



# TEST REPORT

## **DS6 Composite Cover & Frame EN124 D400 Test (BIF 49139)**

Document reference number - SSC-DS6-49139-04-04-17

### **Report by:**

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M. A. Salisbury 

### **Date test carried out:**

17<sup>th</sup> April 2017

### **Customer name:**

Structural Science Composites Ltd.  
Unit 8 James Freel Court,  
James Freel Close,  
Barrow in Furness  
LA14 2NG

## Clarifying Statements:

1. The results reported have been performed in accordance with the test requirements agreed by the customer (Structural Science Composites Ltd.) and laid down in the new draft FprEN 124-1 2014 standard along with the composite section FprEN 124-5.
2. This report does not include or imply any expert opinions as to the serviceability of the sample tested or their suitability for a specific purpose.
3. The submitter disclaims any liability of any kind for any damage whatsoever resulting from the use of either data in the files or the attached values of the test results reported.
4. The report may not be reproduced other than in full, except with the prior written consent of the Engineering Dept., Lancaster University.
5. All testing has been carried out in within the Engineering Department, Gillow Ave., Lancaster University, Bailrigg, Lancaster LA1 4YW.
6. This report applies only to those items and/or materials that have been tested and reported on herein. No inference shall be made to similar test items or materials/samples.

## Cover

The cover supplied is a square DS6 composite cover (Photo. 1)

Cover No. – 49139

A composite frame was also supplied.

Frame No. – 38332



Photo. 1

## Test Rig

The test rig consists of a 'giant mecano' frame bolted to the floor and supporting an Enerpac 50 ton hydraulic cylinder. (Photo 2)

Calibration Sticker (Photo.3)

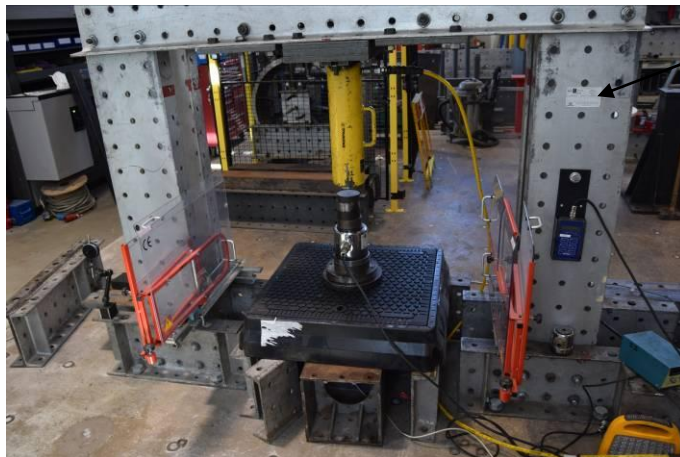


Photo.2

The frame sat on steel channels with shims to pack and level.

In accordance with the draft FprEN124-1:2014 standard the load cell and test rig complies with EN ISO 7500-1:2004 minimum Class 3.

Test Rig ID: EG100TF (Photo.3)

Load Cell ID: 440/3243

Instron Calibration Certificate No. E225112816155035

System Class: 1

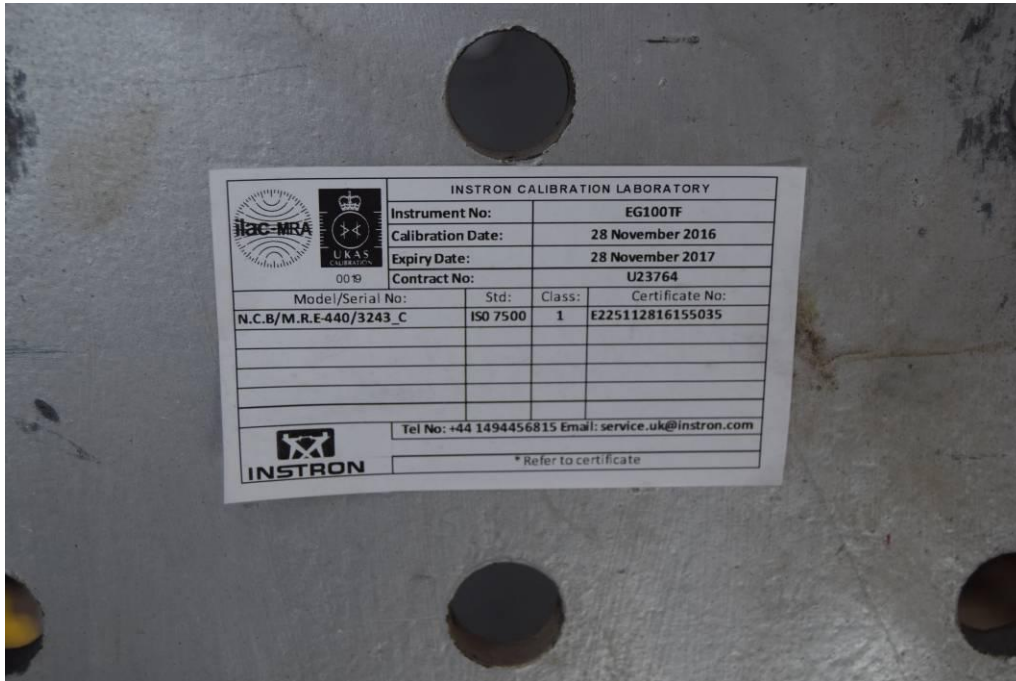


Photo.3

## **Test**

The tests were carried out in accordance with the Draft FprEN 124:2014 standard for:

- Permanent Set – Clause 8.2
- Load Bearing Capacity – Clause 8.3

The load was applied to the panels through a 250mm diameter by 45mm thick steel block with a 250mm diameter by 10mm rubber pad between the block and panel.

### **Permanent Set Test**

Measurement of permanent set shall be made on the upper-side of the cover in the same place as the applied load at the longest dimension which can be inscribed within the cover through the centre point of the load application. The measurement device shall be positioned as close as possible to the centre point of the load application and the seating of the measuring device support as close as possible to the edge of the cover but not exceeding 10mm from the edge.

An initial reading is to be taken at the geometric centre of the cover before the first load or any preloading has taken place.

The load is then to be applied at a rate of 1kN/s to 5kN/s up to 2/3 of the test load. This procedure is to be carried out five times without significant disruption.

A final deflection reading shall then be taken and the permanent set determined as the difference of the measured readings between the first and fifth readings.

### **Load Bearing Capacity**

Immediately after the permanent set test the cover shall be loaded up to the test load at a rate of 1kN/s to 5kN/s.

The test load shall then be maintained for  $30^{+2}_{-0}$  seconds.

## **Permanent set test**

Photograph 3 below shows the initial reading being taken for the permanent set test.

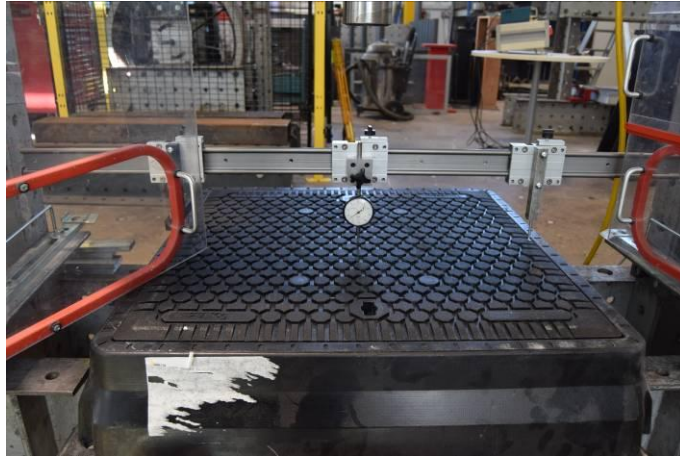


Photo.3

Initial Reading	0.00mm
Reading after 5 cycles	0.55mm
<b>Permanent Set</b>	<b>0.55mm</b>

Permissible permanent set for a D400 test is  $\frac{CO}{300} = 600/300 = 2.00\text{mm}$

**Therefore cover passes the permanent set test.**

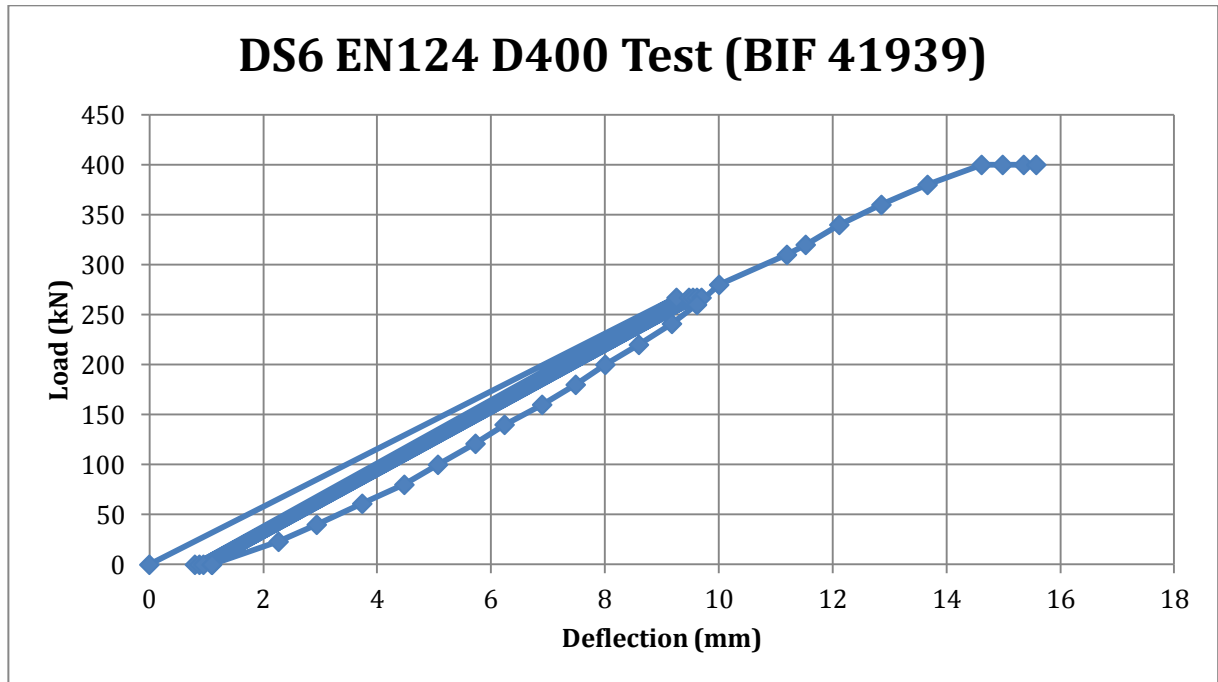
## Load Bearing Capacity Test

Load applied immediately after the permanent set test.

Although the standard does not require it for the load bearing test, a measuring device (linear potentiometer) was placed on the underside of the cover directly under the loading point. Deflection readings were taken throughout the test including the initial permanent set test and the results given in the following table.

## Results

LOAD (kN)	DEFLECTION (mm)	REMARKS
0	0.00	
267	9.26	Light cracking noises just for the 1 <sup>st</sup> cycle.
0	0.80	
267	9.48	
0	0.88	
267	9.55	
0	0.95	
267	9.62	
0	1.10	
267	9.70	
0	1.10	
23	2.27	
40	2.94	
61	3.74	
80	4.48	
100	5.07	
121	5.73	
140	6.24	
160	6.90	
180	7.49	
200	8.01	
220	8.60	
241	9.18	
260	9.62	
280	10.01	
310	11.20	
320	11.53	
340	12.12	
360	12.86	
380	13.67	
400	14.62	
400 (10 seconds)	14.99	
400 (20 seconds)	15.36	
400 (30 seconds)	15.58	<b>PASS</b>
0	1.83	
439	Gauge removed	Ultimate failure



The cover held the test load for the required 30 seconds with no visible signs of damage.

**The cover therefore passed the Load Bearing test.**

After the cover had passed the Load bearing test the cover was reloaded up to ultimate failure which occurred at 439kN.