Roediger Agencies cc

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30 March 2023

Wayne Dickson
Super Thene Films (Pty) Ltd.
PO Box 24581
7779 LANDSDOWNE

Dear Mr. Dickson

REF no.: 0703SUP1/2-4

Cling film samples were sent to the analytical laboratory of Roediger Agencies cc for analysis via the following test methods.

The following samples were tested:

2	Superthene 12 micron
3	Superthene 14 micron
4	Superthene 16 micron

Moisture vapour transmission (MVTR)

Introduction

Moisture vapour transmission rate (MVTR) test is done to determine the amount of Moisture Vapour that would pass through the board in 24 hours at specified conditions of relative humidity and temperature.

1. **Apparatus:**
   - Humidity cabinet or conditioned room that can be set at 38 °C and 85% RH
   - Moisture resistant vessel of diameter ±70 mm and depth ±50 mm open at the top. Screw on open lid with rubber seal to be able to fit on top of vessel.
   - Balance accurate to two decimals.
   - Silica gel with colour indicator.
2. **Test procedure:**
   - Dry silica gel in oven for ±2 hours.
   - Add + 1 cm (100 g) of silica gel to bottom of vessel.
   - Cut round disc of sample and fit in lid of vessel.
   - Screw lid with sample on vessel.
   - Weigh vessel on balance and record reading as (A) to two decimals.

- Leave sample in humidity cabinet for 72 hours.
- Re-weigh vessel after 72 hours and record weight as (B).
- Calculate open area of vessel in m^2.
- Calculate MVTR as follows:

$$MVTR_{72} = \frac{B - A}{3(Area)}$$

$$\text{Re}\, sults\ to\ be\ in\ g / m^2\ / 24h$$

- An indicative reading can be obtained after 24 hours with the following formula:

$$MVTR_{24} = \frac{B - A}{(Area)}$$

Sample	Average MVTR ($g/m^2/24hr$)
Superthene 12 micron	72.11
Superthene 14 micron	67.49
Superthene 16 micron	36.41

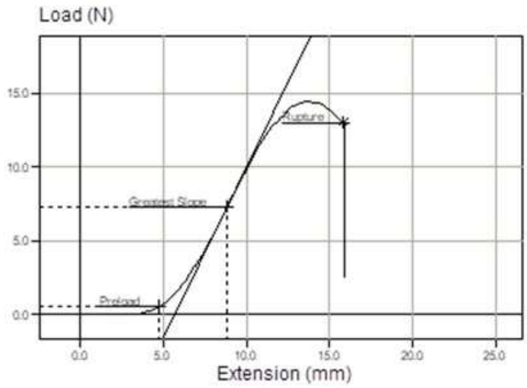
Tensile tests – strength & elongation

Tensile properties were measured on a tensile strength testing machine with a moving jaw of 50 ± 5 mm per minute. According to ISO 6259-1 & 6259-3.

Sample	Machine direction (MD)			Transverse direction (TD)		
	Maximum load (N)	Stress at maximum load (MPa)	Strain at maximum load (%)	Maximum load (N)	Stress at maximum load (MPa)	Strain at maximum load (%)
Superthene 12 micron	1.35	18.8	331	1.78	24.7	654
	1.25	17.4	237	1.50	20.9	621
	1.51	20.9	251	1.54	21.3	624
	1.57	21.9	330	1.72	23.9	652
	1.26	17.5	274	1.48	20.6	647
	1.44	20.0	397	1.69	23.5	647
	1.34	18.6	276	1.41	19.6	567
Average	**1.39**	**19.3**	**299**	**1.59**	**22.1**	**630**
Superthene 14 micron	2.58	30.7	237	2.59	30.8	831
	2.53	30.1	194	2.38	28.4	786
	2.55	30.4	204	2.59	30.8	882
	2.61	31.0	256	2.65	31.5	881
	2.79	33.3	281	2.32	27.6	823
	2.98	35.5	279	2.54	30.2	837
	2.63	31.3	170	2.58	30.7	834
Average	**2.67**	**31.8**	**232**	**2.52**	**30.0**	**839**
Superthene 16 micron	3.04	31.7	472	3.34	34.8	721
	2.59	27.0	442	3.08	32.1	705
	2.76	28.7	442	2.91	30.4	705
	2.46	25.6	353	2.86	29.8	678
	2.61	27.2	436	2.99	31.2	723
	2.76	28.7	464	3.37	35.1	724
	2.50	26.0	399	3.18	33.1	725
Average	**2.67**	**27.8**	**430**	**3.10**	**32.3**	**711**

Puncture resistance ASTM F1306

Impact Resistance of Plastic Film by the Penetration Probe Method A 3.2 mm diameter hemispherical (biaxial stress) probe was used.



A typical probe penetration at 25 mm/min force

Sample	Maximum load (N)
Superthene 12 micron	4.31
	4.34
	4.04
	4.17
	4.26
	3.73
Average	**4.14**
Superthene 14 micron	3.78
	3.61
	3.88
	4.20
	3.89
	3.91
Average	**3.88**
Superthene 16 micron	5.45
	5.57
	6.31
	5.58
	5.67
	5.76
Average	**5.73**

Summary

Sample		Average MVTR ($g/m^2/24$ hr)	Tensile tests – strength & elongation						Puncture resistance
			Machine direction (MD)			Transverse direction (TD)			
			Maximum load (N)	Stress at maximum load (MPa)	Strain at maximum load (%)	Maximum load (N)	Stress at maximum load (MPa)	Strain at maximum load (%)	Maximum load (N)
2	Superthene 12 micron	72.11	1.39	19.3	299	1.59	22.1	630	4.14
3	Superthene 14 micron	67.49	2.67	31.8	232	2.52	30.0	839	3.88
4	Superthene 16 micron	36.41	2.67	27.8	430	3.10	32.3	711	5.73

Yours faithfully,

Dr. AHA Roediger.

Please take note that samples will be retained for a six-month period and discarded thereafter. Food stuffs will only be kept for two weeks.