

TEST REPORT

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1.0. PURPOSE

The purpose of this report is to reflect the results of physical testing of a butyl tapes for use on tracker systems in automobiles. The samples were submitted by Accent Manufacturing during September 2016.

2.0. INTRODUCTION

Accent Manufacturing submitted two Tracker samples for physical and performance testing. The tape is used in the automotive industry to stick tracker systems to the bottom of cars.

The following samples were received:

Sample Name	Description	Our sample number
Accent Tracker	Black roll of tacky butyl tape that has a potential to be used as tracker tape – in white cover	ACCTR-01
Commercial Tracker	Black roll of tacky butyl tape current selling for use for tracker devices – in yellow cover	COMTR-01

3.0. STANDARDS

Currently no standards are prescribed by the tracker industry for tracker tape. The standards that are used are for industrial adhesion tape.

4.0. TESTING METHODOLOGY

The following tests were performed on all the samples submitted:

- Density – Amended ISO 2781, mass based and volumetric based

- Tensile – ASTM D-638
- Adhesion / Peel Strength – Standard Test method 1, 2002 - provided
- Low static Force – Standard Test Method 2, 2002, provided
- Ball Initial Adhesion test – in-house test based on applying the tape to a sloped surface and using two balls to measure the distance of travelling. A glass ball (60.55g) and golf ball (45.66g). The ball adhesion test was started on a 45⁰ angle sloped surface. The ball was released at the top of the tape, without applying any definite pressure. The movement of the ball downwards were measured after 5 minutes. Thereafter the sloped surface was lifted to a 90⁰ angle and further movement of the ball was measured after 5 minutes.

The low static force and peel tests were contracted to an accredited laboratory.

5.0. RESULTS

5.1 Density Results

The results for density was determine by amendment of the ISO 2781 standard. A mass balance based method was also used, as well as a volumetric method for comparative purposes. The result of the density measurements are shown in Table 5.1. The volumetric densities are not as accurate as the recalculated and mass based densities.

TABLE 5.1: Density of different rubber samples using amended ISO 2781, Mass Based and Volumetric Analysis

Sample	Density (g/cm ³) Recalculated - ISO2781	Density (g/mc ³) mass based	Density (g/ml) volumetric
Commercial Tracker – COMTR 01	1.35	1.35	1.38
Accent Tracker - ACCTR 01	1.52	1.53	1.54

5.2 Ball Initial Adhesion Test

The results of the ball initial adhesion test were recorded for the 45°, the 90° angle and the total movement. The results are shown in Table 5.2.

TABLE 5.2: Movement of balls to test initial adhesion of tape

Ball adhesion test on butyl tracker tape samples			
Movement Degree	Movement (mm)	Movement (mm)	Movement (mm)
	45°	90°	Total
Commercial tracker - COMTR 01			
Glass Ball	10	1	11
Golf Ball	10	1	11
Accent Tracker – ACCTR 01			
Glass Ball	10	0.5	10.5
Golf Ball	7	0.5	7.5

5.3 Low Static Force (Shear) testing

The results of the adhesion for low static force (shear) and peel tests on the tape samples are shown in Tables 5.3.

TABLE 5.3: Low Static Force (Shear) and Peel Test Results

Shear and peel adhesion test results					
Test Method	COMMTR 01		Requirement	ACCTR 01	
	Description	Pass/ Fail		Description	Pass/ Fail
Shear Test @80°C/24 Hrs					
Shear Category A - With weights	Panels fell off during test	Fail	No movement	0mm	Pass
Shear Category B - Without weights	3mm shift	Fail	No Movement	0mm	Pass
Peel test					
Metal Plate 100mm/min	699 N/25cm	Pass	200 N/25 cm	1709 N/25cm	Pass

The results of the testing can be seen in Photographs 1 and 2.



Before testing



After testing

*Photograph 1. Results of **Commercial Tracker, COMTR-01**, for the test: Category A – Shear Peel with weights in oven @80°C for 24 hours. Some of the panels fell off and can be seen lying on the floor.*



Before testing



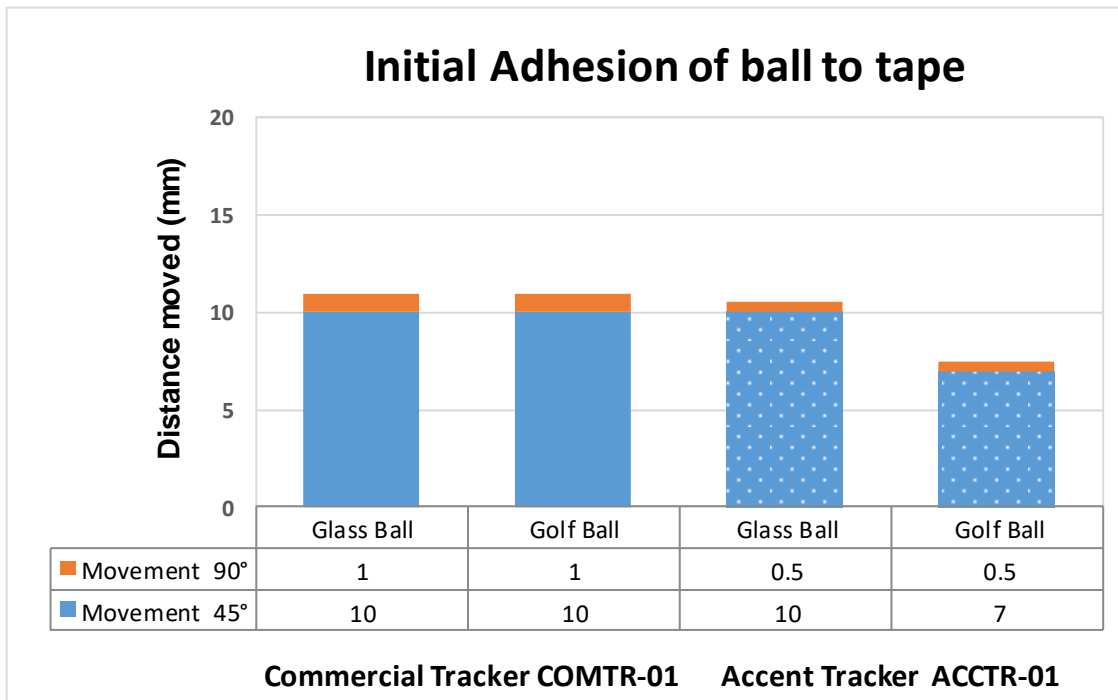
After testing

*Photograph 2. Results of **Accent Tracker, ACCTR-01**, for the test:*

Category A – Shear Peel with weights in oven @80°C for 24 hours. The panels showed no movement after this period and were still intact.

6.0. DISCUSSION

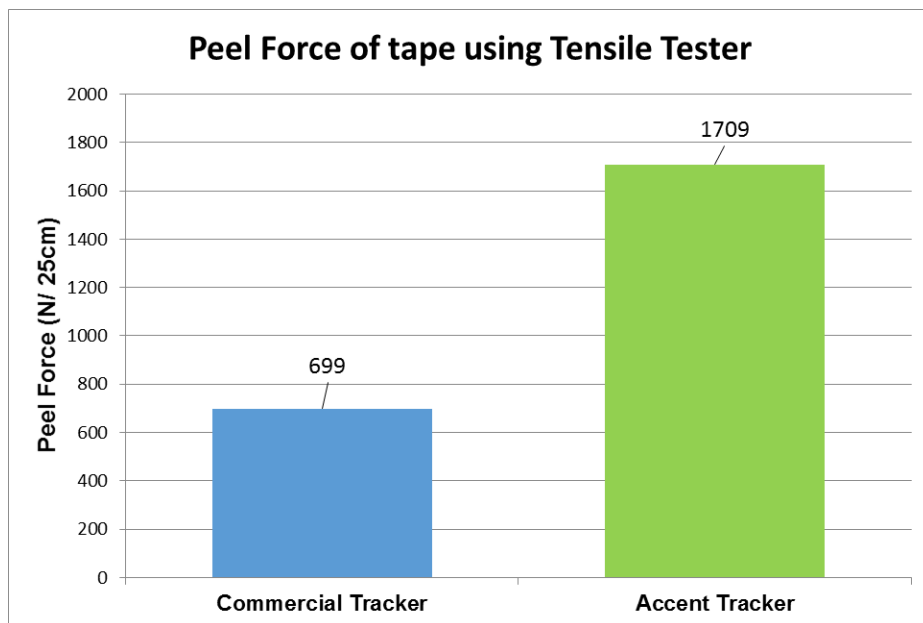
- 6.1. The butyl tapes Commercial Tracker, COMTR-01, and the Accent Tracker, ACCTR-01, behaved differently during the testing performed in this study.
- 6.2. Concerning the density the Commercial Tracker tape has a slightly lower density than the Accent Tracker.
- 6.3. The comparison of the initial ball adhesion test on the tape samples is graphically shown in Graph 1. For the glass ball the initial movement was similar for both the tapes, while the 90° angle movement for the golf ball was lower for the Accent Tracker tape.



GRAPH 1: Comparison of the Ball initial adhesion test

- 6.3 The results of the Shear and the Peel adhesion tests indicated that the Accent Tracker samples outperformed the Commercial Tracker sample.

- 6.4 During the Shear testing at 80°C both with and without weights, the Commercial Tracker showed movement and failed. At the elevated temperature with weights attached to the panels the inadequate adhesion of the Commercial Tracker resulted in the panels coming loose and falling of.
- 6.5 No movement was observed in the Accent Tracker tape during the shear test at elevated temperatures with and without weights and it passed the test. The requirement is that no movement must occur over the test period.
- 6.6 Both the samples passed the peel test that was performed on the tensile meter.
- 6.7 The peel force required to peel away the Accent Tracker was more than twice the force required compared with the Commercial Tracker. Graph 2 indicates the comparison between the peel forces required for the two samples. The Accent Tracker tape exceed the requirements of 200N/25cm for an adhesion tape by far.



GRAPH 2: Comparison of Peel Force testing of the Commercial and Accent Tracker samples

7.0. OPINION

Based on the testing performed in this study the Accent Tracker tape complies with and exceeds the requirements of an adhesion tape respectively for the Low Static Shear and Peel Adhesion Tests.

The Accent Tracker tape sample outperformed the Commercial Tracker Sample on both the Low Static Shear and Peel Adhesion Tests.

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23-09-2016

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