



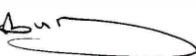
TEST REPORT

FL180 Composite Cover BS EN124 Class D400 Load Test

Document reference number – FIB-FL180-D400-13-02-24

Report by:

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Date test carried out:

13th February 2024

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.
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

A round FL180 composite cover and frame have been supplied for load testing (Photo.1)

Cover No. 2400645



Photo. 1

Test Rig

The test rig consists of a 'giant mecano' frame bolted to the floor and supporting an Enerpac 90 ton hydraulic cylinder. (Photo.2)

A steel structure was fitted in place to support the frame for both stability and safety.

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. E184010324091540

Calibrated on 3rd January 2024

System Class: 2



Photo.2

Photograph 3 below shows the calibration certificate for the load cell and test rig.



Photo.3

Test

The tests were carried out in accordance with the EN 124:2015 standard for:

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

The load was applied to the cover through a 250mm x 50mm steel block with a 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.

Results

Permanent set test

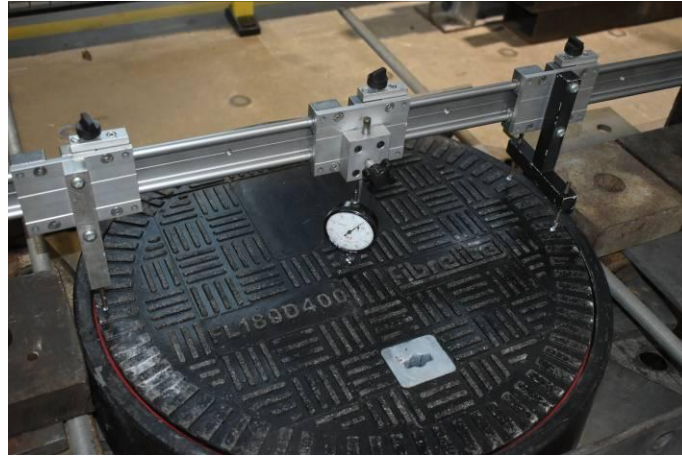


Photo.4

Initial Reading	0.00mm
Reading after 5 cycles	0.37mm
Permanent Set	0.37mm

Permissible permanent set for a D400 test is $\frac{CO}{300} = 450/300 = 1.50\text{mm}$

Therefore panel passes the permanent set test.

Load Bearing Capacity Test

Load applied immediately after the permanent set test.

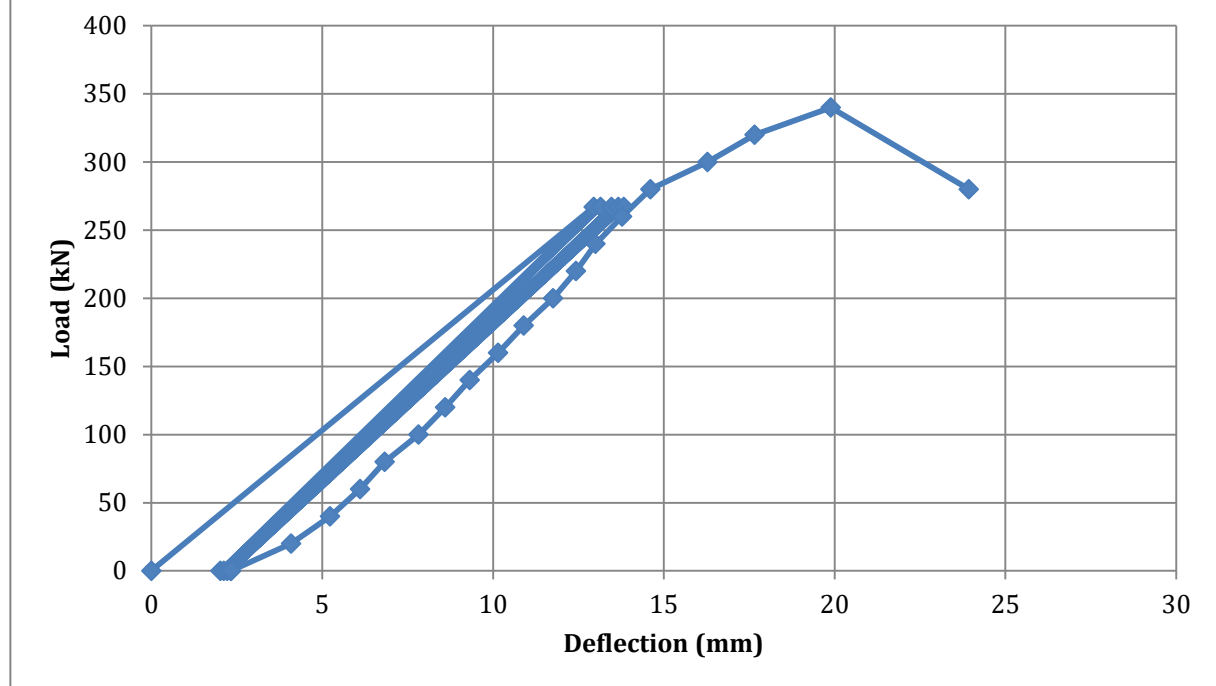
Although the standard does not require it for the load bearing test, a measuring device (linear potentiometer) was placed on the underside of the cover directly under the loading point and deflection readings taken every 267kN for the five cycles and 20kN intervals after that.

Results

LOAD (kN)	DEFLECTION (mm)	REMARKS
0	0.00	
267	12.95	
0	2.02	
267	13.15	
0	2.12	
267	13.47	
0	2.22	
267	13.67	
0	2.33	
267	13.83	
0	2.33	
20	4.09	
40	5.23	
60	6.11	
80	6.83	
100	7.82	
120	8.60	
140	9.32	
160	10.15	
180	10.90	
200	11.76	
220	12.43	
240	13.00	
260	13.78	
280	14.61	
300	16.28	
320	17.66	
340	19.89	FAILURE – loud cracking and load dropping off.
280	23.93	

The cover failed at 340kN and did not reach the required test load of 400kN, so therefore the cover failed the BS EN124 Class D400 load bearing test.

FL180 Composite Cover BS EN124 Class D400 Load Bearing Test



Photograph 5 below shows the cover still in the test rig at failure, with the top of the cover deformed and pushing down into the frame.



Photo.5

After the test the cover and frame were removed from the test rig and inspected for damage.

Photograph 6 shows major cracking to the underside and down one edge of the cover

Major failure



Photo.6

There was also significant damage to the inside of the frame.

Cracking

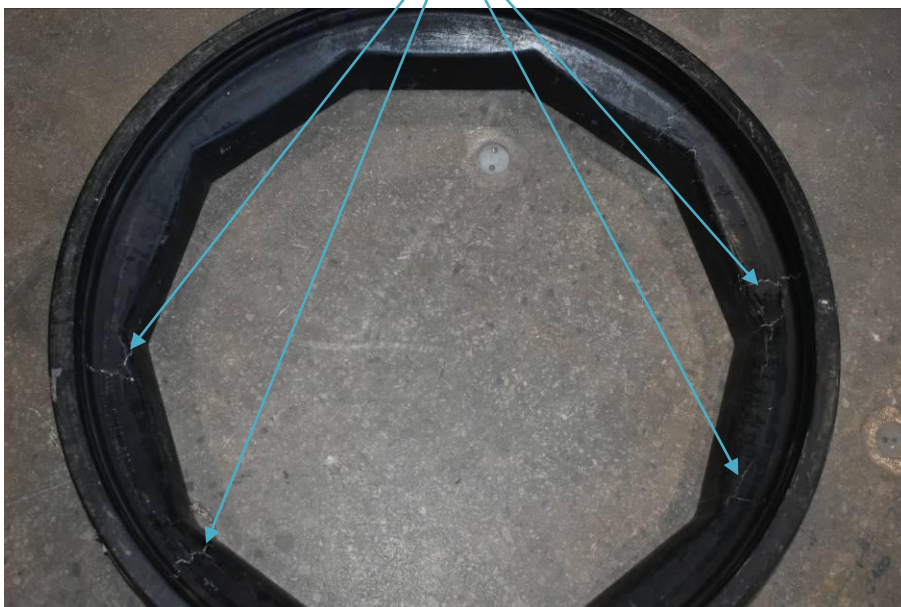


Photo.7