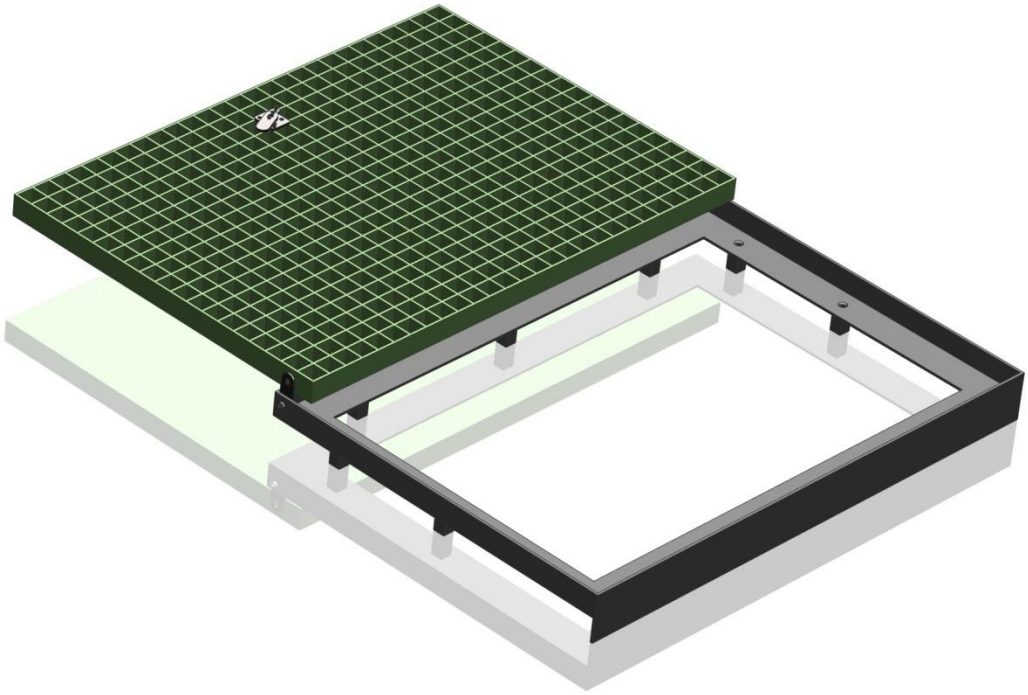
FRP ECOLITE RANGE



2015 - 2016

Product Information Booklet

Road Safety Grating
13 Healey Rd
Dandenong South VIC 3175

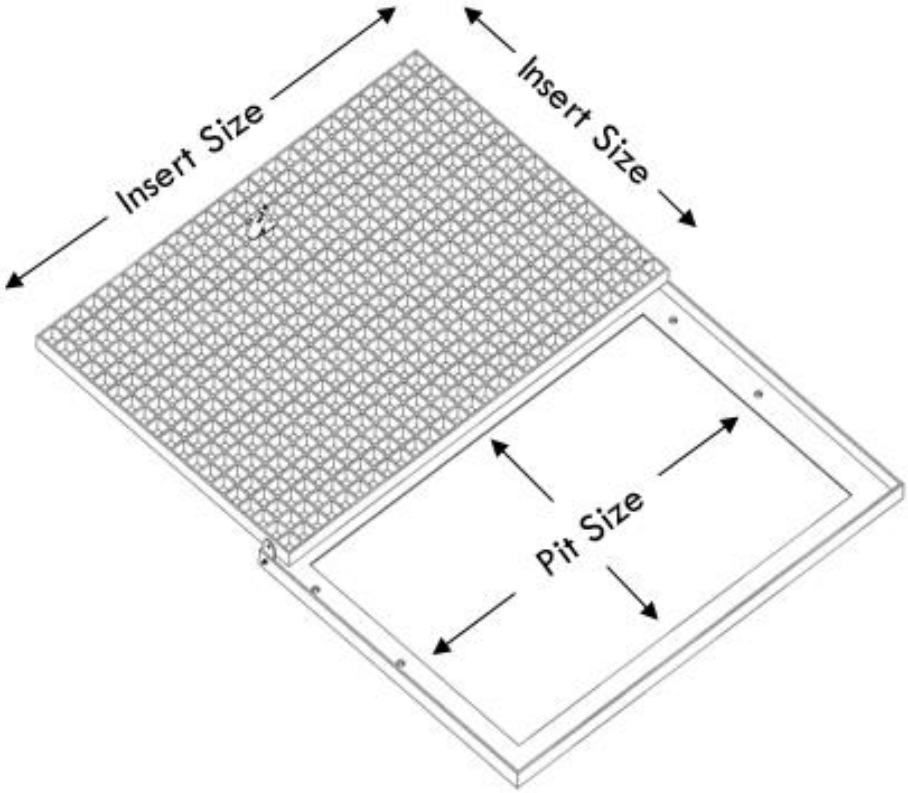
PH: (03) 9238 5888
Fax: (03) 9238 5800
Email: sales@grating.com.au
Web: www.grating.com.au

NOTES

CONTENTS

STANDARD FRP ECOLITE PRODUCTS

FRP Ecolites are available in the following styles.



Green (RAL6021)

Grey (RAL7035)

Charcoal (RAL9004)

* Additional colours available upon request.

Pit Size (mm)	Product Code	Pit Type	Insert Size (mm)	Insert Lift Weight (kg)	Gross Product Weight (kg)
450x450	frp-green-4545	Junction	605x605x45	8.0	21.0
600x600	frp-green-6060	Junction	765x765x45	11.0	30.0
750x750	frp-green-7575	Junction	925x925x45	15.1	41.0
900x600	frp-green-9060j	Junction	1085x765x45	15.0	41.0
900x600	frp-green-9060s	Side Entry	1085x765x45	15.0	45.0
900x900	frp-green-9090j	Junction	1085x1085x45	17.0	54.0
900x900	frp-green-9090s	Side Entry	1085x1085x45	17.0	54.0

FRP 227 FOR RETROFITTING

- Simply replace broken insert by bolting steel frame to existing concrete frame.
- Strong rollover or barrier RHS lintel prevents future damage if the unit is traversed.
- All the standard features of the FRP range: hinged, light-weight and locked down, preventing dislodgement and tampering.

- A galvanised frame, galvanised lintel and FRP insert is available that can be bolted to an existing 227 concrete frame.
- Barrier or rollover front lintels are available, providing strength to the unit when traversed.
- Costs are significantly reduced by bolting the new cover to the existing concrete frame.
- FRP 227s are then fully secured to the pit and will not dislodge. In addition, the FRP insert is hinged, light-weight and lockable, making maintenance and access simpler and safer.

FRP 227 FOR NEW INSTALLATION

- Fully assembled, including galvanised steel frame with RHS lintel and FRP insert with the option of a variety of concrete frames available.
- Rollover or barrier RHS lintel included.
- All the standard features of the FRP range: hinged, light-weight and locked down, preventing dislodgement and tampering.
- Concrete encased (ENC), extended back concrete encased (EX-ENC) and rollover extended back concrete encased (REX-ENC) concrete frames all available.

Pit Size (mm)	Product Code	Kerb Type	Insert Size (mm)	Colour	Class Rating (AS3996)
900x600	frp227-green	Barrier	970x530x45	Green	B
900x600	frp227-grey	Barrier	970x530x45	Grey	B
900x600	frp227-r-green	Rollover	970x530x45	Green	B
900x600	frp227-r-grey	Rollover	970x530x45	Grey	B

CUSTOM FRP PRODUCTS

A DOUBLE SIDE ENTRY FRP INSERT WITH A FABRICATED THROATED LINTEL.

Double Side Entry Pits	Fabricated Throated Lintels
• FRP covers can be used for double side entry pits. • A support beam is included in the centre to ensure maximum strength is maintained. • Double side entry FRP covers can also incorporate a steel fabricated throated lintel, ensuring maximum performance when traversed by any manner of vehicle.	• All side entry FRP covers can include a steel fabricated throated lintel. • A steel fabricated throated lintel provides significantly more strength than a traditional concrete lintel, negating the need for regular replacement. • Ideal for near corners and spots where trucks and buses regularly mount the kerb.
Multi-Part FRP Covers	**Custom Colours**
• FRP covers can be made to any custom size. • Support beams can be used to ensure strength no matter what span needs to be covered. • Support beams can be either fixed or removable to ensure full, unobstructed access to the pit. • Multi-part FRP covers can be made in a variety of colours to match the surrounding material.	• FRP covers are typically stocked in green, grey and charcoal colours. • A variety of different colours, such as terracotta, are also available. • Additional colours can be achieved through the use of a long life, UV resistant paint.

PRODUCT INNOVATION

Road Safety Grating sought to develop a product that addressed the safety and security concerns of existing market products. Of particular concern to local governments was the tendency of existing products to become detached from their frames and float away during periods of flooding. This results in exposed pits, posing serious safety risks to members of the community and potentially leaving local governments vulnerable to damages claims. Additionally, theft and larrikinism are an increasing problem in our local communities, once again resulting in exposed pits.

With these concerns in mind, Road Safety Grating has developed the FRP Ecolite range of lids. FRP Ecolite's are hinged (registered design), as well as lockable with existing Australian Standard AS3996 lifting keys.

HINGING

One of the biggest advantages of the FRP Ecolite range is its hinging mechanism (registered design). The hinging mechanism not only secures the insert to the frame, preventing it from becoming fully detached, but also decreases the required lifting weight of the insert to 15.0 kg (maximum).

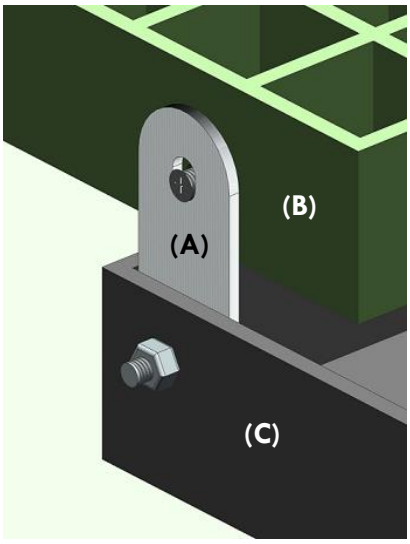


FIGURE 1: HINGING MECHANISM

The hinging mechanism makes use of a hinging plate (**A**), which has 90° freedom of rotation. The hinging plate is attached to both the insert (**B**) and the frame (**C**), as shown in figure 1.

Additionally, the insert has 180° freedom of rotation. This allows the insert to be opened and placed lying flat behind the pit. This facilitates full, unobstructed access to the pit.

In the event of flooding, the hinging mechanism also provides an additional source of protection from the insert dislodging, though the locking mechanism prevents the lid from dislodging when locked.

Testing has shown the average lifting weight of the insert to be 14.8 kg once hinged, with a maximum lift weight of 15.0 kg.

The FRP Ecolite hinge is a registered design.

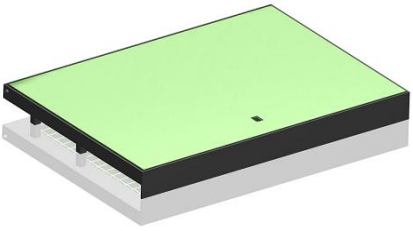


FIGURE 2: CLOSED.

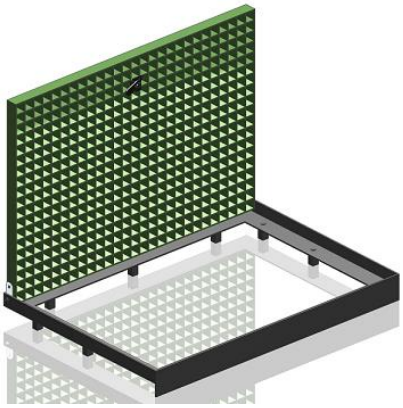


FIGURE 3: OPEN AT 90 DEGREES

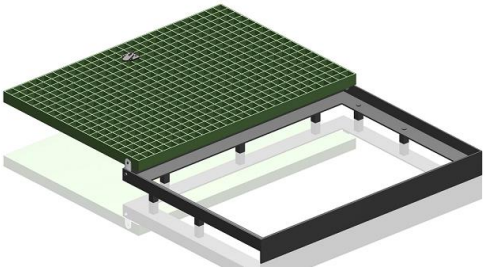


FIGURE 4: FULLY OPEN

LOCK DOWN MECHANISM

The FRP Ecolite range is fitted with a stainless steel locking mechanism, designed to prevent unwanted access, while also securing the insert in the event of flooding. The locking mechanism is operated with standard AS3996 lifting keys.

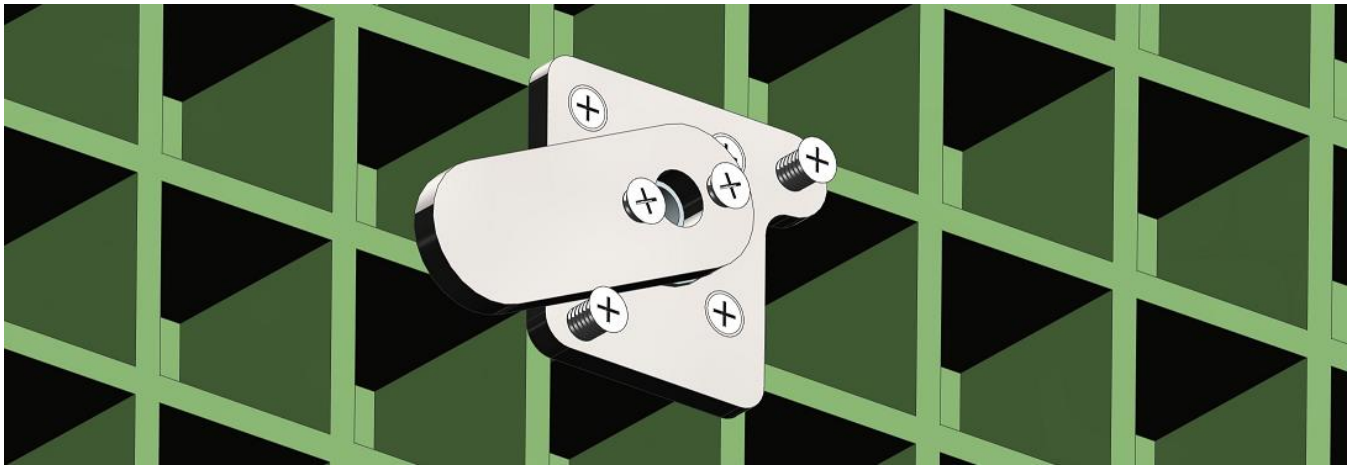


FIGURE 5: LOCKING PLATE IN OPEN POSITION (BOTTOM VIEW)

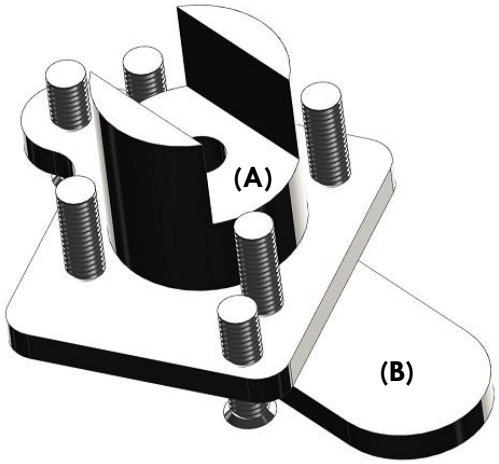


FIGURE 6: LOCKING PLATE (TOP VIEW)

The locking mechanism includes a recessed swivel cylinder **(A)**, designed to house standard 25x15mm lifting keys.

When the locking mechanism is in the open position, the lifting keys cannot be removed from the lid. This prevents the cover from being accidentally left unlocked.

Additionally, the FRP Ecolite lid cannot be fully closed from an open position, while the lock is in the closed position, as the locking plate **(B)** prevents the lid from sitting flush in the frame. This reminds operators that the lid is not locked.

The locking mechanism also includes two stopper screws, permitting only 120° of rotation. All components of the locking mechanism are made of stainless steel.

A protective panel is also included standard in all junction pit FRP Ecolite lids, to protect the locking plate during installation.

Side entry pit FRP Ecolite lids are protected by the side entry plate on their frame.

Although existing AS3996 lifting keys can be used to open FRP Ecolite lids, Road Safety Grating also offers lifting keys specifically designed for the FRP Ecolite.

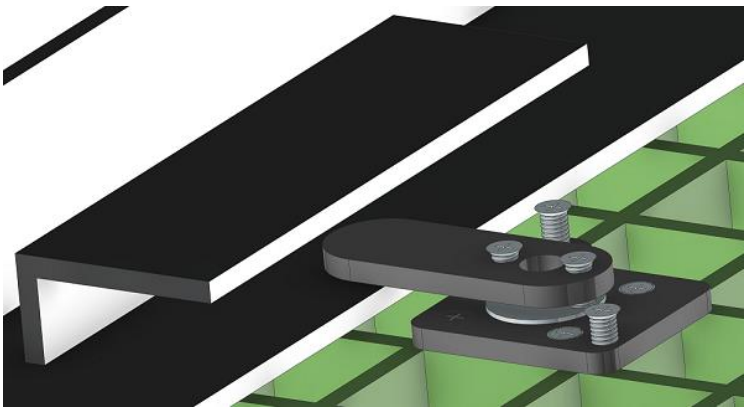


FIGURE 7: LOCKING PLATE IN LOCKED (CLOSED) POSITION

PRODUCT SPECIFICATIONS

FRP Ecolite lids are rated to Class B of Australian Standard AS3996 – 2006. Currently the range is designed

to suit both side entry and junction pits with internal sizes of 900mm x 600mm. Below is an overview of available products. For full product specifications, see appendices A and B.

SIDE ENTRY PIT

Side Entry Pit FRP Ecolite lids are designed to suit 900mm x 600mm internal pits. They include a 100mm x 10mm plate on the front of the frame, designed to nestle in behind lintels.

Product Code	**frp-green-9060s (green)** or **frp-grey-9060s (grey).**
Total Weight	**45.0 ± 0.5 kg**
Insert Lifting Weight	**14.8 ± 0.2 kg** (after installation)
Overall Frame Dimensions	**1103 x 784 x 100 mm**
Overall Insert Dimensions	**1085 x 765 x 45 mm**
Class Rating (AS3996)	**B**
Ultimate Limit State Load	**80 kN**
Serviceability Limit State Load	**53 kN**
Nominal Wheel Loading	**2 670 kg**

JUNCTION PIT

Junction Pit FRP Ecolite lids are designed to suit 900mm x 600mm internal pits.

Product Code	**frp-green-9060j (green)** or **frp-grey-9060j (grey).**
Total Weight	**41.0 ± 0.5 kg**
Insert Lifting Weight	**14.8 ± 0.2 kg** (after installation)
Overall Frame Dimensions	**1103 x 784 x 50 mm**
Overall Insert Dimensions	**1085 x 765 x 45 mm**
Class Rating (AS3996)	**B**
Ultimate Limit State Load	**80 kN**
Serviceability Limit State Load	**53 kN**
Nominal Wheel Loading	**2 670 kg**

INSTALLATION GUIDELINES

The following guidelines are for replacing existing, broken concrete lids and inserts with FRP Ecolite lids.

GUIDELINES FOR REPLACING BROKEN CONCRETE LID

Preparation

1 Begin by first removing the concrete insert from the concrete frame, and then removing the concrete frame. Remove all rubbish, taking care to ensure that no rubbish falls into the pit. Finally, brush the area clean, leaving the existing concrete pit exposed, ensuring all debris is removed.

Installation

2 Place the FRP Ecolite cover in position. Ensure that the cover is level and at the same finish height as the existing lintel in front of the pit.

For FRP Ecolite side entry lids the lid should be placed so that the keyhole is closest to road. For junction pits, the FRP Ecolite lid should be placed with consideration of which way the insert will be opening out.

3 Open the FRP Ecolite insert using standard AS3996 lifting keys. Lay the insert on the ground behind the pit, resting it on the lifting key, as shown on the right.

4 Drill through the holes in the FRP Ecolite frame, using a 10mm drill bit. Bolt the FRP Ecolite lid into place using five 100x10mm dynabolts.

5 Box inside of the frame in preparation for concreting.

6 Box 150mm around the edge of the frame in preparation for concreting.

7 Ensure the frame is fully supported and secured by the dynabolts. Mix and then pour concrete under and around the frame, in the recesses left by the boxing. Ensure that the concrete reaches the base of the frame, supporting the frame once the concrete has set.

8

Once the concrete has set, remove the boxing. Fill any surrounding crevasses with dirt and pound down to prevent sinking. Lock the insert in position.

Finish by cleaning the area.

OPERATION INSTRUCTIONS

The operation instructions below are intended for use on fully installed FRP Ecolite lids.

1 Remove the plastic keyhole protector from the keyhole.

2 Insert either a standard AS3996 lifting key, or an Ecolite Key (available from Road Safety Grating), and twist more than 90°, until the key cannot be rotated any further. Leave the key in this position.

3 Lift the cover using the handle on the lifting key past 90°. The cover can then be lowered, by hand, and left resting on the lifting key, with the lifting key still inserted in the keyhole and left in the unlocked position. Please note, while the key is in the unlocked position, it cannot be removed from the insert. If it is necessary to remove the key, the key can be rotated to the locked position and the insert left lying flat on the ground behind the pit.

4 To close, ensure that the key and lock are in the open position. Lower the lid using the lifting key. Once the insert is flush with the frame and surrounding concrete, the key can be rotated to the closed/locked position and removed.

5 Replace the plastic keyhole protector (plug) prior to leaving.

TEST RESULTS SUMMARY

LOAD TEST RESULTS

Load testing was carried out by Melbourne Testing Services on 25th June, 2012. The FRP Ecolite lid was load tested to Class B of AS3996 – 2006, in compliance with clause 4.2.1.2 in appendix C. The acceptance criteria and results are summarized below. For full results, refer to appendix C.

Serviceability Design Load Test

The Serviceability Design Load test was carried out in accordance to Class B requirements of AS3996 – 2006, table 3.1 of section 3.1, with a serviceability design load of **53kN**. The acceptance criteria are as follows:

Acceptable Deflection = Circular Opening/45 = 635mm/45 = 14.11mm

The recorded elastic deflection under the 53kN load was **11.41mm** and is therefore acceptable. The deflection vs. test load is shown in figure 8.

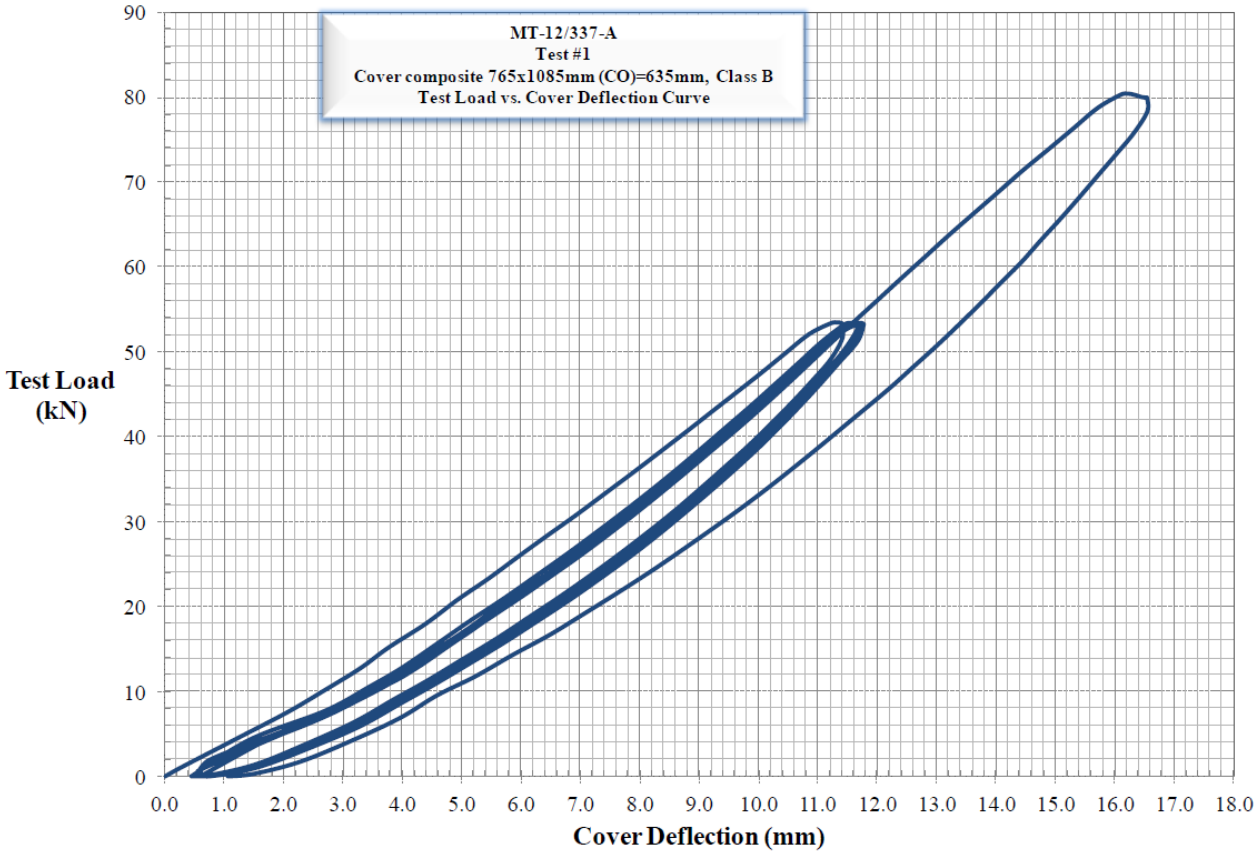


FIGURE 8: DEFLECTION VS. TEST LOAD (TAKEN FROM APPENDIX C)

The permanent set was then assessed once the load was removed. The acceptance criteria for the permanent set are as follows:

Acceptable Permanent Set = Circular Opening/100 = 635mm/100 = 6.35mm

The recorded permanent set was **0.66mm** and is therefore acceptable.

Ultimate Limit Test

The Ultimate Limit test was carried out in accordance to Class B requirements of AS3996 – 2006, table 3.1 of section 3.1, with ultimate limit state design load of **80kN**. The acceptance criteria for Class B compliance is for the cover to sustain a load of 80kN for a minimum of 30 seconds, without any cracking or structural failure.

The test load was sustained for 31 seconds, with no structural failure observed.

Destruction Load Test

In addition to the serviceability and ultimate limit state load requirements of AS3996 – 2006, a destruction load test was carried out to determine at what load the FRP Ecolite cover would fail.

Initially, a peak load of **139.65kN** was sustained before signs of failure. Once the load was removed, the cover was determined to not have failed and a subsequent load of **182.71kN** was sustained prior to the cover showing unacceptable deflection. Full details of the destruction load test are available in appendix C.

OIL-WET RAMP SLIP RESISTANCE TEST RESULTS

An oil-wet ramp slip resistance test was carried out by ATTAR on 20th March, 2012. The test was carried out in compliance with AS/NZS 4586 – 2004. The FRP Ecolite obtained an **R13** rating, as defined in table D3 of AS/NZS 4586 – 2004. For full test results, refer to appendix D.

LIFT TEST RESULTS

A vertical lifting-force test was carried out by ATTAR on 20th March, 2012. The test evaluated the required lifting force to lift a fully installed FRP Ecolite insert, with the hinge attached.

The average lifting weight was found to be **14.8kg**, while the maximum recorded lifting weight was **15.0kg**.

For full test results, refer to appendix E.