Roediger Agencies cc

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31 January 2024

Billy McMillan
Super Thene Films (Pty) Ltd.
PO Box 24581
7779 LANDSDOWNE

Dear Mr. McMillan

REF no.: 1901SUP1/1-5

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

The following samples were tested:

1	Clingfilm 14 micron
2	Clingfilm 15 micron
3	Clingfilm 16 micron
4	Clingfilm 18 micron
5	Clingfilm 20 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:

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

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

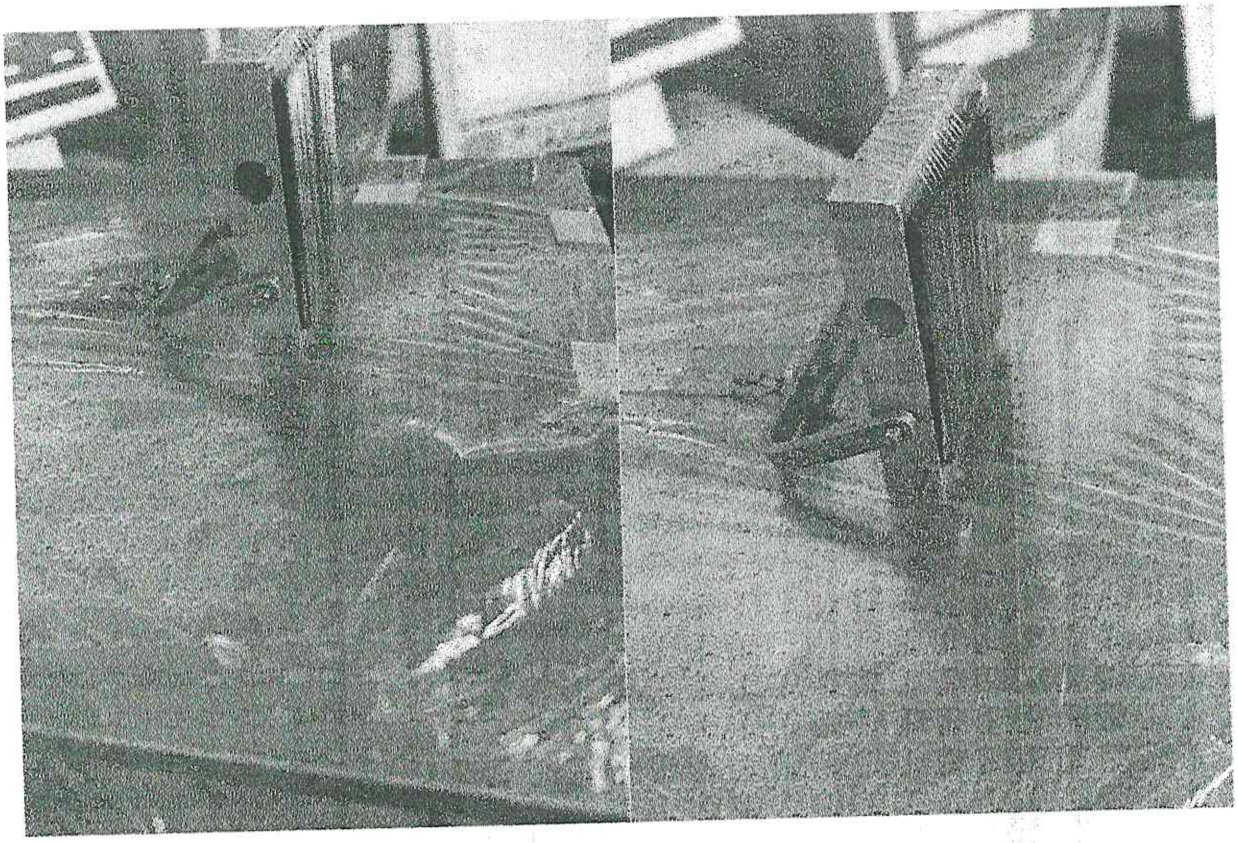
- An indicative reading can be obtained after 24 hours with the following formula:

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

Sample	Average MVTR (g/m²/24hr)
Clingfilm 14 micron	81.31 101
Clingfilm 15 micron	100.82
Clingfilm 16 micron	92.99
Clingfilm 18 micron	80.41
Clingfilm 20 micron	63.36

COF

Could not be carried out as the material is too tacky and the sled does not move resulting in a somersault. See below.



Free falling dart

ASTM D 1709: Standard methods for impact resistance of plastic film by the free-falling dart method. It covers the determination of the energy that causes plastic film to under specified conditions of impact of a free-falling dart. Method A was employed where the height of fall is 66cm. This energy is expressed in terms of the weight (mass) of the missile falling from a specified height which would result in failure.

A dart with a 38.0 ± 1 mm diameter hemispherical head was used.

Sample	Mass (g)
Clingfilm 14 micron	306
Clingfilm 15 micron	306
Clingfilm 16 micron	306
Clingfilm 18 micron	306
Clingfilm 20 micron	306

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 (%)**
Clingfilm 14 micron	2.17	25.8	337	2.80	33.3	728
	3.50	41.7	480	2.98	35.5	742
	2.90	34.5	482	2.62	31.1	680
	1.66	19.8	281	3.10	36.9	732
	1.82	21.7	285	2.96	35.3	739
	3.11	37.0	511	2.93	34.9	716
	2.71	32.2	489	2.96	35.2	741
	2.68	31.9	436	3.32	39.5	761
Average	**2.57**	**30.6**	**413**	**2.96**	**35.2**	**730**
Clingfilm 15 micron	2.57	28.5	491	2.48	27.6	663
	2.18	24.2	477	2.39	26.6	672
	2.21	24.5	416	2.71	30.1	732
	2.09	23.2	457	2.38	26.4	656
	2.16	24.0	347	2.69	29.9	744
	2.76	30.7	430	2.52	28.0	719
	2.26	25.1	436	2.27	25.3	693
	2.09	23.2	474	2.65	29.5	718
Average	**2.29**	**25.4**	**441**	**2.51**	**27.9**	**700**

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 (%)
Clingfilm 16 micron	3.40	35.4	565	3.00	31.2	735
	3.07	32.0	493	3.89	40.6	805
	3.09	32.2	538	3.83	39.9	812
	3.10	32.2	530	3.91	40.8	814
	3.16	32.9	514	3.86	40.3	763
	3.12	32.5	519	3.48	36.3	718
	2.89	30.1	496	3.39	35.3	729
	3.06	31.9	526	3.91	40.7	767
Average	**3.11**	**32.4**	**523**	**3.66**	**38.1**	**768**
Clingfilm 18 micron	2.82	26.1	446	3.42	31.7	672
	3.00	27.8	475	3.33	30.9	683
	2.82	26.1	444	3.42	31.6	728
	2.80	25.9	388	3.70	34.2	754
	3.22	29.8	460	3.38	31.3	745
	2.92	27.0	430	3.53	32.7	775
	3.01	27.8	447	3.79	35.1	753
	3.12	28.9	471	3.52	32.6	774
Average	**2.96**	**27.4**	**445**	**3.51**	**32.5**	**736**
Clingfilm 20 micron	3.28	27.3	473	3.87	32.3	792
	3.74	31.1	495	3.58	29.8	779
	4.21	35.1	525	3.58	29.8	769
	3.73	31.1	501	4.09	34.1	785
	4.28	35.6	530	3.83	31.9	771
	3.84	32.0	511	3.93	32.7	788
	4.35	36.3	521	3.51	29.2	802
	4.27	35.6	497	3.74	31.1	795
Average	**3.96**	**33.0**	**507**	**3.77**	**31.4**	**785**

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.