tensile Strength kN/m (CD)	16.8	15.7	14.6	14.3	13.9						15.1	1.2
Tensile Strain % (MD)	37.7	36.6	45.1	45.7	44.9						42.0	4.4
Tensile Strain % (CD)	33.6	43.1	41.9	36.4	34.4						37.9	4.4
Puncture Resistance (BSEN ISO 12236:2006)												
Puncture Force kN	2.32	2.25	2.14	2.42	1.91						2.21	0.2
Puncture Displacement mm	47.0	43.9	45.0	44.8	43.3						44.8	1.4
In Plane Waterflow (BSEN ISO 12958:2010)												
H.G = 1.0, 20kPa, Hard/Soft Platens												
l/s/m	1.39	1.36	1.41								1.39	0.03
Characteristic Opening Size (BSEN ISO 12956:2010)												
O ₉₀ µm	98										98	
Waterflow Constant Head (BSEN ISO 11058:2010)												
l/s/m ²	85	87	90	88	89						88	2

Atmospheric Conditions at Test / Conditioning : 21 ± 2 °C, Relative Humidity : 65 ± 5 % RH

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GEOSYNTHETICS TEST RESULTS STRATUS ENVIRONMENTAL LTD P.O NO: 669/CE1005/A Everson

Contract Ref: Hafod Landfill Site {Cell 3 Sidewall}
Material: Geocomposite
Sample ID: Roll No. GCD 102, Roll 12

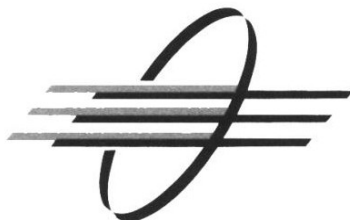
Report Ref No: BS-K115/a
BICS Labs ID: 02
Dates Tested: 02-03-09-2014

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Thickness (BSEN ISO 9863:2005)												
mm	6.58	6.43	6.59	6.91	6.64	6.99	7.02	6.83	6.79	6.84	6.76	0.19
Tensile Properties (BSEN ISO 10319:2008)												
Tensile Strength kN/m (MD)	12.9	12.3	14.4	14.6	14.1						13.7	1.0
Tensile Strength kN/m (CD)	17.2	17.5	15.0	14.4	14.2						15.7	1.6
Tensile Strain % (MD)	37.1	34.4	34.4	34.9	36.4						35.4	1.2
Tensile Strain % (CD)	34.0	37.1	40.5	35.6	33.4						36.1	2.8
Puncture Resistance (BSEN ISO 12236:2006)												
Puncture Force kN	2.41	2.59	2.05	2.62	2.64						2.46	0.2
Puncture Displacement mm	45.5	45.3	40.9	47.3	48.1						45.4	2.8
In Plane Waterflow (BSEN ISO 12958:2010)												
H.G = 1.0, 20kPa, Hard/Soft Platens												
l/s/m	1.30	1.41	1.33								1.35	0.06
Characteristic Opening Size (BSEN ISO 12956:2010)												
O ₉₀ µm	101										101	
Waterflow Constant Head (BSEN ISO 11058:2010)												
l/s/m ²	93	85	88	90	88						89	3

Atmospheric Conditions at Test / Conditioning : 21 ± 2 °C, Relative Humidity : 65 ± 5 % RH

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REPORT

GEOSYNTHETICS TEST REPORT

REPORT REFERENCE: BS-K115/b

Report Date 29/09/2014
Client Stratus Environmental Ltd, Thorpe Park, Leeds, LS15 8GB
Contact Adam Everson
Contract Reference Hafod Landfill Site {Cell 3 Sidewall}
Client PO/Ref No 669/CE1005/A Everson

Material Tested Geocomposite
Date Received 14/08/2014
Sample ID GCD 03 & GCD 04

Tests Requested Thickness - BSEN ISO 9863:2005
Tensile Strength - BSEN ISO 10319:2008
Puncture Resistance - BSEN ISO 12236:2006
In Plane Water Flow - BSEN ISO 12958:2010
Water Flow Under Constant Head - BSEN ISO 11058:2010
Characteristic Opening Size - BSEN ISO 11058:2010

If you have any questions or require additional information, please do not hesitate to contact us.

Report Authorisation:

Clifford Butt
Managing Director
30/09/2014

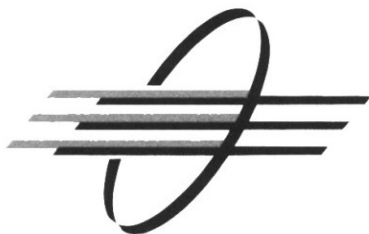


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GEOSYNTHETICS TEST RESULTS

STRATUS ENVIRONMENTAL LTD

P.O NO: 669/CE1005/A Everson

Contract Ref: Hafod Landfill Site {Cell 3 Sidewall}

Material: Geocomposite

Sample ID: Roll No. GCD 03

Report Ref No: BS-K115/b

BICS Labs ID: 03

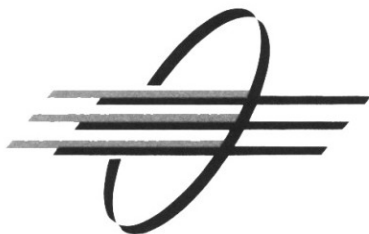
Dates Tested: 14/08-29/09/2014

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Thickness (BSEN ISO 9863:2005)												
mm	6.44	6.30	6.35	6.44	6.27	6.46	6.33	6.45	6.34	6.59	6.40	0.10
Tensile Properties (BSEN ISO 10319:2008)												
Tensile Strength kN/m (MD)	14.3	14.8	13.3	14.9	13.2						14.1	0.8
Tensile Strength kN/m (CD)	13.8	15.9	15.7	16.8	16.2						15.7	1.1
Tensile Strain % (MD)	41.9	37.6	36.1	35.6	36.1						37.5	2.6
Tensile Strain % (CD)	37.2	39.3	35.4	36.0	35.6						36.7	1.6
Puncture Resistance (BSEN ISO 12236:2006)												
Puncture Force kN	2.71	2.51	2.28	2.39	2.29						2.44	0.2
Puncture Displacement mm	48.3	47.3	46.8	47.1	46.3						47.2	0.8
In Plane Waterflow (BSEN ISO 12958:2010)												
H.G = 0.5, 20kPa, Hard/Soft Platens												
l/s/m	1.33	1.36	1.30								1.33	0.03
Characteristic Opening Size (BSEN ISO 12956:2010)												
O ₉₀ µm	96										96	
Waterflow Constant Head (BSEN ISO 11058:2010)												
l/s/m ²	89	94	92	88	93						91	2

Atmospheric Conditions at Test / Conditioning : 21 ± 2 °C, Relative Humidity : 65 ± 5 % RH

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GEOSYNTHETICS TEST RESULTS

STRATUS ENVIRONMENTAL LTD

P.O NO: 669/CE1005/A Everson

Contract Ref: Hafod Landfill Site {Cell 3 Sidewall}

Material: Geocomposite

Sample ID: Roll No. GCD 04

Report Ref No: BS-K115/b

BICS Labs ID: 04

Dates Tested: 14/08-29/09/2014

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Thickness (BSEN ISO 9863:2005)												
mm	6.76	6.44	6.65	6.91	6.72	6.74	6.66	6.62	6.69	6.55	6.67	0.13
Tensile Properties (BSEN ISO 10319:2008)												
Tensile Strength kN/m (MD)	18.1	18.8	16.1	18.0	16.5						17.5	1.1
Tensile Strength kN/m (CD)	16.9	19.2	16.8	19.8	15.0						17.6	1.9
Tensile Strain % (MD)	45.3	48.4	40.6	42.0	37.0						42.6	4.4
Tensile Strain % (CD)	40.1	42.4	36.7	42.1	37.1						39.7	2.7
Puncture Resistance (BSEN ISO 12236:2006)												
Puncture Force kN	2.62	2.66	2.98	2.19	2.63						2.62	0.3
Puncture Displacement mm	46.6	48.2	46.3	43.7	42.3						45.4	2.4
In Plane Waterflow (BSEN ISO 12958:2010)												
H.G = 0.5, 20kPa, Hard/Soft Platens												
l/s/m	1.29	1.28	1.32								1.30	0.02
Characteristic Opening Size (BSEN ISO 12956:2010)												
O ₉₀ µm	95										95	
Waterflow Constant Head (BSEN ISO 11058:2010)												
l/s/m ²	92	96	89	93	88						92	3

Atmospheric Conditions at Test / Conditioning : 21 ± 2 °C, Relative Humidity : 65 ± 5 % RH

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