



Test Report

**Determination of resistance
to root damage to flexible sheets and coatings for
roof planting according to FLL (2008)**

Product name

MAPEPLAN T B

Principal/Manufacturer

**POLYGLASS SPA MAPEI GROUP
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31047 Ponte di Piave (TV)
Italy**

The report comprises 33 pages and is only allowed to be used unabridged.

The report has a 10 years period of validity.

Date: 13-07-2012

Information given by POLYGLASS SPA MAPEI GROUP concerning data and characteristics of the flexible sheet MAPEPLAN T B

- **Product name:** MAPEPLAN T B
- **Intended use:** synthetic waterproofing
- **Material code/type of material:** TPO/FPO - PP
- **Thickness of the sheet (without lamination):** 1.5 mm
- **Product design/structure:** bottom shift/glass mat/middle shift/top shift
- **Supply form:** Rolls
- **Manufacturing technique:** Extrusion
- **Material standards / norms:** DIN EN 13956
- **Test certificates:** CE
- **Year of manufacture:** 2010
- **Installation method at the test site:**
 - Overlap: 10 cm
 - Jointing technique: hot air welding
 - Jointing agent: none
 - Type of joint seal: none
 - Wall corner joint reinforcing: prefabricated homogeneous corner
- **Addition of root inhibition agents with details of concentration:** none

5 Summary

In accordance with the "Method of testing resistance to root damage to flexible sheets and coatings for roof planting" (FLL, 2008) a two year-long test was carried out with the sheet MAPEPLAN T B.

The flexible sheet MAPEPLAN T B did not show any perforations or penetrations caused by roots or rhizomes after the 2 year test period.

The sheet MAPEPLAN T B is therefore considered to be resistant to roots and to Couch Grass rhizomes according to FLL standard.

The FLL method involves all relevant elements of the method according to the European Standard EN 13948. Furthermore the FLL method is more extensive and is considered to be more significant among experts. So from the technical point of view the tested sheet MAPEPLAN T B can be regarded as being resistant to root penetrations according EN 13948 as well.

The test on root resistance relates to the data and material characteristics as well as the applied jointing technique and manufacturing technique described on page 2 of this report.

Check samples of the tested sheet were taken and are stored at the Institute of Horticulture, University of Applied Science Weihenstephan-Triesdorf.

The test report was compiled in July 2012.

This report comprises 33 pages.

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13-07-2012



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Annex 1
Photos concerning the tested sheet MAPEPLAN T B (July 2012)



Figure 1: Sheet surface



Figure 2: Sheet surface with wall corner joint reinforcing



Figure 3: Sheet surface with T joint

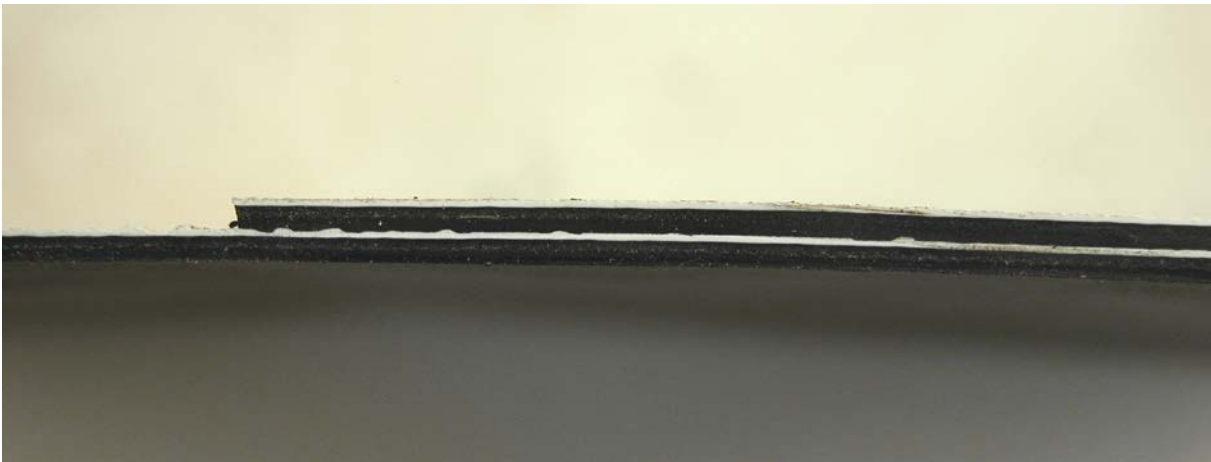


Figure 4: Cross-section of a joint of the membrane

Annex 2 Data on plant development

Table 1: Height and trunk diameter of Firethorn in 8 test containers

Cont. No.	Plant No.	Jan. 2011		July 2011		Jan. 2012		July 2012	
		Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm
1	1	1.5	205	1.8	240	2.0	265	2.4	310
	2	1.5	210	1.6	220	1.8	310	2.0	305
	3	1.5	200	1.5	250	1.6	305	1.8	320
	4	1.6	210	1.7	225	1.9	310	2.3	285
2	1	1.7	180	1.8	235	2.2	245	2.5	350
	2	1.4	205	1.4	245	1.6	280	1.7	310
	3	1.7	185	1.9	200	2.1	270	2.4	265
	4	1.6	230	1.7	230	1.7	310	1.8	330
3	1	1.6	215	1.7	250	1.9	295	2.4	320
	2	1.4	195	1.5	275	1.8	295	2.2	260
	3	1.6	230	1.8	245	2.1	290	2.4	315
	4	1.4	200	1.6	240	1.9	295	2.0	275
4	1	1.5	195	1.7	240	1.9	290	2.1	395
	2	1.5	210	1.5	210	1.7	300	1.7	330
	3	1.4	200	1.5	220	1.6	315	1.7	280
	4	1.5	150	1.7	220	2.1	240	2.4	325
5	1	1.5	190	1.6	235	1.9	275	2.0	265
	2	1.6	200	1.6	215	1.7	270	1.8	315
	3	1.8	220	1.9	240	2.2	265	2.4	375
	4	1.7	195	1.8	235	2.1	310	2.4	300
6	1	1.5	210	1.6	225	1.8	270	2.0	270
	2	1.5	220	1.5	230	1.8	295	2.0	280
	3	1.4	195	1.5	195	1.7	245	1.8	315
	4	1.4	230	1.6	290	1.7	325	1.7	275
7	1	1.5	185	1.7	210	2.1	245	2.3	275
	2	1.6	215	1.7	230	1.9	330	2.3	295
	3	1.5	175	1.7	180	2.1	245	2.3	275
	4	1.6	215	1.7	215	1.9	255	2.3	295
8	1	1.6	195	1.7	255	1.7	310	1.9	315
	2	1.3	220	1.4	215	1.7	280	1.7	295
	3	1.7	210	1.9	195	2.2	230	2.3	340
	4	1.5	220	1.6	265	1.8	320	2.1	340

¹⁾ Trunk diameter measured at 20 cm above substrate surface

Table 2: Average height and trunk diameter of Firethorn in 8 test containers

Cont. No.	Plant No.	Jan. 2011		July 2011		Jan. 2012		July 2012	
		Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm
1-8	1-4	1.53	203.6	1.65	230.5	1.88	283.9	2.10	306.3

¹⁾ Trunk diameter measured at 20 cm above substrate surface

Table 3: Height and trunk diameter of Firethorn in 3 control containers

Cont. No.	Plant No.	Jan. 2011		July 2011		Jan. 2012		July 2012	
		Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm
1	1	1.5	235	1.7	245	1.9	305	2.4	345
	2	1.4	200	1.6	210	1.9	300	2.1	305
	3	1.5	205	1.6	215	1.9	305	2.1	335
	4	1.6	225	1.8	235	2.0	315	2.2	335
2	1	1.5	235	1.7	245	2.0	300	2.3	310
	2	1.4	190	1.6	200	1.8	285	2.1	315
	3	1.5	210	1.7	220	1.9	305	2.2	320
	4	1.5	240	1.7	250	1.9	305	2.2	345
3	1	1.5	180	1.7	230	1.8	290	2.1	310
	2	1.5	210	1.7	220	1.9	295	2.2	330
	3	1.5	215	1.8	225	2.0	315	2.3	355
	4	1.4	185	1.6	235	1.9	280	2.3	335

¹⁾ Trunk diameter measured at 20 cm above substrate surface

Table 4: Average height and trunk diameter of Firethorn in 3 control containers

Cont. No.	Plant No.	Jan. 2011		July 2011		Jan. 2012		July 2012	
		Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm	Ø cm ¹⁾	Height cm
1- 3	1-4	1.48	210.8	1.68	227.5	1.91	300.0	2.21	328.3

¹⁾ Trunk diameter measured at 20 cm above substrate surface

Table 5: Average values of height and trunk diameter of Firethorn in 8 test containers related to the values of the plants in 3 control containers (data in %, nominal value: ≥ 80 %)

Cont. No.	Plant No.	Jan. 2011		July 2011		Jan. 2012		July 2012	
		Ø %	Height %	Ø %	Height %	Ø %	Height %	Ø %	Height %
1-8	1-4	103	97	98	101	98	95	95	93

¹⁾ Trunk diameter measured at 20 cm above substrate surface

Table 6: Classification of the stand density of Couch Grass in 8 test containers

Cont. No.	Jan. 2011	July 2011	Jan. 2012	July 2012
	stand density (in %)	stand density (in %)	stand density (in %)	stand density (in %)
1	60	70	70	70
2	60	65	70	75
3	60	65	75	70
4	50	75	70	75
5	60	65	75	70
6	60	65	70	65
7	60	70	75	75
8	50	70	70	70

Table 7: Average values of the stand density of Couch Grass in 8 test containers (nominal value: ≥ 40 %)

Cont. No.	Jan. 2011	July 2011	Jan. 2012	July 2012
	stand density (in %)	stand density (in %)	stand density (in %)	stand density (in %)
1-8	57.5	68.1	71.8	71.3

Table 8: Classification of the stand density of Couch Grass in 3 control containers

Cont. No.	Jan. 2011	July 2011	Jan. 2012	July 2012
	stand density (in %)	stand density (in %)	stand density (in %)	stand density (in %)
1	60	70	70	75
2	50	60	70	75
3	60	65	75	70

Table 9: Average values of the stand density of Couch Grass in 3 control containers

Cont. No.	Jan. 2011	July 2011	Jan. 2012	July 2012
	stand density (in %)	stand density (in %)	stand density (in %)	stand density (in %)
1-3	56.7	65.0	71.7	73.3