

## EN 124-1 Pit Cover Testing

### 24" x 24" Pit Cover

BGSE Group

JID 19-00074

4 March 2019

Reported by:



Shawn Titus  
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Approved by:



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**INDEX**

TEST INFORMATION.....	3
TEST SUMMARY .....	4
TEST METHOD .....	5
TEST RESULTS .....	7
PHOTOGRAPHS .....	9
TEST EQUIPMENT LOG .....	12

**PHOTOGRAPHS**

Photograph 1 Tilt Testing Setup.....	9
Photograph 2 Load Test Setup .....	10
Photograph 3 Cover and Frame Post Test .....	11



## **JID 19-00074 24 x 24 TEST REPORT**

### **TEST INFORMATION**

Test Requested By: Patrick Lester

Test Method Used: EN 124-1:2015

Type of Test: Structural

Test Item Description: 24" x 24" pit cover and frame

Test Commencement Date: 28 February 2019

Test Completed Date: 4 March 2019

Test Performed By: Shawn Titus

Traceability: NIST

Instrumentation Accuracy: +/- 1% full scale or +/- 4 deg F unless otherwise stated

## **TEST SUMMARY**

The following results relate only to the items tested and only under the test conditions specified in this report.

No opening hardware was provided.

The customer specified a F900 rating, which corresponds to Group 6 in the EN 124-1 specification.

The cover as tested met the requirements specified in the following sections:

8.2, 8.3, 8.4.3, 8.4.4, 8.4.5 (tilt test), 8.4.6, 8.4.11, 8.4.14, 8.4.15

The cover as tested met the requirements specified in the following section:

8.4.13 Pattern Height (the pattern height met the requirement)

The requirements specified in the following sections were unable to be verified with the cover as provided:

8.4.2 Clear opening

8.4.5 Compatibility of seatings (specifications)

8.4.7 Handling

8.4.16 Opening angle

The requirements specified in the following sections were not applicable:

8.4.1, 8.4.8, 8.4.9, 8.4.10, 8.4.12

## **TEST METHOD**

The following test method is intended to demonstrate compliance with EN 124-1:2015. Photograph 1 and Photograph 2 show the test setup.

### **Dimensional Checks**

8.4.6 Securing of the cover within its frame. Weigh the cover without the frame (+/- 1%) and calculate the clear area (+/- 100 mm<sup>2</sup> or 0.16 in<sup>2</sup>). Section 8.5 Child safety will also be verified by cover weight.

8.4.1 Vents. These covers have no vents.

8.4.2 Clear Opening. Clear opening is the largest diameter circle than can be inscribed in the clear area of the frame. Measure the clear opening (+/- 1 mm, or .04").

8.4.3 Depth of insertion. Measure the depth of insertion per 3.1.15. Minimum is 50 mm.

8.4.4 Clearance. Measure the max clearance between the cover and frame on each side (+/- .5 mm, or .02"). Add them together to get the total clearance.

8.4.7 Handling of the covers. Test for loosening and opening per manufacturer's instructions. Operation should be accomplished with usual tools.

8.4.8 Slot dimensions. Visually inspect for even distribution of slots. Measure waterway surface area (+/- 100 mm<sup>2</sup> or 0.16 in<sup>2</sup>). Measure straight slot dimensions to the nearest 1 mm (0.04"). Verify that the 170 mm x 170 mm x 20 mm gauge cannot be inserted in non-straight slots.

8.4.9 Not applicable.

8.4.10 Not applicable.

8.4.11 Flatness of cover. Measure flatness with an accuracy of 0.5 mm (0.02").

8.4.12 Not applicable.

8.4.13 Skid resistance. Measure pattern height with an accuracy of 0.5 mm (0.02"). Upper surface area to be provided by customer per drawing.

8.4.14 Frame bearing area. Measure the area of the underside of the cover that rests on the supporting structure.

8.4.15 Frame depth. Measure frame depth to the nearest 1 mm (0.04").

8.4.16 Opening angle. Measure opening angle to an accuracy of 5 degrees.

**JID 19-00074 24 x 24 TEST REPORT****Load Tests**

8.4.5 Compatibility of seatings. Perform tilt test per Annex D.

Apply load from 0 to 50 kN (11,240 lbs) at 1-5 kN/s (225 – 1124 lbs/sec) 3 times in center of each side with 75 mm dia test block and 10 mm thick rubber sheet. Record tilting height on opposite side. Temperature must be between 59 and 95 deg F.

8.2 Permanent set. Perform permanent set test per Annex A.

Apply 600 kN (134,885 lbs) vertical load 5 times at a rate of 1-5 kN/s. Measure the permanent set to an accuracy of 0.1 mm (.004”).

8.3 Load bearing capacity. Perform load test per Annex B.

Apply 900 kN (202,328 lbs) vertical load.

## **TEST RESULTS**

The following results relate only to the items tested and only under the test conditions specified in this report.

No attachment or opening hardware was provided.

8.2 After the permanent set test there was less than 0.1 mm permanent set. This meets the requirement of  $< 1.1$  mm.

8.3 The load bearing capacity test demonstrated the capability to hold a load of 900 kN. After the test there was no visible damage and no visible permanent set. The condition of the cover after removal of the test load is shown in Photograph 3.

8.4.1 Vents. Not applicable.

8.4.2 Clear Opening. The clear opening was measured to be 541 mm. This must be included in the product documentation. No documentation was provided, so this was not verified. It should be noted that this frame did not include any internal brackets for opening hardware which would reduce the clear opening.

8.4.3 Depth of Insertion. The depth of insertion was measured at 4 locations around the frame. The minimum measurement was 51 mm. This meets meet the requirement of  $\geq 50$  mm.

8.4.4 Clearance. The total clearance was measured to be 7.4 mm. This meets meet the requirement of  $\leq 9$  mm.

8.4.4 Clearance. The clearance around the hinge was measured to be 5.2 mm. This meets the requirement of  $\leq 13$  mm.

8.4.5 Compatibility of Seatings. No specifications were provided by the manufacturer regarding the compatibility of the seatings.

8.4.5 Compatibility of Seatings. The tilt test demonstrated a maximum tilting height of 2 mm. This meets the requirement of  $0.5 \times$  depth of insertion or 25 mm. It should be noted that no pins or attachment hardware was in place for this test.

8.4.6 Securing of the cover within the frame. The cover weighed 67 kg.

8.4.6 Securing of the cover within the frame. The clear area was measured to be 303,000 mm<sup>2</sup>.

8.4.7 Handling of Covers and Gratings. Handling of the cover could not be verified because a complete cover/frame and hardware was not provided.

8.4.8 Not applicable.

**JID 19-00074 24 x 24 TEST REPORT**

8.4.9 Not applicable.

8.4.10 Not applicable.

8.4.11 Flatness. The flatness was measured prior to the load testing to be less than 0.2 mm, which meets the requirement of 1% of the clear opening or 6 mm.

8.4.12 Concaveness. Not applicable.

8.4.13 Surface Conditions. The cover was delivered with paint in the surface grooves. The pattern height was measured to be 3.2 mm with the paint. This meet the requirement of 3 to 8 mm.

8.4.13 Surface Conditions. The upper surface area was not determined.

8.4.14 Frame Bearing Area. The frame bearing area was measured to be 253,000 mm<sup>2</sup>. This gives a bearing pressure of 3.6 N/mm<sup>2</sup>. This meets the requirement of  $\leq 7.5$  N/mm<sup>2</sup>. Note that this frame supports two covers, a 24x24 and a 24x36. It is assumed that only one cover at a time is loaded.

8.4.15 Frame Depth. The frame depth was measured to be 576 mm. This meets the requirement of  $\geq 100$  mm.

8.4.16 Opening Angle. Because the attachment hardware was not provided it was not possible to measure the opening angle.



**PHOTOGRAPHS****Photograph 1 Tilt Testing Setup**

**JID 19-00074 24 x 24 TEST REPORT**



**Photograph 2 Load Test Setup**





**Photograph 3 Cover and Frame Post Test**

JID 19-00074 24 x 24 TEST REPORT

## TEST EQUIPMENT LOG

This is a record of specific Equipment and Instrumentation used on this test



CEF 510-1: Instrumentation and Equipment Record - Rev 03-17-2017

JID # / Customer: 19-00074

Test Description: 86SE

Engineer: SHAWN TITUS

Technician: MIKE SIMONS

Units: ☒ English ☐ Metric

Data Collection Filename: TEST #

Data Collection Start Date: 25 FEB 19

Data Collection End Date: 4 MAR 19

Channel Number	Description	Full Scale Rating	DB #	Shunt Value	Calibration Due Date	Comments
N/A	MTS 407	N/A	30644	N/A	15 MAY 19	
1	DC CONDITIONER	N/A	30797	N/A	15 MAY 19	
N/A	SUMAT	N/A	30660	N/A	24 JAN 20	
1	LOAD CELL	200,000 lbs	12047	42,223	11 FEB 21	

\* NO DATA COLLECTION TO OCCUR BEFORE SIGNOFFS OBTAINED FROM ALL SHOWN BELOW:

Initial / Date: Engineer: 84T 2/25/19

Technician: MTS 2/25/19

Instrum Lab: 25 FEB 2019

p. 1 of 1