



Shirley
Technologies
Limited

Confidential Report

Our Ref: 39813(A)/STL/IGS



Shirley Technologies Limited. Registered Office :
Wira House, West Park Ring Road, Leeds, LS16 6QL.
A company registered in England & Wales with company number 04669651.
VAT Number GB 816764800.
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Our laboratories are accredited to EN ISO/IEC 17025





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3 September 2015

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Our Ref: 39813(A)/STL/IGS
Your Ref: Verbal 10 August 2015

Client: Carousel

Address: Carousel
Unit 7, Castle Industrial Estate
Beresford Street
Failsworth
Manchester
M35 0HD
FAO Paul Boomer

Job Title: Comparative Airflow Tests on Manufactured Pillows

Client's Order Ref: Verbal 10 August 2015

Date of Receipt: 10 August 2015

Description of Sample(s): Three samples of manufactured pillows – full details in the body of the report

Work Requested: Comparative testing for airflow using BS procedure



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INTRODUCTION

Shirley Technologies Limited (STL) was supplied with a sample of the client's new development in pillow manufacture. This was stated to incorporate features improving its airflow characteristics. The intended market for the product was for individuals suffering with epilepsy, as the improved airflow characteristics would prevent the potential for oxygen deprivation caused by blocked airways if the individual should have a fit and fall face down into the pillow.

STL was informed that a product manufactured for the same intended end use was already on the market, but that the client thought that this was inferior in quality to their own product.

STL was requested to perform comparative tests to measure the airflow through the two products, using an existing British Standard method developed for children's pillows.

To act as a control sample, STL was also provided with a sample of a polyester fibre filled pillow already on the market.

LABORATORY TESTING AND RESULTS

Subcontracted: # test sub-contracted to another UKAS laboratory

Specification for methods of test for hardness of, and for air flow through, infant's pillows (BS4578:1970)

Methodology

The apparatus used consists of a plane rigid unperforated support for the pillow, over which is mounted a metal tube 150mm in length with an internal diameter of 36mm. On the bottom of the tube is a metal flange with an outside diameter of 100mm. Means are provided to allow either the pillow support or the tube to move in a vertical direction and to submit the pillow under test to a thrust of 10N. The top of the tube is connected to the inlet of a flowmeter, the outlet of which is connected to the suction side of a blower. Provision is made to control the voltage input to the blower motor, and thereby to control the air flow rate. A diaphragm-type valve is fitted to the inlet end of the flowmeter and is used, where necessary, to give fine adjustment of the air flow. From the side of the tube a connection is taken to an inclined manometer. The pressure differential indicated by the manometer shall be noted when the flow rate has been adjusted to 200 ml/sec.



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Test specimens

The test is performed at ten separate locations on the upper side of the pillow and the individual and mean values reported. As all three pillow samples submitted are essentially reversible, for each one side was arbitrarily selected as being the upper surface.

STL was informed that the client's sample contained a removable memory foam insert designed to improve support. STL was requested to perform the air flow test with this insert included and not included.

STL was informed that the competitors sample incorporated two separate blocks of expanded PU foam, perforated with large 'air holes'. At the request of the client the air flow test was performed on areas both incorporating and not incorporating one of these air holes.

Test results

	Air flow test results (mm H ₂ O)				
	Clients epileptic pillow		Competitors epileptic pillow		Control
	Insert	No insert	Hole	No hole	
Test 1	0.39	0.37	1.27	1.70	3.99
Test 2	0.37	0.36	1.26	3.32	3.54
Test 3	0.38	0.33	1.02	2.91	3.59
Test 4	0.40	0.37	1.06	2.83	3.74
Test 5	0.39	0.38	1.06	2.22	3.75
Test 6	0.36	0.36			3.56
Test 7	0.41	0.38			4.15
Test 8	0.40	0.40			4.07
Test 9	0.35	0.35			3.51
Test 10	0.40	0.39			3.16
Mean	0.38	0.37	1.13	2.60	3.71



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COMMENTS AND CONCLUSIONS

Based on the assessments and laboratory testing carried out on the samples submitted, and bearing in mind the information made available by the client, Shirley Technologies Ltd would suggest the following comments and conclusions relating to the matter under investigation.

The client's epileptic pillow exhibits an extremely good level of air flow through its construction. STL would suggest that this is likely due to the very 'open knit' fabric surrounding the core, as this allows air flow to diffuse through the pillow construction and not directly pass perpendicularly downwards from the tube to the base plate. This comment is given weight by the fact that removing the less permeable memory foam core does not affect air flow results.

The competitor's epileptic pillow exhibits a lower level of air flow through its construction. STL would also comment that the expanded PU foam does act to restrict the airflow as tests performed with this foam as a 'barrier' to the passage of air give higher values than tests performed over a perforation in the foam.

STL would comment that there are quantifiable differences in air flow performance of all three pillows, and so it is likely that these differences may affect their comparative serviceability. However to put this into context, STL would note that the minimum air flow requirement quoted in BS1877 Part 8 "Pillows for domestic use" is 20.4 mm H₂O. Therefore, whilst there are quantifiable difference in performance of the pillows submitted, they all achieve the specified target by a significant margin.

STL would also note that the BS4578 test methodology was developed to mimic the breathing of infants. These epileptic pillow products are developed specifically for adults, whose physiology will be different including such as mouth size, breathing force, ability to self-turn etc. Thus the test results may not mimic the breathing of adults.

Reported by:

Ian Strudwick
Technical Manager

Countersigned by:

John Buckley
Principal Analyst

Enquiries concerning this report should be addressed to Customer Services.



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