

ACO Access

Product Catalogue and Technical Handbook

Rhinocast® - Ductile Iron Access Covers
Urbanfil® - Galvanised Steel Access Covers
Saku - Thermoplastic Access Covers
Special Application Access Covers

ACO - A World Leader in Access Cover Solutions



ACO is one of the world leaders in the design and manufacture of access covers.

Established in 1946, the ACO Group has manufactured products for the construction industry for over 70 years and operates on a global basis through its subsidiaries and manufacturing facilities in over 40 countries in 4 continents. ACO is an acknowledged innovator in products manufactured from ductile iron, stainless steel, polymer concrete and other corrosion resistant materials.

ACO employs more than 4,000 people and has sales in excess of \$A800 million and manufacturing operations in 28 countries.

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Quality

The ACO Group is dedicated to achieving the highest possible standard of quality throughout the organisation. ACO Pty Ltd is an ASI registered firm assessed to ISO 9001, the internationally recognised standard for quality.



Certified Products

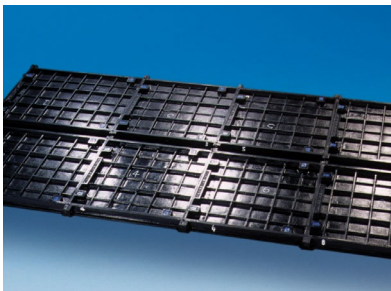
All Rhinocast® ductile covers are designed and manufactured in full compliance with the requirements of AS 3996 Access Covers and Grates. Other ACO Access products are independently tested to meet the loading requirements of AS 3996. Servokat covers are load tested to EN 124.



ACO manufactures and distributes Australia's most comprehensive range of access covers. Products are available for every application from architectural to heavy duty industrial.

Rhinocast® - Ductile Iron

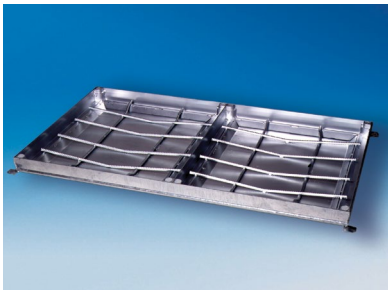
- Circular solid top and recessed
- Square/rectangular solid top and recessed
- 2-part, 3-part, multi-part and trench runs



Ductile iron multi-part recessed cover

Urbanfil® - Galvanised Steel

- Square/rectangular recessed
- 2-part, 3-part, multi-part and trench runs
- Pavermate® access covers



Galvanised steel 2-part recessed cover

Saku - Thermoplastic

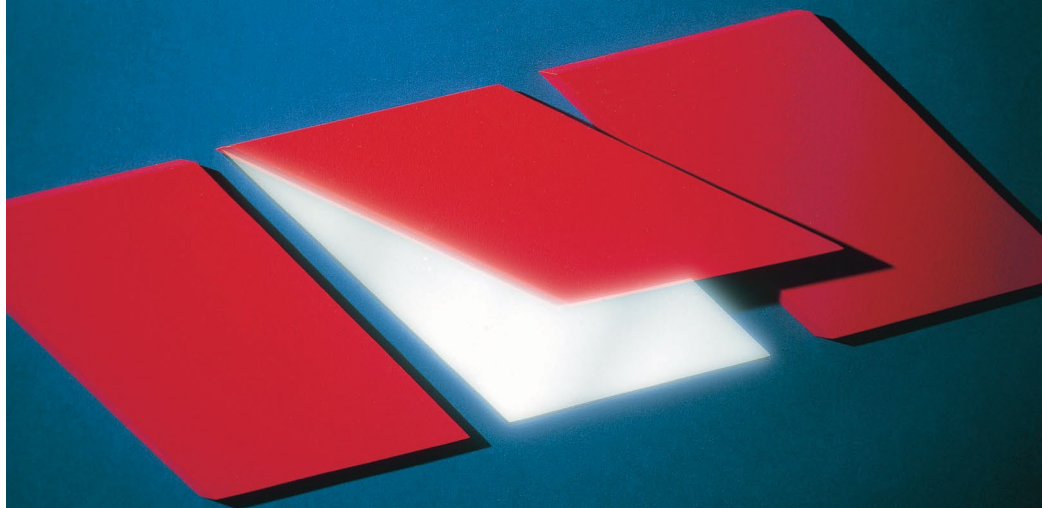
- Circular lightweight solid top



Saku thermoplastic solid top cover

Special Applications

- Servokat - Assisted lift covers
- Fire rated covers



Materials Information

ACO cover and frame systems are manufactured from either cast iron, galvanised steel or thermoplastic. A choice of materials is available to provide a range of solutions to various application requirements - from loading, health and safety, aesthetics, and lifting to chemical resistance.



Cast Iron

Grey iron is made when pig iron is melted in small cupola furnaces and poured into moulds to make castings. Containing around 2% - 6% carbon, scrap iron or steel is often added to vary the composition.

Ductile iron is produced by adding magnesium to the molten pig iron; when the iron is cast, the carbon forms tiny spherical graphite nodules around the magnesium.

Engineering Properties:

- 600/3 ductile iron to AS 1831:1985
- Tensile Strength - 600 MPa min.
- 0.2% Proof Stress - 370 MPa min.
- Hardness, 145-185 (HRB)
- Density - 7.15 gm/cc
- Elongation - 3% minimum



Galvanised Steel

Hot rolled mild steel is low carbon steel, with traces of manganese, silicon and phosphorus. Recessed access covers fabricated from mild steel are typically reinforced with either 8mm merchant rods or 12mm Tempcore-400Y deformed bars.

Engineering Properties:

- 2mm steel frames and covers to AS 1365
- Hot dip galvanised to AS 4680 for maximum corrosion resistance
- Yield Strength: 280MPa
- Tensile Strength: 395MPa
- Elongation on 80mm %: 35%
- Hardness, 55 (HRB)



Thermoplastic

Thermoplastic resin is a polymer compound that becomes soft or fluid when heated and then returns to its original solid state when cooled.

This compound is typically used in injection moulding which requires the raw material to be in liquid or plastic state to fill the mould completely. When cooled, the resin or polymer solidifies to form the finished product.

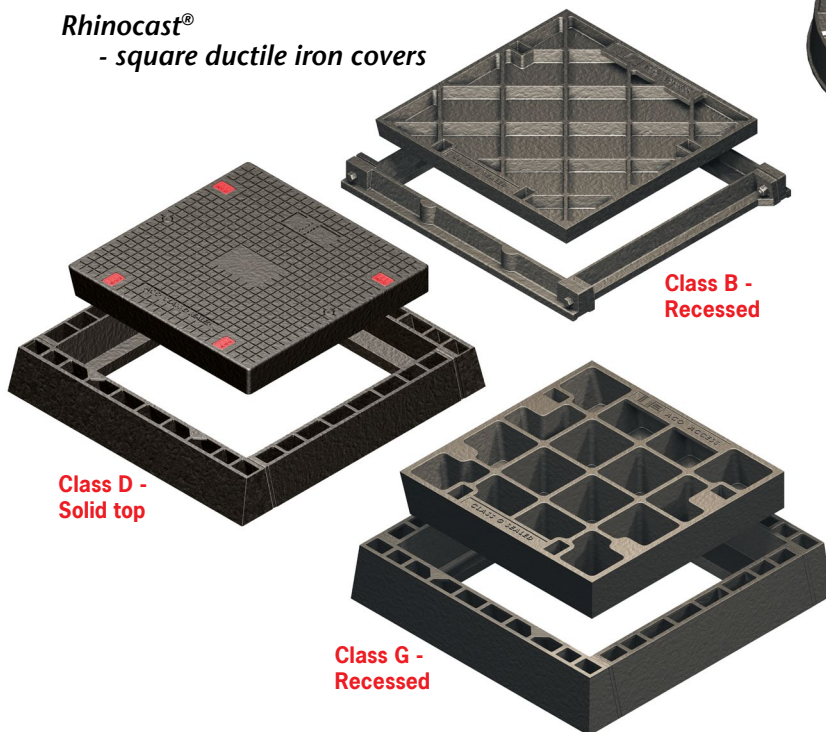
Engineering Properties:

- Density: 1.13 g/cm³ @ 23°C
- Tensile strength: 85 MPa @ 50mm/min
- Bending strength: 140 MPa @ 50mm/min
- Strain at Break: 3.5% @ 50mm/min
- Impact Strength: 48 kJ/m² @ 23°C
- Offers excellent corrosion and chemical resistance

Product Range

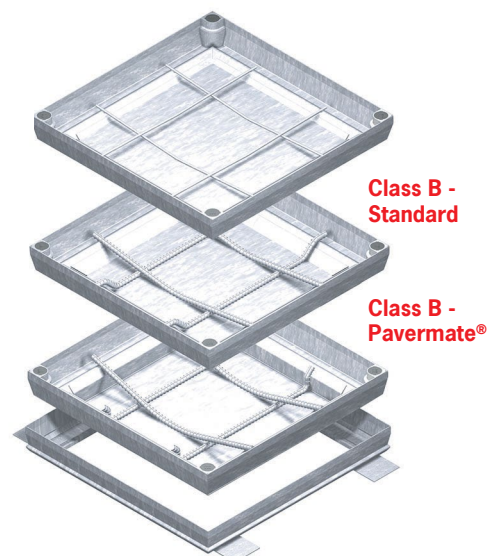
ACO cover and frame systems are manufactured from either galvanised steel, thermoplastic or ductile iron. Galvanised steel and thermoplastic access covers are typically used for light duty applications and ductile iron covers for light to extra heavy duty applications.

Rhinocast®
- square ductile iron covers



Rhinocast®
- circular ductile iron covers

Saku
- thermoplastic cover with iron frame



Urbanfil®
- galvanised steel covers

ACO Access Product Selector

This diagram is provided as a guide to aid selection of the right access cover. It illustrates the various applications where access covers are used and key factors to consider when selecting an access cover.



G900kN

1

4

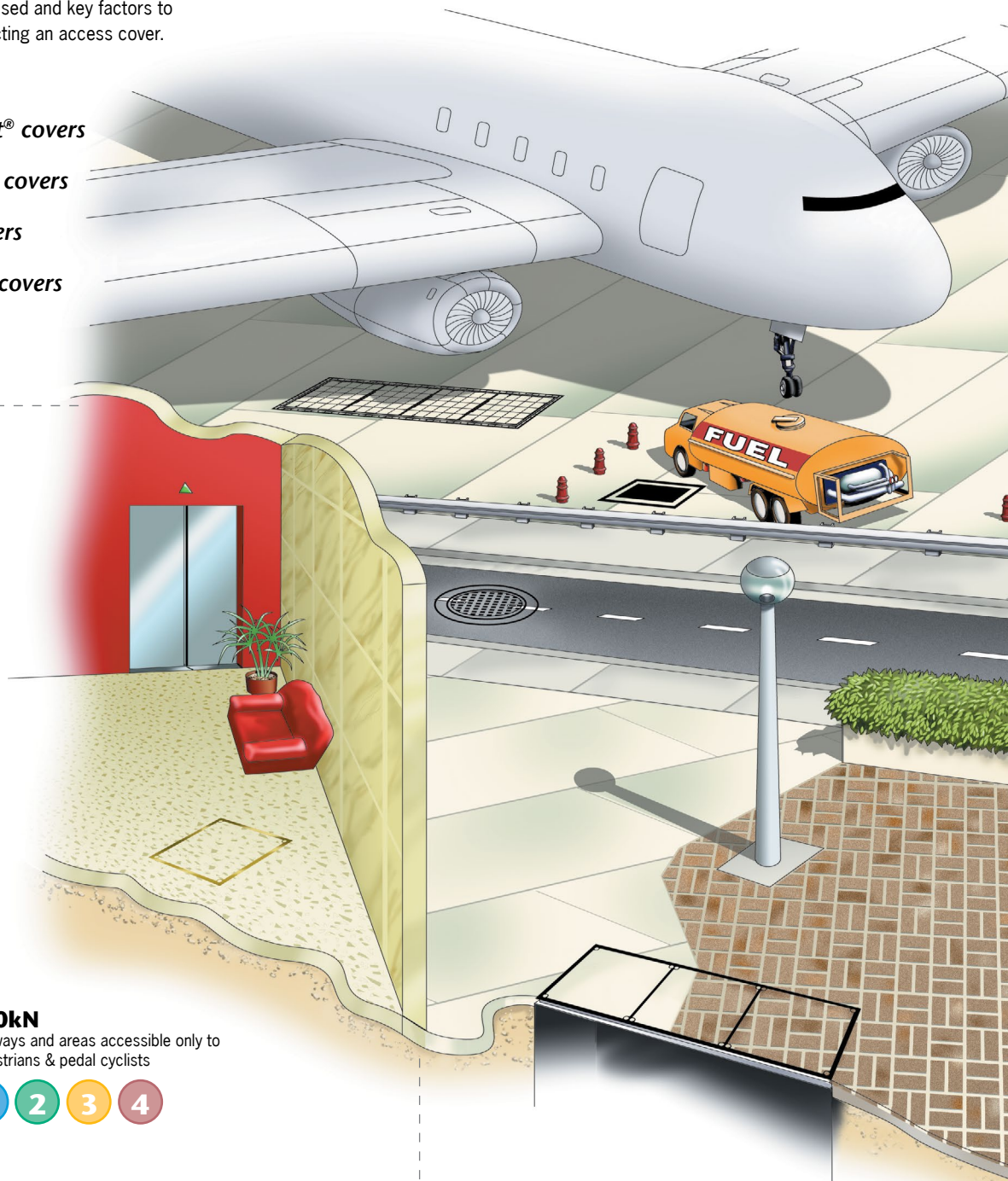
Docks and aircraft pavements subject to very high wheel loads

1 **Rhinocast® covers**

2 **Urbanfil® covers**

3 **Saku covers**

4 **Servokat covers**



A10kN

Footways and areas accessible only to pedestrians & pedal cyclists

1

2

3

4



B80kN

1

2

3

4

Footways that can be mounted by vehicle or livestock, and light tractor paths

NOTE: The Load Classes shown above are indicative only. It is the customer's responsibility to determine/verify the anticipated design loads for each application. Engineering advice may be necessary.



E400kN

General docks and aircraft pavements

1 4



F600kN

Docks and aircraft pavements subject to high wheel loads

1 4



B80kN

Footpath and paved areas where vehicles mount accidentally or for light vehicles such as tractors and livestock

1 2 3 4



D210kN

Carriageways of roads and areas open to commercial vehicles

1



B80kN

Footways that can be mounted by vehicle or livestock, and light tractor paths

1 2 3 4



C150kN

Malls and pedestrian areas open to slow moving commercial vehicles

1 4

Choosing the Right Access Cover

Choosing the right access cover for the given application is essential to prevent problems and product failures in the future. The key factors to consider are listed below and covered in more detail on pages 9-11.

ACO can also offer additional advice and assistance in choosing the right access cover.

1 Load Class		Choose the right cover and frame to withstand the anticipated type and frequency of traffic. ACO covers are designed for AS 3996 loadings. See details on page 9 for full information.
2 Size		Access cover sizes are quoted in terms of clear opening. ACO offer a range of sizes & formats; Single-parts, 2-part, 3-part, Trench runs and Multi-parts.
3 Aesthetics		Recessed covers allow matching infill. Decorative brass or stainless steel edging can be added to rectangular & square covers.
4 Security		Certain covers are bolted as standard, others can have bolts added as an option. Security Barri bolts are also available.
5 Gas & water tight		All covers are gas and water tight under normal atmospheric pressure. Hold down bolts are available to assist with back pressure applications.
6 Cover orientation		In fast moving traffic, covers should be positioned with the drawcut facing traffic flow to prevent the cover from accidentally lifting. Covers should be positioned to avoid obstacles that may prevent easy cover removal.
7 Handling		Smaller individual covers can be combined to create the required opening if there are manual handling restrictions. ACO also offers a range of thermoplastic covers and a range of assisted lift covers for easier lifting.

1

Load Class



AS 3996 – Clause 1.1 Scope

"This standard specifies requirements for access covers and grates for use in vehicular and pedestrian areas. It applies to access covers & grates having a clear opening of up to 1300mm..."

NATA Certification








As part of ACO's continuous product development and commitment to quality, ACO has NATA certified testing equipment (Licence no. 15193), operated by fully trained and certified technicians

In practice, there are a number of key factors affecting a cover's resistance to load:

- i) **Type of traffic** - pedestrians, cars, trucks, forklifts etc. crossing the cover. For trolleys and forklifts particularly consider the weight of loads being carried.
- ii) **Frequency of traffic** - more frequent traffic may require a heavier load class.
- iii) **Speed of traffic** - fast moving traffic can intensify the load effect on the cover.

- iv) **Position of cover** - if the cover is positioned where traffic will be turning, braking or if the cover is installed at the bottom of a ramp, it will be subjected to extreme forces. Selecting the right cover and frame is essential.
- v) **Wheel type** - solid tyres exert loads through smaller contact areas than pneumatic tyres. A heavier duty cover may be required.

AS 3996 table of load classification

						
Load Class A 10kN Extra light duty	Load Class B 80kN Light duty	Load Class C 150kN Medium duty	Load Class D 210kN Heavy duty	Load Class E 400kN Extra heavy duty	Load Class F 600kN Extra heavy duty	Load Class G 900kN Extra heavy duty
Typical uses Footways and areas accessible only to pedestrians & pedal cyclists	Footways that can be mounted by vehicle or livestock, and light tractor paths	Malls and pedestrian areas open to slow moving commercial vehicles	Carriageways of roads and areas open to commercial vehicles	General docks and aircraft pavements	Docks and aircraft pavements subject to high wheel loads	Docks and aircraft pavements subject to very high wheel loads
Approximate wheel load 330kg	2,670kg	5,000kg	8,000kg	13,700kg	20,000kg	30,000kg

EN124 table of load classification

Class A 15kN	Class B 125kN	Class C 250kN	Class D 400kN	Class E 600kN	Class F 900kN
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Rhinocast® - Ductile Iron Covers

Circular covers - p14

Square/rectangular covers ¹ - p16

Urbanfil® - Galvanised Steel Covers

Standard covers - p28

Pavermate® cover ¹ - p32

Special sizes made to order
- contact ACO for details

Saku - Thermoplastic Covers

Circular solid covers - p36

Servokat - Assisted Lift Covers ²

Square/rectangular covers - p39

Notes:

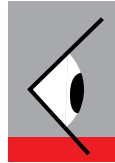
¹ In block paver areas, pavers can decrease the stated loading of the access cover.

² Not certified to AS 3996 but have been tested to stated loads under different loading standards (EN 124). The industry standard is for covers to be tested in the single cover format.

2 Size



3 Aesthetics



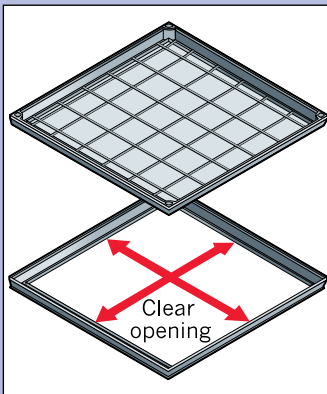
4 Security



Clear opening

The unobstructed opening inside the frame. Dimensions are given as width (W) by length (L).

Ductile iron covers are specified with the width parallel to the lifting ends and undercut. Length is parallel to the direction of cover removal.



Single cover

An access cover where a single cover is used.

Two-part

An access cover where two covers are seated lengthways on a single frame.

Three-part

An access cover where three covers are seated lengthways on a single frame.

Trench Run

An access cover where multiple covers are seated lengthways on a single frame.

Multi-part

An access cover where multiple covers are seated both lengthways and widthways on a single frame. Beams are required to support the covers but are removable to provide full access.

Infill materials

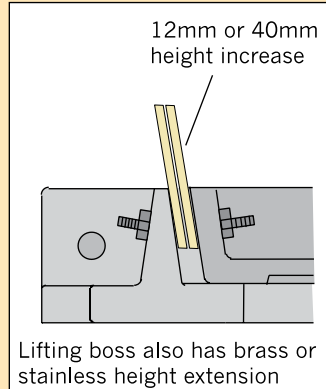
Recessed covers offer the ability to fill the cover with material to match or complement the surrounding pavement.

A maximum tile depth of 25mm and maximum paver depth of 40mm is recommended.

Tiles or pavers must be fully restrained and bonded to the concrete bed to prevent damage to the cover. An epoxy mortar is recommended.

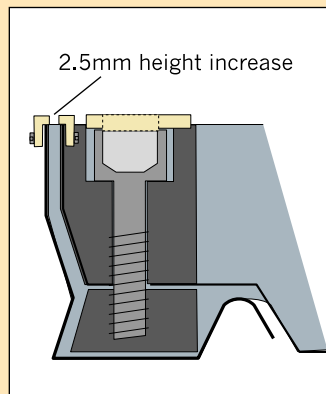
Decorative edging

A strip of stainless steel or brass can be fixed to the edge of the cover and frame for an attractive finish.



Ductile iron covers

Height increase : 12 or 40mm
Width/Length increase : 6mm



Galvanised steel covers

Height increase : 2.5mm
Width/Length increase : 2.5mm

Locking

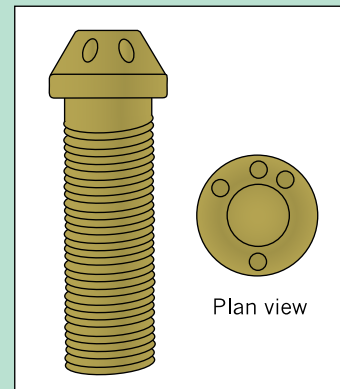
For additional security or for back pressure applications, locking bolts can be added to the cover. Locking bosses are fitted to the cover. The cover and frame is drilled and tapped to accept the locking bolt.

Note: the following covers are locked as standard;

- Ductile iron solid top circular covers
- All Urbanfil® galvanised steel covers
- Saku covers
- Servokat covers

Barri Bolt

A tamper resistant locking bolt for security applications. Special tools are required to remove the bolt.



5 Gas and Water seal



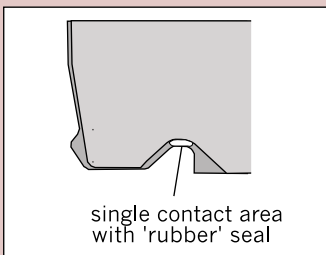
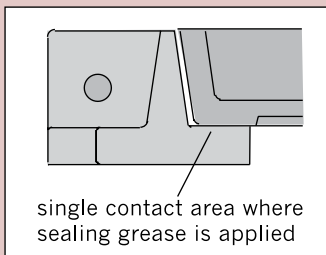
All standard covers are gas and water sealed as standard, to normal atmospheric pressure (up to 1kPa). This type of seal also offers a seal against odours.

Pressure tight

For applications where back pressure is over 1kPa, the addition of locking bolts prevents the ingress of gas or water.

Single Seal

There is one point of contact between the frame and cover where the seal is achieved. The seal can be achieved with grease (RhinoCast®) or a 'rubber' gasket (Urbanfil®, Saku & Servokat).

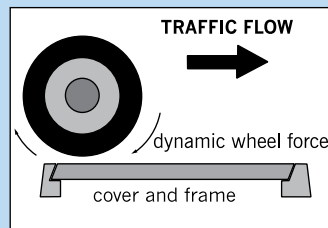


6 Traffic Flow



Traffic Flow

For RhinoCast® covers, the drawcut edge should face the orientation traffic flow to prevent cover lifting.

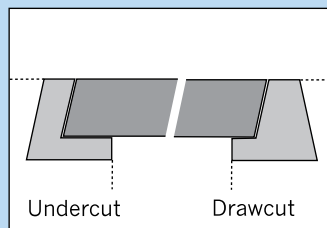


Drawcut

Top of cover is set back from bottom.

Undercut

Top of cover overhangs the bottom.



7 Handling



Work Cover Lifting Guidelines

Work Cover National Code of Practice for Manual Handling recommends a maximum unassisted lifting weight of 55kg. Weights above this require the use of mechanical lifters. All Saku covers comply with this code.

Note: Certain states/companies may have different maximum lifting requirements.

Assisted lift

A gas strut is fitted to the frame and cover to enable the cover to be easily lifted.

Refer to Servokat covers (pg 39).

Lifting Keys

Ductile iron, galvanised steel and thermoplastic covers can be lifted using standard Australian lifting keys. A selection of short handle, long handle and mechanical lifters are available - see pg 42 - 44.

Other Commonly Used Terms

Anti-slip surface

A textured finish on solid top covers to reduce the risk of slipping.

Concrete ties

Profile that holds the frame into the concrete bed and prevents the frame being lifted out of its surround.

Keyhole cap

A cover above the keyhole to prevent dirt and debris ingress.

Lead seal

Lead is used to seal the joint between cast iron frames. Lead provides a flexible seal that does not deteriorate in extreme temperatures.

Lifting boss

The recess where the lifting key is inserted and turned to enable the cover to be lifted. ACO's ductile iron and galvanised steel covers use standard lifting keys to AS 3996.

Recessed cover

A cover that requires a concrete infill material added on site. Also allows infill paving materials to compliment or match surrounding area.

Reo-bar

Steel bars used for reinforcing galvanised steel covers. These are integral to the covers' strength.

Seating

The frame has an angle at the bottom upon which the cover sits and seals.