FABRICATED ACCESS COVERS TRADE ASSOCIATION (FACTA)

SPECIFICATION FOR FABRICATED ACCESS COVERS

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FOREWORD

This specification is published by the Fabricated Access Covers Trade Association (FACTA) and came into effect on 1st March 2013 and supersedes all earlier versions of the FACTA Specification (originally published in 1995). It was prepared by members of the FACTA Technical Committee.

The Specification is intended to enable users to specify their requirements for fabricated access covers in terms of the required performance, particularly relating to wheel loads. The test loads and calculations contained in this specification are based upon the European standards for structural steelwork.

1. SCOPE

Specification for requirements for fabricated access cover systems with a clear opening up to and including 1m for installations within areas subject to pedestrian and/or slow moving vehicular traffic, for use as covers over chambers and ducts.

NOTE: For clear openings greater than 1m, BS 9124 applies Specification for steel and aluminium access cover systems with over 1m clear opening.

This specification establishes definitions; materials; design; load testing; installation; testing requirements; of such access cover systems.

This specification applies to fabricated access cover systems of the following types:-

1.1 Solid top covers

1.2 Recessed covers designed for non-structural infill

1.3 Recessed covers designed for structural infill

1.4 Surface drainage products

2. NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 287-1, *Qualification test of welders – Fusion welding – Part 1: Steels*

BS EN 287-2, *Approval testing of welders for fusion welding – Part 2: Aluminium and its alloys*

BS EN 571-1, *Non-destructive testing – Penetrant testing – Part 1: General principles*

BS EN 1386, *Aluminium and aluminium alloys – Tread plate – Specifications*

BS EN 1418, *Welding personnel. Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials*

BS EN 10025, *Hot rolled products of structural steels*

BS EN 10056, *Specification for structural steel equal and unequal angles*

BS EN 10088, *Stainless steels*

BS EN 10130, *Cold-rolled low-carbon steel flat products for cold forming – Technical delivery conditions*

BS EN 10210-1, *Hot finished structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery conditions*

BS EN 10219-1, *Cold formed welded structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery conditions*

BS EN 13036-4, *Road and airfield surface characteristics – Test methods – Part 4: Method for measurement of slip/skid resistance of a surface – The pendulum test*

BS EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

BS EN ISO 14554, *Quality requirements for welding – Resistance welding of metallic materials*

BS EN ISO 15609, *Specification and qualification of welding procedures for metallic materials – Welding procedure specification*

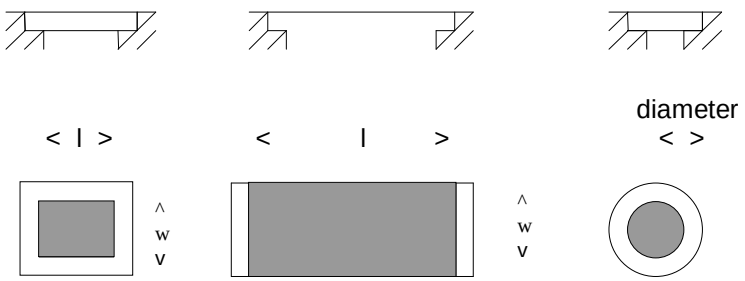
DD ENV 12633, *Method of determination of unpolished and polished slip/skid resistance value*

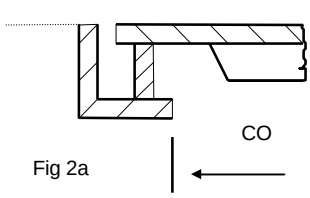
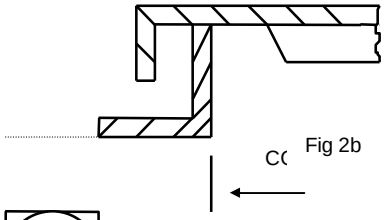
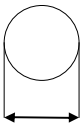
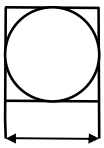
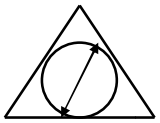
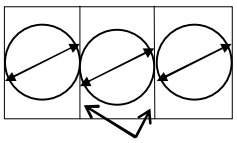
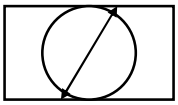
EN 206-1, *Concrete:Specification, performance, production & conformity*

BS EN 12390-1:2000, *Testing hardened concrete. Shape, dimensions and other requirements for specimens and moulds*

ISO 9001, *Quality management systems*

3. DEFINITIONS

No	Term	Definition
1	Access cover	Assembly consisting of a frame and cover or covers providing access and egress to chambers / shaft openings / fire escapes etc.
2	Cover	The moveable part(s) of an access cover which cover the chamber or shaft
3	Safety grid	Protective frame below an access cover
4	Fabricated cover	Cover manufactured by welding or pressing of steel, aluminium or similar materials
5	Recessed cover	Fabricated cover the upper surface of which is recessed to allow for the insertion of infill materials whether of a structural or non-structural nature
6	Solid top cover	Fabricated cover the upper surface of which has no provision for the insertion of additional structural or non-structural infill
7	Frame	The fixed part of an access cover which receives and supports a cover or covers including structural elements
8	Sealed covers and frames	Where an interface is used between cover and frame which restricts ingress/egress of liquids/gases
9	Plain seated	Flat continuous non-sealed interface between cover and frame
10	Non-structural infill	Material inserted in a recessed cover which does not contribute significantly to the strength of the cover and which is not required in order for the cover to achieve its rated performance
11	Structural infill	A material inserted in a recessed cover whether by the cover manufacturer or others which contributes to the structural strength of the cover and upon which the cover relies in order to achieve the rated performance
12	Test load	Load applied to access covers when tested
13	Test 1 (Service)	Test load comprising the static wheel load and the relevant allowances for overload and dynamic effects.
14	Test 2 (Ultimate)	Test load comprising the Test 1 load and the ultimate safety factor
15	Structural / chamber opening (length x width or diameter)	The dimension(s) of the internal chamber i.e. the shaded area as shown in fig 1 (a-c)  fig 1a fig 1b fig 1c

16	Clear opening (CO) (mm)	The diameter of the largest circle that can be inscribed within the clear area of the frame, as shown in fig 2 (a-g)  Fig 2a  Fig 2b  CO Fig 2c  CO Fig 2d  CO Fig 2e  CO CO CO Fig 2f Fixed bars  CO Fig 2g
17	Duct cover	Access cover system designed to suit a continuous trench or duct
18	Multiple unit	Access cover consisting of a frame containing multiple covers
19	Single unit	Access cover consisting of a single frame and cover
20	Lift assistance	Access cover with a design feature that provides assistance to the operative during opening and closing sequence
21	Span	Distance between centres of adjacent supports
22	Airtight cover	Access cover system which restricts the egress of air at normal atmospheric pressure (compliant with airtightness test as per appendix B)
23	Watertight cover	Access cover system which restricts the ingress of water (compliant with water ingress test as per appendix A)
24	Pressure tight cover (hydrostatic surcharge)	Access cover system capable of resisting pressure from within the chamber
25	Sealing gasket	Integral element within the cover and frame assembly to prevent or limit ingress/egress of liquids and/or gases at normal atmospheric pressure
26	Debris gasket	Integral element within the cover assembly to prevent or limit the ingress of detritus that may otherwise prevent the operation of the cover
27	PSRV	Polished slip resistance value
28	Flush fitting	When the access cover frame/lid is designed to be level with the finished floor/structure level
29	Upstand covers	When the access cover frame/lid is designed to stand proud of the finished floor/structure level
30	Peephole	A secondary access cover within the main access cover (usually required for inspection purposes)

31	Stay mechanism	A mechanical arm fitted to a hinged access cover top to provide support to the access cover in the open position

4. CLASSIFICATION - TABLE 1

Fabricated access covers complying with the requirements of this specification shall be graded as follows:

	Comparison**	**Wheel Loads**		**Load Test Data**	
FACTA Class	**EN124 Class**	**Wheel Loads * (slow moving) Pneumatic**	**Wheel Loads * (slow moving) Solid**	**Test 1 (Service)** (Static Wheel Load plus overload & dynamic effects)	**Test 2 (Ultimate)** (Test 1 load plus ultimate safety factor)
A 	A15	0.6 tonne (5kN)	N/A	5.0 x 1.0 x 1.0 = 5.0kN	5.0 x 1.6 = 8.0kN
AA 	N/A	1.5 tonne (15kN)	N/A	15.0 x 1.1 x 1.15 = 19.0kN	19.0 x 1.6 = 31.0kN
AAA 	N/A	2.5 tonne (25kN)	0.5 tonne	25.0 x 1.1 x 1.15 = 32.0kN	32 .0 x 1.6 = 52.0kN
B 	B125	5.0 tonne (50kN)	0.75 tonne	50.0 x 1.1 x 1.15 = 63.25kN	63.25 x 1.6 = 101.0kN
C 	C250	6.5 tonne (65kN)	1.0 tonne	65.0 x 1.1 x 1.15 = 82.5kN	82.5 x 1.6 = 132.0kN
D 	D400	11.0 tonne (108kN)	3.0 tonne	108.0 x 1.1 x 1.15 = 137.5kN	137.5 x 1.6 = 220.0kN
E 	E600	16.0 tonne (158kN)	5.0 tonne	158.0 x 1.1 x 1.15 = 200.0kN	200.0 x 1.6 = 320.0kN
F 	F900	24.0 tonne (237kN)	N/A	237.0 x 1.1 x 1.15 = 300.0kN	300.0 x 1.6 = 480.0kN

NOTE: Under the "Road Vehicles (Authorised Weight) Regulations 1998", axle weights for the UK are limited to 11.5 tonnes maximum. 'Refer to 'Acceptance Test for maximum design load/load bearing capacity).

* Slow moving wheel loads are deemed to be speeds no greater than 20mph, in low intensity trafficked areas. Where higher intensity traffic is expected, a higher load classification of cover is recommended.

** These comparisons are indicative of the typical suitable area of application of each product class and are not a like-for-like performance comparison. Comparisons are for guidance only and not intended to be exact.

5. MATERIALS

5.1 General

Access cover systems shall be suitable for use in normal conditions.

NOTE 1: If covers are to be used in more aggressive/severe conditions, additional requirements for corrosion protection may be necessary.

NOTE 2: If sealed covers are to be used in more aggressive/severe conditions, special requirements for the durability of the seal may be necessary.

Access covers, frames and all structural elements shall be made from any of the following materials:

a) aluminium conforming to **5.2**;

b) mild steel conforming to **5.3**;

c) stainless steel conforming to **5.4**;

d) a combination of one of the above materials with concrete infill to **5.5**.

Operating systems for lift assistance and security locks may be made from additional materials, however such materials shall have durability and corrosion properties compatible with those of the access cover and frame.

5.2 Aluminium alloy access cover systems

Aluminium access cover systems for use in normal conditions shall be fabricated from aluminium EN-AW 5052 or marine grade aluminium grade 5086-H34 and 6063-T5, 6063-T6 conforming to BS EN 1386.

Where aluminium access cover systems are to be used in contact with other metals or cementitious materials, corrosion protection shall be applied to the aluminium surface (see 5.7.4).

NOTE: BS 8118 Structural Use of Aluminium can be used for aluminium in contact with concrete.

5.3 Mild steel access cover systems

Mild steel access cover systems shall be fabricated from steel conforming to BS EN 10025, BS EN 10210-1, BS EN 10219-1, BS EN 10130 or BS EN 10056.

Mild steel access cover systems shall be made resistant to corrosion in accordance with 5.7.2, unless specified otherwise by the purchaser.

5.4 Stainless steel access cover systems

Stainless steel access cover systems shall be fabricated from austenitic stainless steel grades 1.4301 or 1.4401, conforming to BS EN 10088.

If the stainless steel surface is given a decorative finish the treatment shall not be detrimental to the corrosion or slip resistance of the stainless steel.

NOTE: For normal conditions, no additional corrosion protection is required for stainless steel. Post fabrication finishing processes are permitted, providing they do not reduce the product's resistance to corrosion.

5.5 Concrete infill covers

When required, the manufacturer shall specify the necessary information to enable filling of the cover by others and for the cover, thus filled, to attain the tested performance.

Minimum crushing strengths shall be by agreement between the supplier and specifier. All testing of strength shall be fully in accordance with BS EN 12390:2000.

5.6 Dissimilar metals in combination

Where the use of dissimilar metals in combination with each other could affect the corrosion or structural performance of an access cover system, a suitable durable isolating medium shall be used to prevent direct contact of the dissimilar metals.

5.7 Corrosion protection

5.7.1 General

Corrosion protection, where specified, shall apply to all access cover systems.

NOTE: Additional coatings may be applied for aesthetic purposes. Such coatings can give a degree of corrosion protection.

5.7.2 Hot dip galvanizing (mild steel)

Corrosion resistance of mild steel shall be achieved by hot dip galvanizing in accordance with BS EN ISO 1461.

After the hot dip galvanizing process it might be necessary to straighten the cover or frame, to overcome any distortion induced during the galvanizing process. This straightening process shall not adversely affect the integrity of the coating or the structural stability of the cover.

NOTE: For further information on corrosion rates seek advice from The Galvanisers Association, www.galvanizing.org.uk

5.7.3 Weld protection of stainless steel

Corrosion resistance of welds in stainless steel shall be achieved by a passivation or other suitable process.

Prior to passivation, or other chemical corrosion-resistance treatment, all parts shall be inspected for the presence of contaminants such as; grease, oil, lubricants, forming compound, cutting fluids, wax markings as well as metallic residue and other contaminants which would affect the passivation or chemical treatment process. Such contaminants shall be removed before passivation.

NOTE: Passivation is the spontaneous formation of a hard non-reactive surface film that inhibits further corrosion. This layer is usually an oxide or nitride that is a few atoms thick.

The passivation process normally comprises the total immersion of the component(s) in sodium hydroxide and citric acid followed by immersion in nitric acid (up to 20% at 49^0C) and finally followed by a water rinse. This process will restore the corrosion-resistant film, remove metal particles, dirt, and welding-generated compounds (ex. oxides)

Other chemical corrosion-resistance treatments may be employed so long as they achieve the intended aim without detriment to any part of the product assembly or its intended operation.

5.7.4 Aluminium in contact with cementitious materials

Aluminium in contact with cementitious materials shall be protected against corrosion by the application of a suitable, durable barrier coating.

NOTE: See BS 8118 Structural Use of Aluminium for more information.

6. DESIGN

6.1 Clearances

The maximum clearances between adjacent covers and the covers and frame shall be as follows.

a) For access cover systems comprising one or two covers, the total clearance shall be equal to or less than 9 mm.

b) For access cover systems comprising of three or more covers each of which is secured to the frame, the clearance between adjacent covers and the covers and frame shall be equal to or less than 5 mm.

c) For access covers systems comprising of three or more covers not secured to the frame, a secured cover or design feature shall be provided at a suitable position to prevent the total clearance from exceeding 16 mm at any location within the frame boundary.

d) For hinged access cover systems the clearance on the hinged side between the cover and frame shall be equal to or less than 16 mm.

6.2 Edge and contact surfaces protection for access covers of steel reinforced concrete

The edges of reinforced concrete covers shall be protected to resist erosion or wear of the concrete edge in service.

6.3 Surface condition

Unless specified, solid top flush fitting covers shall not have any slip resistant coating applied, the minimum requirement shall be either a durbar or a tread plate pattern. For upstanding covers it is the responsibility of the purchaser to specify if plain plate finish is required or durbar / tread plate.

NOTE: Where slip resistant coatings are required, it will be the responsibility of the specifier to state the minimum polished slip resistant value (PSRV).

6.4 Vertical alignment

6.4.1 Trip Hazard

The alignment to the cover and the frame shall be such as to minimise any trip hazard. Any vertical step between the top of the cover and the frame shall not exceed 3 mm.

6.4.2 Surface flatness of the cover

For flush fitting covers the upper surface of the cover shall be flat within a tolerance of +/- 0.8% of the clear opening, to a maximum of 6 mm.

For upstand covers the upper surface shall be flat within a tolerance of +/- 0.8% of the clear opening, where covers are designed to have a pyramid / apex formation to further assist water shedding, the height of the pyramid shall be agreed with the specifier.

6.5 Hinged covers

6.5.1 Opening angle

Hinged covers shall be so designed that when in the fully open position they do not impede access to the clear opening.

6.5.2 Stay mechanism

The stay mechanism shall engage automatically when the cover is in the fully open position, unless otherwise specified by the purchaser.

Once engaged, the stay mechanism shall be capable of withstanding, without collapse, 2.5 kN applied to the geometric centre of the cover whilst in the vertical position.

6.5.3 Surface protrusion

Hinges shall not protrude above the upper surface of the cover in the closed position unless specified by the client.

6.5.4 Hinge mechanism under load

Where covers have hinge mechanisms, the design shall be tested with the cover present within the frame in line with section 7 of this Specification.

6.5.5 Lift assistance

Hinged covers may be designed with a lift assistance mechanism The lift assistance mechanism shall be declared by the manufacturer. The design of the mechanism used shall enable a safe lift throughout.

NOTE: As a guideline the maximum force encountered by an operator throughout the lift sequence should not exceed 250 N.

If liquid filled lift assistance parts are used then the potential environmental impact should be declared by the supplier.

6.6 Recessed covers

6.6.1 Structural infill

Where the manufacturer produces covers which are designed to have a structural infill present it is the manufacturer's responsibility to declare the relevant physical properties of the infill required to achieve the desired loading(s). The manufacturer shall ensure the design is such that the structural infill does not detach, degrade or crack during normal cover operation.

6.6.2 Non-Structural infill

Where the manufacturer produces covers which are designed to have no structural infill present (such as block paviours), the cover shall be designed to achieve the desired loading(s) with no infill present.

6.6.3 Hinged Recessed Covers

Infilled covers shall be designed to prevent the infill material from detaching when operated.

Where a cover is designed to be infilled by others and is supplied with the lift assist mechanism pre-set for the mass of the infill material the supplier shall ensure a temporary clamping device shall be incorporated into the design. Furthermore, a danger/warning sign shall be visible on the product to illustrate that a potentially hazardous force will be encountered should the cover be opened unfilled.

6.7 Seatings

6.7.1 Seatings shall be designed to be stable in use.

6.7.2 Where quietness under traffic load is an specific application requirement, this shall be stated in the enquiry document(s) and reflected in any subsequent manufacturers correspondence.

6.7.3 If a sealing gasket is used within the design, it shall be durable and shall not be integral to the load bearing capacity of the product when tested in accordance with clause 7 of this Specification, unless specifically designed to do so.

6.8 Sealed covers and frames (optional)

6.8.1 Watertight access covers

A cover and frame designed to be watertight shall be capable of resisting 100 mm head of water above the upper surface of the cover when tested in accordance with the water ingress test in Appendix A**.**

A measured water leakage throughout the test shall not exceed 5ml/m of seal in a 24 hour test period.

6.8.2 Airtight access covers

Airtight covers and frames shall be capable of withstanding resistance to air pressure of +10 mb gauge (+ 100 mm water gauge) from below the cover when tested in accordance with the Air Tightness Test in Appendix B. The pressure below the cover shall not drop by more than 0.1 mb/m of seal (1 mm water gauge / m of seal) in a 15 minute timed period.

6.8.3 Pressure tight covers (hydrostatic surcharge)

A pressure tight access cover and frame shall be capable of resisting internal hydrostatic pressure as specified by the purchaser with its covers remaining fixed in the frame when subjected to such a pressure.

The manufacturer shall state the provisions made for fixing to the chamber structure to resist the pressure specified by the client. The type of fixings shall be the responsibilty of the specifier.

6.8.4 Frame drainage

Where frame channel drainage is required due to wet environmental conditions, this may be achieved by a method agreed with the purchaser. Such methods usually comprise of either internal or external drainage to/from the chamber.

6.8.5 Debris gasket

Debris gaskets may be required to prevent stones and foreign matter preventing the normal operation of the cover. Where this has been specified, the gasket shall be made from a material suitable to its condition of use.

6.9 Access Security

The level of protection if required shall be specified by the purchaser.

NOTE 1: If tamper proof covers are specified by the purchaser, the cover shall not be capable of being opened using objects readily available to children within the immediate vicinity of the installation.

NOTE 2: The level of protection required for access security varies depending upon whether it is intended for child safety or to resist malicious intent.

NOTE 3: Guidance to purchasers on the level of protection and appropriate testing is given in LPS 1175 published by the Loss Prevention and Certification Board (LPCB).

6.10 Welding

The specification and qualification of welding procedures for covers shall conform to BS EN ISO 15609.

The fabrication of fusion welded component parts of an access cover system shall be undertaken by a welder approved by the procedures in BS EN 287-1 for steel systems, and in BS EN 287-2 for aluminium alloy systems.

The fabrication of resistance welded metallic components shall conform to the quality requirements of BS EN ISO 14554.

The approval testing of welding operators for fusion welding and of resistance weld setters for fully mechanised and automatic welding of metallic materials shall conform to BS EN 1418.
Welds shall be tested to BS EN 571-1.

6.11 Fall Protection / Safety Grids

Where specified, a safety grid shall be incorporated to prevent operatives from falling into the chamber and shall sit within the frame opening.

The safety grid shall be capable of withstanding without collapse a 140 kg (+/- 1 kg) mass applied over an area of 300 mm x 200 mm (+/- 1 mm) and dropped from a height of 2 m (+/- 10 mm) onto any point on the grid.

Where the safety grid is of a hinged design, the maximum force to be exerted by any individual operative to open it shall not exceed 250 N. The safety grid shall not to permit a 100 mm (+/- 1 mm) diameter sphere through any aperture.

NOTE: The grid is designed for fall protection only and not as a working platform. An appropriate warning sign must be incorporated on the grid to describe this condition.

If a working platform is required then consult with the manufacturer for an alternative solution.

6.12 Frame Fixings

Frame fixings shall be as follows;

Hinged covers	All hinged cover designs shall contain provisions for fixing the frame to the substrate. The customer shall be advised of the provisions made, but fixings shall not form part of the supply unless agreed otherwise.
Non hinged covers	A provision for frame fixings shall be present on frames classified FACTA C loadings and greater.

The design of the fixing provision shall be capable of withstanding a 2.5 kN force in the horizontal plane acting at any point when fixed to the chamber.

Where a lift assist device has been used to aid in opening hinged covers structural flexing may take place within the frame. The manufacturer shall take this into account within the frame design.

6.13 Cover lifting points

6.13.1 Manual lifting

A cover shall be designed to have lifting points to aid in cover removal / opening. The design of the lifting points shall enable a balanced lift. The number and location of lifting points shall be appropriate for the size, geometry, mass and load classifiaction of the covers.

Each manual lifting point should be capable of withstanding, without fracture a 750 N pull test or half the mass of the cover which ever is the greater.

6.13.2 Mechanical lifting

For mechanical lifting, each lifting point needs to be designed to take a minimum 1.2 times the mass of the cover, including infill if applicable.

6.14 Installation lifting points

Suitable installation lifting points, evenly distributed such that they enable a balanced lift when the cover and frame are installed, shall be provided. Such lifting points shall be individually capable of withstanding a minimum of 1.2 times the mass of the access cover and shall ensure that there is no structural detriment throughout the lifting sequence.

6.15 Structural beam support

Structural beam supports, if supplied, shall, wherever possible, be fixed to the access cover frame. Where structural supports are provided as separate components to the access cover frame and are not ultimately intended to be fixed to it, the manufacturer shall stipulate the correct method of fixing within their installation instructions.

6.16 Installation instructions

Where poor installation and/or assembly of a cover and frame could result in hazardous or detrimental product operation, installation instructions shall be provided. It is the responsibility of the manufacturer to supply installation instructions relevant to their designs.

7. LOAD TESTING

A test specimen shall be checked for compliance with the requirements of this clause. Compliance with the loading requirements for the appropriate class of Clause 4 shall be determined by a loading test with loads according to the class of fabricated access covers.
(See table 2).

Single unit access covers shall be tested as complete units in their condition of service. For multiple units a representative cover and support frame shall be tested so as to simulate the condition of service.

Structural infill covers shall be load tested filled with material of the required specification.

Covers recessed for non-structural infills and which are delivered unfilled shall be load tested unfilled.

7.1 Test Loads

TABLE 2 - Test Loads for Fabricated Access Covers

Class	Static wheel load x overload factor (OF) x dynamic factor (DF)			Imposed Test Loads	
	kN	OF	DF	Test 1 (Service) * kN	Test 2 (Ultimate) ** kN
A	5	1	1	5	8
AA	15	1.1	1.15	19	31
AAA	25	1.1	1.15	32	52
B	50	1.1	1.15	63.25	101
C	65	1.1	1.15	82.5	132
D	108	1.1	1.15	137.5	220
E	158	1.1	1.15	200.0	320
F	237	1.1	1.15	300.0	480
				*see 7.3.1	**see 7.3.2

For fabricated access covers with a Clear Opening less than 300 mm see table 3 for factor to be applied to test loads.

7.2 Testing Apparatus

7.2.1 Testing machine

The testing machine, preferably a hydraulic test press, shall be capable of applying a load at least 25% greater than the respective test load for classes A to D and at least 10% greater than the respective test load for classes E and F.

A tolerance of +/- 3% of the test load shall be maintained.

The dimensions of the bed of the testing machine shall be greater than the bearing area of the unit to be tested.

7.2.2 Test blocks

TABLE 3 - The dimensions and shapes of test blocks are shown in the table below

Shape and Test Opening of Fabricated Access Cover	**Dimension of Test Block**	**Factor to be applied to test loads**
Fabricated access covers of any shape over 300 mm test opening	Circular test block 250 mm diameter	1.0
The test opening between 200 mm and 300 mm - rectangular cover with 1 side greater than 300 mm	Rectangular test block* 250 mm x 150 mm	0.7
Test opening between 200 mm and 300 mm - all other shapes	Circular test block 150 mm diameter	
Test opening less than 200 mm - rectangular cover with one side greater than 300 mm	Rectangular test block* 250 mm x 75 mm	0.4
Test opening less than 200 mm - all other shapes	Circular test block 75 mm diameter	

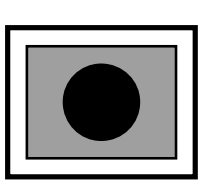
*****The long axis of the test block shall be orientated parallel to the long axis of the cover.

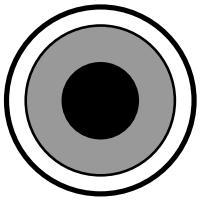
7.2.3 Preparation for the test

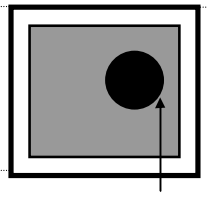
The test block shall be placed on the unit with its vertical axis perpendicular to the surface and coincidental with the geometric centre of the cover (examples, see figure 3). In the case of multiple units the test blocks shall be placed on an individual unit in the geometric centre as shown in figure 3 and a second test shall be carried out with the edge of the test block 75 mm from an unsupported edge of the cover also shown in figure 3. The cover shall be supported and levelled to simulate in-service conditions.

The test load shall be uniformly distributed over the whole surface of the test block and any irregularities compensated for by means of an appropriate intermediate layer, e.g. softwood, fibre board, felt or similar material positioned between the cover and the test block. The dimensions of this intermediate layer shall not be larger than those of the test block.

When testing fabricated access covers with a non-flat surface, the contact face of the test block shall be shaped to match the cover. Patterns as defined in sub-clause 6.3 and small deviations from a flat surface do not require a shaped contact face of the test block.







75 mm from edge

Figure 3 - test blocks and geometric centres

7.3 Load Testing Procedures

Prior to testing, the manufacturer may apply a single settlement load of up to 20% of the service test load for the relevant loading class.

NOTE: This is to bed the cover into the frame.

The performance of fabricated access covers shall be demonstrated by carrying out Test 1 (Service) and then a test Test 2 (Ultimate) on the same cover.

For bespoke covers, Test 2 shall not be required provided that either Test 2 has been performed on a cover of similar structural configuration or a suitable finite element analysis (FEA) or structural calculation has been carried out to demonstrate that the cover complies with the required loading class.

7.3.1 Test 1 (Service)

The test is intended to be a non-destructive test for confirming structural performance and demonstrating the essentially elastic characteristics of the cover. For compliance, fabricated access covers shall prove capable of sustaining the test loading given in Table 2 whilst satisfying the permanent set figure.

The permanent set value of the test sample shall be treated as zero prior to commencing the service test, regardless of whether a settlement load has been previously applied.

The full test load shall be applied through the test block as described in 7.2.3 (directly after the settlement load) at a rate of between 1kN/sec and 5kN/sec. The deflection under load shall be noted, (incremental deflection readings at Key Stages may prove useful for analysis purposes). The load on the test specimen shall then be released and applied a further 4 times as outlined above.

On removal of the 5^{th} test load, the permanent set value shall be recorded. The permanent set value recorded from the settlement test added to the permanent set value from Test 1 (Service) shall NOT exceed test opening multiplied by 0.8%.

For structural infilled covers with reinforcing bars, no visible cracks wider than 0.3 mm shall appear in the concrete after this test.

For structural infilled covers without reinforcing bars, no visible cracks shall appear in the concrete after this test.

For covers complying with Load Classes ‘C’, ‘D’, ‘E’ and ‘F’ of this specification, the maximum total permanent set value shall not exceed clear opening multiplied by 0.5%.

7.3.2 Test 2 (Ultimate)

Test 2 (Ultimate) is designed to confirm the compliance of the fabricated access cover to the load factor in Table 2. Before carrying out Test 2 , the specimen should first be submitted to and satisfy Test 1 described in section 7.3.1 above.

The full test load shall be applied at a rate between 1kN/sec and 5kN/sec and shall be held for 30 seconds. The deflection under load shall be noted, upon release of the load the permanent set shall be recorded.

On removal of the test load, the deflection shall reduce by at least 20%.

8. IDENTIFICATION & LABELLING

All products claiming conformance to this Specification, shall bear as a minimum:

(a) FACTA mark/logo as the marking of this Specification
(b) Three letter FACTA membership code
(c) The appropriate load class
(d) The name and/or identification mark of the manufacturer

Omission of all or any one of the markings shall constitute a product's non-conformance to this Specification, irrespective of the reason.

NOTE: The FACTA mark or logo is a registered mark and is for use by FACTA members only.

9. QUALITY ASSURANCE

Products complying with this guide shall be designed and manufactured under a quality management system which complies with the requirements of ISO 9001.

Appendix A

Water Ingress Test

This type test shall be carried out on each configuration, or change of configuration of sealing arrangement to prevent the ingress of water

I. Water tight access cover in accordance with 6.8.1 shall be tested by subjecting the system to 100 mm of water pressure for a period of 24 hours.

II. The apparatus shall be set up similar to that in Figure 4

III. The test shall be carried out on a simple access cover and frame specially made for the purpose

IV. A fully welded water retaining collar shall be mounted and sealed on to the top of the frame

V. The test frame shall sit flat on a surface and checked with a spirit level

VI. The cover shall be fitted in accordance with the manufacturers instructions

VII. Water shall be filled to a level of 100 mm above the cover and left for a period of 24 hours. After that period the volume of any water which has penetrated the seal and has been collected in the drip tray shall be measured in a measuring cylinder and reported.

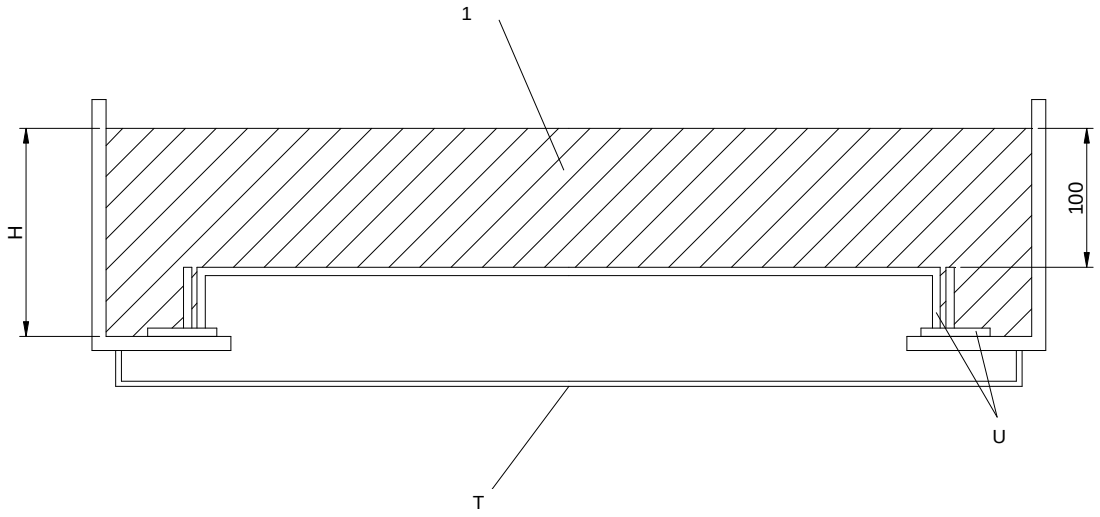


Figure 4 Typical apparatus for water ingress test

Key

1 = Water
H = Height of frame
U = Cover and frame under test
T = Drip tray

Appendix B

Air-tightness Test

This type test shall be carried out on each configuration, or change of configuration of sealing arrangement to maintain air tightness. Airtight access covers in accordance with 6.8.2 shall be tested by subjecting a specific sample to an air pressure of 10mb above atmosphereic pressure for three periods of 15 minute duration.

I. The apparatus shall be set up similar to that in Figure 5

II. The test shall be carried out on a sample access cover and frame specially made for the purpose with a clear opening upto 1m.

III. The frame shall be mounted and sealed onto the top of a fully welded skirt, at least 225 mm deep.

IV. The water bath shall be filled with water to 20 mm below the seal under test and the cover shall be fitted in accordance with the manufacturers instructions.

V. Air shall be injected below the access cover and brought to a pressure of 10mb gauge (100 mm water gauge) (+/- 5%) and left under pressure for 15 minutes (+/- 1 minute).

VI. After that period the manometer or pressure gauge shall be read and reported.

VII. Release the pressure.

VIII. Paragraphs v), vi), and vii) shall be repeated after 24 hours, and repeated again after one week.

IX. The assembly shall be left totally undisturbed between tests.

NOTE: The uplifting (floating) force exterted on a cover under test will be 1kN (approx 100kg force) and it is therefore recommended that the total mass of the test access cover and skirt exceeds 150kg.

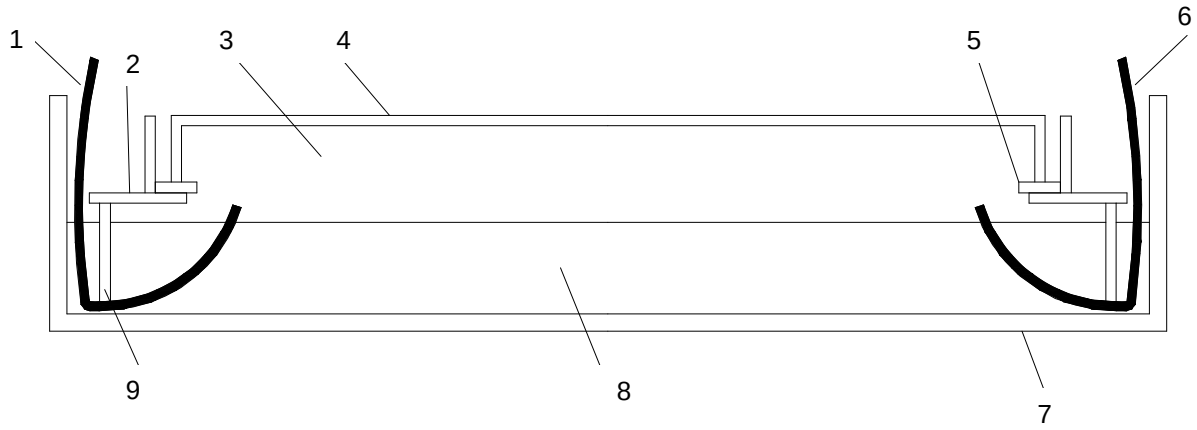


Figure 5 Typical apparatus for air-tightness test

Key

1 = Pipe for connection to manometer
2 = Frame
3 = Entrapped air at 10 mb
4 = Cover
5 = Airtight seal under test
6 = Air pipe and valve for pressurizing entrapped air
7 = Water bath
8 = Water 200 mm deep
9 = 225 mm skirt welded to frame