

Monsieur Buzon
BUZON PEDESTAL INTERNATIONAL SA

ZI des Hauts Sarts - Zone I
Prolongement de la rue de l'Abbaye 134

4040 HERSTAL

your reference
BC 07-0380-CB-SIRRI-BPI

our reference
7-2017

contact person
Francine Schoumaker
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Liège
20-11-2007

7-2017

Dear Sir,

Following your analysis request, please find enclosed the test results

We stay at your disposal for any complementary information.

Best regards,

F. Schoumaker
Responsible for the project

M. Gasparini
Laboratory manager

Remarks

The here-above tests results may be published or communicated provided 'test realised in Sirris' is mentioned.

Test results are valid only for the tested samples.



TESTS REPORT

Ref: 7-2017

Company: Buzon

CONCERNING: Tensile tests before and after UV ageing

Samples type:

Receipt date:

Client reference: Recycled material Synova 504 PP

Sirris Reference: Idem

Samples conditioning:

According to the laboratory normal atmosphere: European standard EN-62

Temperature: 23°C – Humidity: 50%

Analysis

Tensile tests according to the Standard ISO 527-2

Methodology

Tensile tests with HRD extensometer

Instron Corporation Type: Series 4500

Automatized mechanical testing machine Series IX 7.34.00

The testing machine is calibrated by INSTRON.

Cell load class is 0.5

The calibration certificate for the 10KN load cell is valid until May 2008. The calibration certificate for crosshead speed and displacement is valid until September 2008.

The calibration certificate for the HRD extensometer is valid until May 2008.

Sample type 1A according to the standard ISO 527-2 specifications.



Sampling

Samples were injected in Sirris workshop on an injection machine type BILLION.
Average injection temperature 220°C - Sirris Tensile tests sample
Closing time 30 sec - Injection pressure 1250 Bar - Holding pressure 3 seconds at 900 Bar.

The samples rest 48 hours minimum in the laboratory atmosphere before placing in the UV weathering tester.

Cycle applied:

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Ageing duration 500h, 1000h, 1500h, 2000h, 2500h, 3000h and 3500h.

Tests date

Samples injected on 2007/06/25

Reference tensile tests : 2007/07/19

Tensile tests after 500 hours : 2007/07/20

Tensile tests after 1000 hours : 2007/08/08

Tensile tests after 1500 hours : 2007/08/31

Tensile tests after 2000 hours : 2007/09/24

Tensile tests after 2500 hours : 2007/10/15

Tensile tests after 3000 hours : 2007/11/05

Tensile tests after 3500 hours : 2007/11/19

Operator

F. Schoumaker

Traitement des résultats

Testing machine parameters :

Acquisition (pts/s) : 5

Testing speed : (mm/min) : 50

Distance between grips : 115 mm

Entensometer gauge length 50mm

Humidity (%) : 50

Temperature : (Deg C) : 23

Load cell : 10KN



Results

Treatment : none

Graph 7-2017-01

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.16	3.786	2000
2	10.09	3.734	1959
3	10.15	3.771	2069
4	10.13	3.796	2072
5	10.13	3.749	2092
6	10.15	3.883	1965
7	10.17	3.755	2074
Average:	10.14	3.782	2033
Standard deviation			57
% variat			3%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	21.34	4.33	20.04	10.99
2	21.88	4.28	19.67	13.66
3	21.49	4.32	19.57	13.83
4	-	-	21.36	3.96
5	21.77	4.88	20.22	11.66
6	21.12	4.57	19.28	12.10
7	21.78	4.63	19.87	13.12
Average:	21.52	4.476	20.00	11.33
Stand. deviat.	0.31	0.25	0.67	3.41
% variat	1%	6%	3%	30%



UV ageing - Duration 500h graph 7-2017-02

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.10	3.757	2142
2	10.17	3.771	2047
3	10.21	3.736	2074
4	10.19	3.760	2051
5	10.16	3.759	2019
6	10.15	3.764	2087
7	10.20	3.774	2096
Average:	10.17	3.760	2074
Standard deviation			40
% variat			2%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	22.47	4.27	21.47	8.76
2	22.30	4.28	20.50	13.22
3	22.31	4.52	21.85	8.45
4	22.12	4.29	20.12	14.27
5	22.37	4.74	20.74	11.76
6	22.49	4.63	21.16	11.77
7	22.18	4.73	19.99	13.42
Average:	22.32	4.49	20.83	11.66
Stand. deviat.	0.14	0.21	0.69	2.28
% variat	1%	5%	3%	20%



UV ageing - Duration 1000h graph 7-2017-03

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.10	3.731	2120
2	10.16	3.759	2109
3	10.13	3.762	2105
4	10.13	3.750	2055
5	10.18	3.754	2082
6	10.13	3.751	2117
7	10.11	3.754	2104
Average:	10.13	3.752	2099
Standard deviation			23
% variat			1%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	22.91	4.30	20.26	13.42
2	22.49	4.30	20.86	11.86
3	22.74	4.39	22.37	6.94
4	22.41	4.94	21.30	9.66
5	22.30	4.99	21.35	8.58
6	22.71	4.59	21.13	10.23
7	22.17	4.39	20.49	10.80
Average:	22.53	4.56	21.16	10.21
Stand. deviat.	0.26	0.30	0.62	2.12
% variat	1%	6%	3%	21%



UV ageing - Duration 1500h graph 7-2017-04

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.09	3.855	1935
2	10.15	3.860	1673
3	10.11	3.750	1965
4	10.07	3.751	1823
5	10.09	3.750	1845
6	10.12	3.872	1792
7	10.10	3.860	1913
8	10.16	3.845	2221
9	10.15	3.740	2065
10	10.10	3.765	1764
Average:	10.11	3.805	1900
Standard deviation			159
% variat			8%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	21.81	4.34	20.43	10.31
2	-	-	21.36	3.92
3	22.16	4.48	20.33	11.88
4	-	-	22.19	4.26
5	22.31	4.63	20.47	11.94
6	21.82	5.02	20.33	10.06
7	21.96	4.51	20.86	9.54
8	22.01	4.79	20.90	9.37
9	22.43	4.53	21.47	8.69
10	22.16	4.75	21.60	7.13
Average:	22.08	4.63	20.99	8.71
Stand. deviat.	0.22	0.21	0.64	2.81
% variat	1%	5%	3%	32%



UV ageing - Duration 2000h graph 7-2017-05

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.12	3.835	2181
2	10.08	3.752	2212
3	10.10	3.738	2213
4	10.12	3.754	2191
5	10.08	3.864	2123
6	10.10	3.867	2218
7	10.18	3.739	2181
8	10.11	3.743	2209
9	10.12	3.757	2249
10	10.12	3.765	2243
Average:	10.11	3.781	2202
Standard deviation			36
% variat			2%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	22.54	4.25	21.15	8.31
2	23.06	4.16	21.42	10.54
3	23.01	4.68	21.38	10.33
4	22.88	4.39	21.14	10.16
5	22.28	4.35	20.46	10.65
6	22.31	4.32	20.85	9.20
7	22.75	3.00	22.37	7.87
8	22.97	4.27	21.48	9.61
9	23.05	4.68	22.26	7.58
10	22.96	4.25	22.62	6.16
Average:	22.78	4.24	21.51	9.04
Stand. deviat.	0.30	0.47	0.70	1.51
% variat	1%	11%	3%	17%



UV ageing - Duration 2500h graph 7-2017-06

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.15	3.74	1789
2	10.18	3.85	1774
3	10.15	3.86	1643
4	10.15	3.87	1521
5	10.16	3.84	1498
6	10.16	3.87	1488
7	10.15	3.87	1522
8	10.09	3.75	1677
9	10.13	3.88	1542
10	10.16	3.86	1599
Average:	10.15	3.84	1605
Standard deviation			112
% variat			7%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	23.14	5.25	21.58	9.99
2	22.30	5.17	20.51	11.17
3	22.20	5.24	20.56	11.08
4	22.14	5.14	20.15	10.96
5	22.09	5.10	20.64	9.31
6	22.07	5.09	20.33	10.99
7	22.21	5.08	20.32	11.20
8	22.70	5.23	21.05	10.60
9	21.84	5.15	20.28	10.21
10	22.15	5.18	21.07	8.77
Average:	22.28	5.16	20.65	10.43
Stand. deviat.	0.37	0.06	0.45	0.85
% variat	2%	1%	2%	8%



UV ageing - Duration 3000h graph 7-2017-07b

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.15	3.87	-
2	10.13	3.89	1812
3	10.09	3.74	1577
4	10.15	3.90	1841
5	10.17	3.88	1872
6	10.11	3.84	1708
7	10.14	3.88	1826
8	10.12	3.88	1806
9	10.15	3.76	1517
Average:	10.13	3.85	1745
Standard deviation	0.02	0.06	132
% variat	0.2%	2%	8%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	22.33	5.11	20.41	10.27
2	22.27	5.17	20.11	11.98
3	23.20	5.24	22.20	6.84
4	22.36	5.23	20.80	9.96
5	22.41	5.53	20.42	11.89
6	22.38	5.21	20.31	11.88
7	22.08	5.27	20.90	9.15
8	22.12	5.24	20.02	11.85
9	22.37	5.12	21.61	6.85
Average:	22.39	5.23	20.75	10.07
Stand. deviat.	0.32	0.12	0.73	2.09
% variat	1%	2%	4%	21%



UV ageing - Duration 3500h graph 7-2017- 08

UV-A 340 est de 8 hours at 60°C and 4 hours condensation at 50°C.

Sample	Width mm	Thickness mm	Tensile Modulus norme ISO 527 MPa
1	10.11	3.559	1825
2	10.11	3.549	1898
3	10.09	3.552	1791
4	10.11	3.567	1672
5	10.11	3.554	1790
6	10.11	3.570	1764
7	10.10	3.583	1704
8	10.10	3.547	1787
9	10.11	3.551	1840
10	10.10	3.551	1735
Average:	10.10	3.558	1781
Standard deviation			66
% variat			4%

Sample	Yield stress MPa	Yield strain %	Failure stress MPa	Nominal failure strain %
1	23.79	4.57	21.73	12.39
2	23.76	4.16	21.74	12.40
3	23.50	4.59	21.99	10.03
4	23.57	4.52	22.11	11.98
5	23.82	4.83	21.44	13.46
6	23.84	4.59	22.11	11.65
7	23.66	4.21	23.38	7.39
8	23.44	3.86	22.18	10.59
9	23.81	4.29	21.88	11.47
10	23.83	4.64	21.35	13.75
Average:	23.70	4.43	21.99	11.51
Stand. deviat.	0.15	0.29	0.56	1.85
% variat	0.6%	7%	3%	16%

Remark: Test results are valid only for the tested samples