Engineering | Lancaster University

TEST REPORT

FL180 Composite Cover
BS EN124 Class E600 Load Test

Weight – 22.1kg

Document reference number – FIB-FL180-E600-22-05-25

Report by:

M.A.Salisbury
Senior Technician

Date test carried out:

22nd May 2025

Customer name:

Fibrelite Composites Ltd.
Snaygill Industrial Estate,
Keighley Road,
Skipton,
North Yorkshire
BD23 2QR

Clarifying Statements:

1. The results reported have been performed in accordance with the test requirements agreed by the customer (Fibrelite Ltd.) and laid down in the new BS EN 124-1: 2015 standard, along with the composite section EN 124-5, plus the added criteria in the Air BP test specification.

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 composite cover supplied for testing is a round FL180 and comes complete with a composite frame. (Fig.1)

Cover No. 2504565

Fig.1

Test Rig

The test rig consists of a 'giant mecanno' frame bolted to the floor and supporting twin Enerpac 60 ton hydraulic cylinders. (Fig.2)

Fig.2

A steel ring with steel blocks and shims to pack were used to provide extra support to the frame. (Fig.3)

Fig.3

In accordance with the EN124-1:2015 standard the load cell and test rig complies with EN ISO 7500-1:2004 minimum Class 3.

System I.D.: TR150-17182835
Load Cell ID: NCB/MRE-440/3243
Instron Calibration Certificate No. E187070224093831
Calibrated on 2nd July 2024
System Class: 0.5

Figure 4 below shows the calibration certificate for the load cell and test rig.

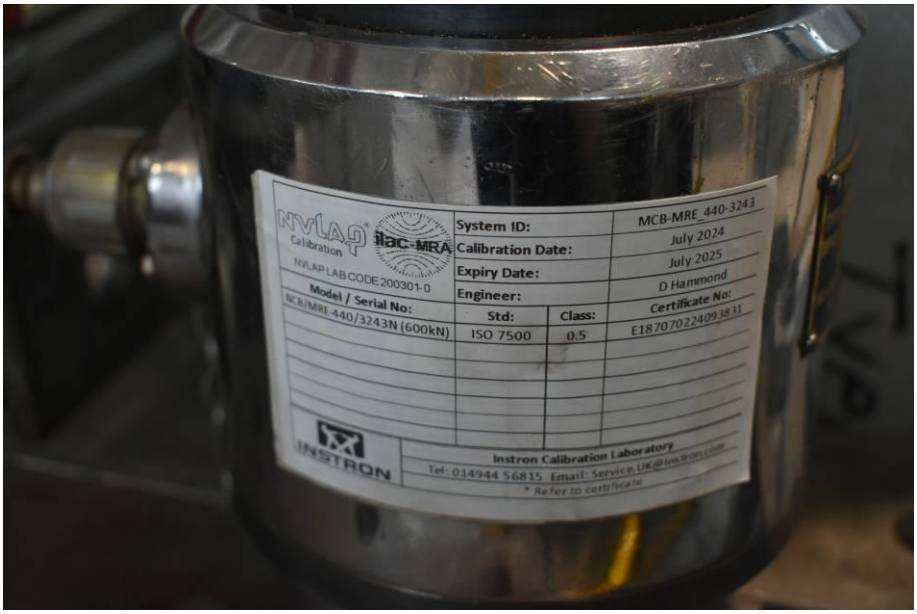

Fig.4

Test

The tests were carried out in accordance with the BS EN124:2015 specification for:

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

Permanent Set Test

The load was applied through a 250mm diameter loading pad with a 25mm thick rubber pad between pad and cover.

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.

Results

Permanent set test

Fig.5

Initial Reading	0.00mm
Reading after 5 cycles	0.53mm
Permanent Set	**0.53mm**

Permissible permanent set for a E600 test is $\frac{CO}{300}$ = 457/300 = 1.52mm

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 and deflection readings taken every 400kN for the five cycles and 50kN intervals after that.

Results

LOAD (kN)	DEFLECTION (mm)	REMARKS
0	0.00	
400	9.34	
0	1.22	
400	9.48	
0	0.23	
400	9.17	
0	0.24	
400	9.41	
0	0.44	
400	9.37	
0	0.52	
50	1.89	
100	2.76	
150	3.59	
200	5.00	
250	6.15	
300	6.93	
350	8.20	
400	9.58	
450	10.45	
500	11.77	
550	13.55	
600	15.70	
600 (10 seconds)	16.00	
600 (20 seconds)	16.92	
600 (30 seconds)	17.45	**PASS**
0	3.50	
642	-	**Ultimate failure**

Fig.6

The cover held the test load of 600kN with no visible signs of damage, so therefore it passed the BS EN124 Class E600 load bearing test.

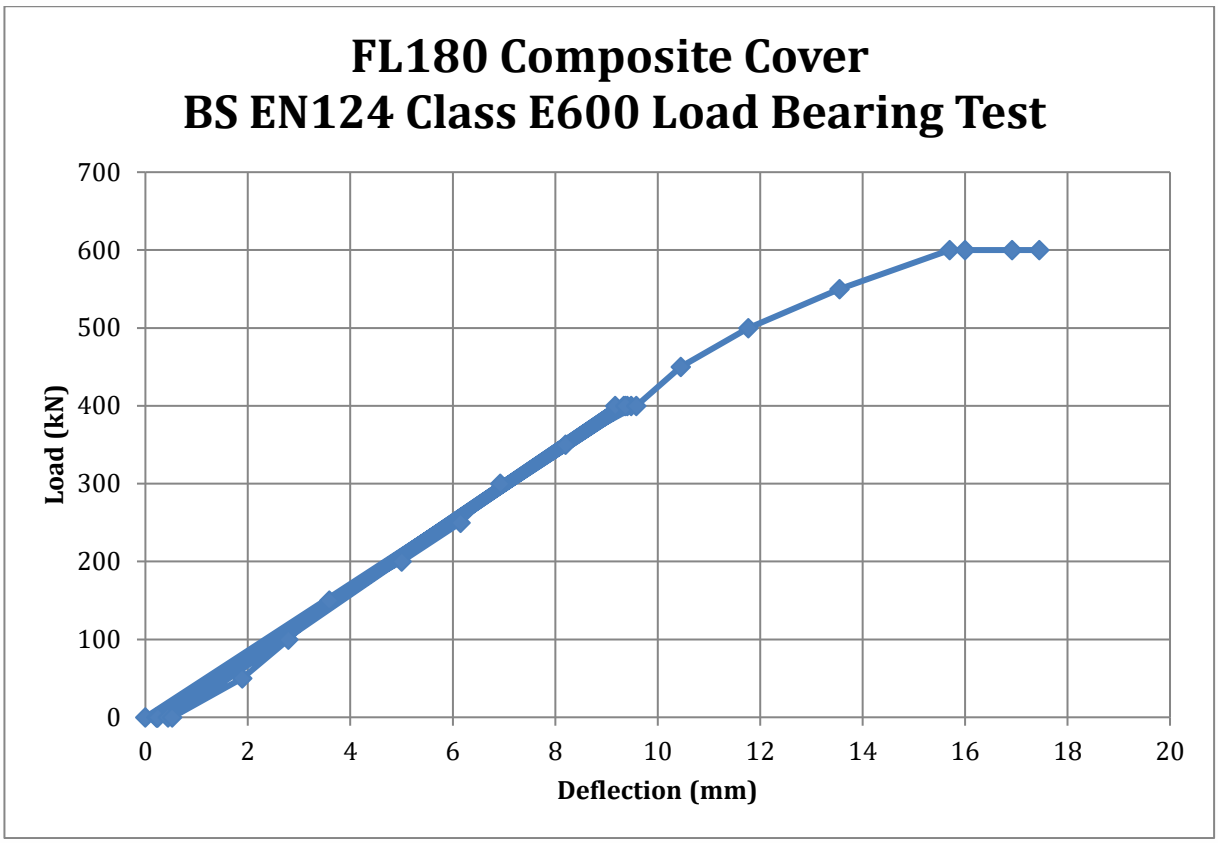

Fig.7

After the cover had been inspected and had passed the BS EN124 test, it was reloaded until ultimate failure occurred at 642kN.