



Assets Planning and Delivery Group
Engineering

Strategic Product Specification

SPS 801 Access Covers for General Purposes

VERSION 1
REVISION 3

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FOREWORD

Each Strategic Product Specification has been prepared to inform Water Corporation staff, consultants, contractors and land developers of the requirements for selecting and acquiring a manufactured product to be used in strategic Corporation infrastructure. The definition of 'Product' includes items that comprise assembled components, equipment or plant for mechanical, electrical and civil infrastructure applications.

The objective of a Strategic Product Specification is to specify fit-for-purpose Product which will contribute to the provision of effective water services at least whole-of-life cost and with least risk to service standards and safety. A Strategic Product Specification also provides uniform standards for compatibility of new water infrastructure with existing water assets.

Many Strategic Product Specifications have drawn on the design, asset management and operational experience of Product performance in live service gained by the Corporation over time. Some Strategic Product Specifications have drawn on the experience of the water industry nationally by referencing Australian or WSAA standards.

Strategic Product Specifications are intended for reference and use in the following typical procurement scenarios:

- Capital funded infrastructure design and construction work;
- Private developer funded subdivision infrastructure for takeover by the Corporation;
- Operationally funded infrastructure design and construction work;
- Corporation period contracts for Product purchases;
- Product purchases for stock or for miscellaneous minor work.

A published Strategic Product Specification will, in some cases, comprise technical content that is typical of a range of products of the same type (type specification) but may exclude specific requirements that should apply to a particular project or application. In such cases, the project designer is required to document the supplementary project specific requirements in the 'Project Specific Requirements' Appendix of the Specification.

The text of a published Specification should not be directly modified. In the event that a text variation is considered necessary to accommodate the needs of a particular project or application, the text modification should be documented in the appropriate Clause of a 'Project Specific Requirements' Appendix.

Enquiries relating to the technical content of this Specification should be directed to the Senior Principal Engineer, Wastewater Conveyance, Engineering.

Head of Engineering

This document is prepared without the assumption of a duty of care by the Water Corporation. The document is not intended to be nor should it be relied on as a substitute for professional engineering design expertise or any other professional advice.

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REVISION STATUS

The revision status of this specification is shown section by section below:

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Strategic Product Specification

SPS 801

Access Covers for General Purposes

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1 Scope and General

1.1 Scope

This Specification sets out requirements for the design, manufacture, production testing, handling and delivery of access cover, cover frame and concrete surround assemblies for use in Corporation wastewater and other selected conveyance systems. The specification aligns with AS 3996 access cover requirements for person entry and for non-person/equipment and inspection access to below ground structures - typically pumping stations, access chambers, valve pits and maintenance shafts. The Specification also details the means by which conformity with the Specification shall be demonstrated and the acceptance criteria for cover assembly components.

Typical access cover assembly types and nominal opening sizes covered by the specification are:

Table 1.1 Access Cover Assembly Sizes

Typical application	Nominal clear opening size (mm)	Typical opening dimensions (mm)	Cover components (no.)	Cover structure
AS 3996 cover assembly load class D – vehicular traffic applications				
PS/IC	2000 x 900	(1980 – 2080) x (900 – 925)	4	Solid top
PS/IC	1650 x 900	(1630 – 1690) x (900 – 925)	3	Solid top
PS/IC; VP	1500 x 900	(1490 – 1550) x (900 – 925)	3	Solid top
AC, VP	900 x 600	(960 – 1010) x (600 – 625)	2	Solid top
AC, VP	Ø 750	(750 – 800) x (750 – 800) - Note 3	1	Solid top
MS, ARP/SP	Ø 375/450	Ø 375 - 450	1	Solid top
AC, VP	900 x 600	(960 – 1010) x (600 – 625)	2	Concrete infill
AS 3996 cover assembly load class B/C – non-vehicular back yard applications only				
AC	900 x 600	(930 – 980) x (600 – 625)	2	Solid top
MS, ARP/SP	Ø 375/450	Ø 375 - 450	1	Solid top
MS	Ø 375/450	Ø 375 - 450	1	Plastics
SPS 802 assisted lift cover assembly				
PS	1950 x 1000	(1900 – 2000) x (950 – 1050)	1	SPS 802 Type4
PS/IC, VP	1500 x 750	(1500 – 1550) x (750-780)	1	SPS 802 Type 1
PS/IC	750 x 750	(750 – 780) x (750-780)	1	SPS 802 Type 2

PS – (SPS 702) Pumping station; IC – (pumping station) Inlet chamber; AC – (SPS 700) Access chamber

MS – Maintenance shaft; VP – Valve pit ARP – Air release point (no valve pit); SP – Scour point (no valve pit)

NOTES:

- 1 The cover assemblies, applications and descriptions tabulated are typical only for the general information of current and prospective cover product manufacturers and suppliers.
- 2 Person access openings in wastewater pumping station wet wells and valve pits are provided with permanently installed safety gratings which, typically, are supplied and installed by the primary civil works contractor/installer, following installation of RC top slab and cover assembly.
- 3 The opening sizes shown reflect currently authorised products except for a 750 mm nominal circular cover opening which is, at present, being reviewed prior to its consideration as a safe engineering and operational option.
- 4 New assembly materials (conforming to Table 2.1) and opening sizes will be duly reflected in the Table as and when conforming proprietary products have been duly appraised and authorised by the Corporation.
- 5 Cover assembly selection, design and performance - including cover hold-down bolting - requirements should be in accordance with the appropriate Corporation design standards, standard drawings and project requirements.
- 6 Where 900 x 600 cover assemblies are unavoidably exposed to vehicular road traffic, concrete infilled cover components are required in preference to solid ductile iron components.
- 7 Typical assisted lift cover assemblies are described for information and comparison purposes only. Assisted lift assembly performance requirements are set out in SPS 802.
- 8 Access cover assembly, cover opening and RC surround/top slab configuration and dimensional details should be in accordance with project – including standard drawing - requirements.

1.2 Referenced Documents

The following documents are referenced in this Specification or are provided for the purposes of design and installation context relevant to the Product:

Water Corporation

DS 50	Design and construction requirements for gravity sewers DN 150 to DN 600
DS 51	The Design and Construction of Wastewater Pumping Stations and Pressure Mains 4.5 to 180 Litres Per Second Capacity
DS 95	Standard for the selection, preparation, application, inspection and testing of protective coatings on Water Corporation assets
S151	Prevention of Falls Strategic Products Register

WSAA

WSA TN-08	Technical Note - Product conformity assessment requirements
WSA 132	Industry standard for ductile iron access covers for water supply and sewerage
WSA 133	Industry standard for lightweight macro-composite access covers and compatible frames for water supply and sewerage

AS

1110.1	ISO metric hexagon bolts and screws - Product grades A and B - Bolts
1111.1	ISO metric hexagon bolts and screws - Product grade C - Bolts
1112.1	ISO metric hexagon nuts Style 1 - Product grades A and B
1112.3	ISO metric hexagon nuts Style 1 - Product grade C
1170	Structural Design Actions – Parts 0 to 4
1192	Electroplated coatings - Nickel and chromium
1199.1	Sampling procedures for inspection by attributes - Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection
1214	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)
1231	Aluminium and aluminium alloys - Anodic oxidation coatings
1379	Specification and supply of concrete
1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
1565	Copper and copper alloys—Ingots and castings
1646	Elastomeric seals for waterworks purposes (Performance requirements in AS 681 Parts 1 to 4)
681.1	Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Vulcanized rubber
681.2	Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Thermoplastic elastomers
681.3	Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Cellular materials of vulcanized rubber
681.4	Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Cast polyurethane sealing elements
1831	Ductile cast iron (<i>Identical to ISO 1083</i>)
1874	Aluminium and aluminium alloys - Ingots and castings
2074	Cast steels
2205.10.1	Methods of destructive testing of welds in metal - Corrosion test for welded austenitic stainless steel
2345	Dezincification resistance of copper alloys
3600	Concrete Structures
3754	Safe application of powder coatings by electrostatic spraying
3996	Access covers and grates
4291.1	Mechanical properties of fasteners made of carbon steel and alloy steel - Bolts, screws and studs

5054	Ausferritic spheroidal graphite cast irons – Classification (<i>Identical to ISO 17804</i>)
5056	Metallic coatings-Powder metal (and composites) applied by mechanical means at ambient temperature
5100.2	Bridge Design – Design Loads
EN	
124	Gully tops and manhole tops for vehicular and pedestrian areas – Design requirements, type testing, marking, quality control
AS/NZS	
1390	Cup head bolts with ISO metric coarse pitch threads
1554.6	Structural steel welding - Welding stainless steels for structural purposes
1594	Hot-rolled steel flat products
1664.1	Aluminium structures Part 1: Limit state design
3862	External fusion-bonded epoxy coating for steel pipes
4158	Thermal-bonded polymeric coatings on valves and fittings for water industry purposes
4291.2	Mechanical properties of fasteners made of carbon and allow steel - Nuts with specified proof load values - Coarse thread
4321	Fusion-bonded medium-density polyethylene coating and lining for pipes and fittings
4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
ISO	
3506-1	Mechanical properties of corrosion-resistant stainless-steel fasteners Bolts, screws and studs
3506-2	Mechanical properties of corrosion-resistant stainless-steel fasteners -Nuts
6507-1	Metallic materials—Vickers hardness test - Test method
7089	Plain washers—Normal series—Product grade A
7091	Plain washers—Normal series—Product grade C
8839	Mechanical properties of fasteners—Bolts, screws, studs and nuts made of non-ferrous metals
AS/NZS ISO	
9001	Quality management systems – requirements
AS/NZS ISO/IEC	
17065	Conformity assessment – Requirements for bodies certifying products, processes and services
17067	Conformity assessment – Fundamentals of product certification and guidelines for product certification schemes
ISO/IEC	
17000	Conformity assessment – Vocabulary and general principles
17025	General requirements for the competence of testing and calibration laboratories
17026 (TR)	Conformity assessment – Example of a certification scheme for tangible products
17030	Conformity assessment – General requirements for third party marks of conformity
Guide 28	Conformity assessment — Guidance on a third-party certification system for products
ASTM (USA)	
A240M	Standard specification for chromium and chromium-nickel stainless steel plate, sheet, and strip for pressure vessels and for general applications
A276	Standard specification for stainless steel bars and shapes
A380	Standard practice for cleaning, descaling and passivation of stainless steel parts, equipment and systems
F593	Standard specification for stainless steel bolts, hex cap screws, and studs
F594	Standard specification for stainless steel nuts
F844	Standard specification for washers, steel, plain (flat), unhardened for general use
WRc (UK) Water Industry Specifications (WIS)	
4-52-03	Specification for anti-corrosion coatings on threaded fasteners
WTIA	
TN13	Stainless steels for corrosive environments

1.3 Definitions and Notation

The following definitions are intended to clarify the terminology used in this Specification.

1.3.1 Australian Standards®

Standards that are developed, published and maintained by Standards Australia

1.3.2 Certificate

A formal certificate issued by a Conformity Assessment Body as an outcome of a compliance audit in accordance with a Certification System.

1.3.3 Certification Mark

A proprietary mark of product conformity issued in accordance with ISO/IEC 17030.

1.3.4 Certification System

An impartial third party product certification scheme or combination of schemes, as exemplified in ISO/IEC TR 17026, that are in accordance with the fundamentals of AS/NZS ISO/IEC 17067 and with the guiding principles of ISO/IEC Guide 28.

NOTE: The effect of this is to require maintenance by the manufacturer of effective production control planning in addition to full type testing from independently sampled production and subsequent verification of conformity with specified standards.

1.3.5 Compliant Product

Product that has been assessed by means of Product Appraisal as conforming to standards and specifications that are specified by the Corporation.

1.3.6 Conformity Assessment Body (CAB)

A third party organisation that has been duly accredited as meeting the requirements of AS/ANZ ISO/IEC 17065 by a signatory member of the International Accreditation Forum (IAF) Multilateral Arrangement (MLA), previously known as a Certification Body.

1.3.7 Corporation

The Water Corporation of Western Australia.

1.3.8 Manufacturer

An entity or combination of entities that are responsible for selection, processing and control of Product constituent materials or compounds and for the processing equipment that collectively result in the manufactured product.

1.3.9 Notation

Statements governed by use of the word 'shall' are mandatory or 'normative' requirements of the Specification. Statements expressed by use of the words 'should' or 'may' are 'informative' but not mandatory and are provided for information and guidance. Notes in Specification text are informative. Notes that form part of Specification Tables are normative. An Appendix to the Specification that is designated 'normative' contains mandatory requirements. An Appendix that is designated 'informative' is provided for information and guidance only. The term 'specified' includes requirements of the Specification and requirements stated or referenced in other project documentation.

1.3.10 Officer

A duly authorised representative or appointed agent of the Corporation.

1.3.11 Product

A single unit or multiple units of manufactured end product or an assembly of manufactured component products, materials or equipment. This Specification and accompanying Purchasing Schedule define the nature and details of Product to be supplied.

NOTE 1: An end product is most commonly an output of manufacturing processes that result in finished end products having the same features and characteristics and can be the result of a single or multiple production batches.

NOTE 2: Manufactured equipment and assemblies of Product components or materials are commonly procured for mechanical, electrical and civil infrastructure applications.

1.3.12 Product Appraisal

A formal process whereby Product is subjected to systematic engineering assessment to determine its fitness for prescribed end uses and to evaluate its conformity with specified standards and requirements. Product Appraisal includes verification of the extent of conformity in accordance with the requirements of a relevant 'Technical Compliance Schedule'.

1.3.13 Product Assessor

An organisation, Officer or other person who, having demonstrated specialist product knowledge and competence acceptable to the Corporation, is appointed to evaluate Product, appraises the Product and issues one or more Product Verification Reports.

1.3.14 Product Certification

A formal process whereby the production and management systems for the manufacture of Product, are assessed by a Conformity Assessment Body to evaluate conformity of these systems with specified product standards and tests, in accordance with Certification System rules.

1.3.15 Product Verification Report

A formal report wherein a Product Assessor evaluates the extent of Product conformity with the specified product standards and specifications.

NOTE: Verification may be on a project-by-project basis or at agreed intervals, as appropriate to the scope of a Purchasing Schedule and Product end use, subject to determination by the Corporation.

1.3.16 Product Warranty

A formal express undertaking by a Supplier that indemnifies the Corporation against the consequences of supplied Product failure to conform with specified fitness for application and in-service life expectancy performance requirements.

1.3.17 Purchasing Schedule

A Corporation purchase order, tender, schedule of prices, bill of quantities, or specification that details the nature, quantity and other characteristics of Product to be supplied, purchased or installed.

1.3.18 Quality System

A management system that establishes, documents, implements and maintains organizational structures, resources, responsibilities, processes and procedures for the manufacture of Product and provision of Product related services in accordance with the requirements of AS/NZS ISO 9001.

1.3.19 Standards Australia

The peak non-government standards development body in Australia which develops Australian Standards®.

1.3.20 Strategic Product

An essential infrastructure component whose performance is critical to the elimination of risk to the safe and effective provision of water services, which are functions of the Corporation under the Water Corporation Act as licensed under the Water Services Coordination Act.

NOTE: Strategic product is a component of permanent Corporation infrastructure. Ancillary operational and safety equipment that does not form part of permanent infrastructure but offers exceptional enhancements in operational performance or personnel safety may also be deemed strategic.

1.3.21 Strategic Product Appraisal Process

The process described in Section 3 of the Strategic Products Register whereby manufactured products and equipment are evaluated and authorized for use in Corporation infrastructure, subject to demonstrated conformity with the nominated product performance requirements.

1.3.22 Supplier

An entity or combination of entities that is responsible for the supply of Product.

NOTE: A Supplier may be a Manufacturer, owner, producer, distributor, vendor, agent, tenderer or contractor for supply of Product or Product related service.

1.3.23 Testing

The determination of Product characteristics by inspection and by the application of specified test procedures in order to determine Product conformity with nominated performance requirements.

2 Design and Performance Requirements

2.1 Cover Assembly Materials

Table 2.1 outlines performance requirements for cover, frame and concrete surround/top slab assembly materials in the required order of preference. Fastener requirements are intended only for application where assembly designers and manufacturers propose to design and incorporate fastener components in assemblies.

Acceptability of proposed materials and design shall be subject to demonstration of the required engineering and longevity performances by reference to proven performance test data and (independently witnesses/audited) certificates.

Table 2.1 Access Cover Assembly Material Requirements
Part 1 Assembly Structure

Component	Material and Application (Notes 1 & 2)	Material Standard	Grade/Type (Note 3)
Cover Body, Frame and assisted lift housing	Polymeric: Reinforcing fibres and inserts encapsulated in structural polymeric (thermo-set or thermo-plastics) resin matrix	Fibre reinforced polymeric formulation supported by engineering calculations and by objective structural and fatigue performance modelling, test data and test records/certificates	25 year unimpaired performance life
	Stainless steel	ASTM A240/A240M (A380 prepared)	316L, 431
	Ausferritic Ductile Iron (Corrosion Protected)	AS 5054	800/10
	Ferritic Ductile Iron (Corrosion Protected)	AS 1831 (Silicon alloyed)	ISO 1083 500/10
	Ductile Iron (Corrosion Protected)	AS 1831	600/3; 550/5; 500/7
	Carbon steel (Corrosion Protected)	AS/NZS 1594	HU 250
	Aluminium (Class B load applications only) including conformity with AS 3996 Clause 2.4	An acceptable structural and durability design basis, duly supported by engineering calculations, objective structural/fatigue performance modelling, test data and test records/certificates.	AS 1874: AA 603/AC 603
Cover Locking Mechanism	Stainless steel	ASTM A240/A240M (A380 prepared)	316L, 431 (Note 9)
DI and carbon steel corrosion protection	Fusion bonded or mechanically applied	AS/NZS 4321; AS/NZS 4158; AS 5056 (in accordance with DS 95 specifications D1 & F1)	25 year unimpaired performance life
Composite UV protection	Acceptable UV stabilising agent in formulation	Objective UV resistance performance evidence	EN 124.5/124.6
Ancillary Safety Grating (Note 10)	Stainless steel	ASTM A276 (A380 prepared)	316L
Cover tightness seals	NBR or SBR	AS 1646 and AS 681.1 or 681.2	> 70 IRHD
Cover & Frame Surround	Reinforced Concrete (AS 1379)	Acceptable surround configuration and engineering design basis details and configuration drawings	N 40 (Note 7) B2 (Note 8)

Table 2.1 (cont.):

(Part 2) Cover Assembly Fasteners (only where specified)

Fastening Component	Material Composition	Material Standard	Grade or type (Note 3)	Dimensional Standard	Product tolerance grade	Mechanical Standard	Property or hardness class
Bolts (Notes 3 and 4)	Stainless steel	ASTM F593	316	AS 1110.1	A	ISO 3506-1	—
	DZR Copper Alloy (Note 5)	AS 1565/2345	C83600A	AS 1110.1	A	ISO 8839	5.6
Nuts	Stainless steel	ASTM F594	316	AS 1112.1	A	ISO 3506-2	—
	DZR Copper Alloy (Note 6)	AS 1565/2345	C83600A	AS 1112.1	A	ISO 8839	6
Anti-galling treatment of stainless steel threads	Molybdenum disulphide or teflon dry film lubricant	—	—	—	—	—	—
Washers	Stainless steel (Note 5)	ASTM F844	316	ISO 7089	A	ISO 6507-1	—

TABLE 2.1 NOTES:

- 1 Alternative assembly component materials may be considered by agreement between the manufacturer and the Corporation, subject to objective evidence/certification of cover assembly engineering and longevity performance.
- 2 Welding of steel components shall conform with AS/NZS 1554. Direct contact between metals that differ significantly in electro-galvanic potential shall be avoided.
- 3 Other product material tensile strength and dimensional tolerance grades may be considered where convincing objective evidence of significant engineering and longevity performance improvements is provided.
- 4 Alternative bolt-head configurations, nuts with alternative thicknesses, and oversized washers may be considered.
- 5 The use of stainless steel washers is intended to be restricted to fastener assemblies of electro-galvanically compatible metals including copper alloy but excluding carbon steel. Contact between electro-galvanically dissimilar metals (e.g. stainless and carbon steel) shall be prevented by the use of robust durable mechanical isolation barriers or membranes at all potential contact interfaces.
- 6 Copper alloy shall be dezincification resistant in accordance with AS 2345.
- 7 Minimum required concrete type and characteristic strength.
- 8 Minimum required concrete exposure classification (or characteristics and levels of liquid/gas concentrations to which concrete may be exposed without impaired performance for a nominated exposure life), for the purposes of design.
- 9 Applies only where cover locking is a specified performance requirement.
- 10 Safety gratings on person access openings in wastewater pumping station wet wells and valve pits are not integral components of RC top slab and cover assemblies and are, typically, supplied and installed by others.

2.2 Corrosion Protection Measures

Metallic cover assembly surfaces shall be designed to prevent the accumulation of grit, debris and moisture and shall, wherever exposed to wastewater gas and moisture, be configured to minimise liquid pooling and moisture accumulations.

NOTE: The preferred method of metallic cover assembly corrosion protection is by the application of a durable non-corrodible coating or material with demonstrated long term resistance to highly corrosive environments.

2.3 Polymeric Material Compliance

Objective evidence shall be provided to demonstrate the conformity of polymeric materials with structural loading requirements, requirements for fatigue resistance to cyclic loading - expressed in terms of the rated number of vehicular loading cycles over the nominated product life, as well as UV and environmental degradation resistance requirements.

NOTE: Application of the current (low order) cyclic loading and UV exposure tests in AS 3996 would only provide assurance of short term cyclic fatigue and UV resistance in WA conditions. A fatigue resistance of at least 5,000,000 vehicular traffic events should be demonstrated for typical Class D (metropolitan vehicular traffic) loading applications and an adequate long term (> 50 year) resistance to UV exposure in WA should be clearly demonstrated, for consideration of polymeric cover acceptance by the Corporation.

2.4 Load Design Requirements

Cover assemblies shall, for exposure to vehicular loads (heavy duty), be designed in accordance with:

- Load class D as defined in AS 3996 – i.e. the ultimate limit state design load rating shall be at least 240 kN - in alignment with AS 5100.2 vehicular (W80 or 80 kN wheel) loading requirements; or
- Load class C 250 (250 kN ultimate limit state design load) as defined in EN 124.

Otherwise, cover assemblies shall be designed in accordance with:

- Load class C (150 kN ultimate limit state design load) as defined in AS 3996 where the risk of exposure to vehicular traffic is limited or controlled to light slow-moving traffic, as defined by and agreed with the Corporation, following a project specific analysis of loading needs and risk.
- Load class B (80 kN ultimate limit state design load), as defined in AS 3996 where there is no risk of exposure to vehicular traffic, as defined by and agreed with the Corporation, following a project specific analysis of loading needs and risk.

Any discrete part-cover component, that needs to be lifted to gain routine operational access to the chamber below the cover, shall not exceed 200 kg in mechanically unsupported weight.

NOTE: The static and dynamic load effects imposed on access covers in a particular application should be assessed by a suitably qualified design engineer, prior to the nomination of a cover load class selection in accordance with the appropriate Design Standard.

2.5 Cover Assembly Structure

Cover assemblies shall be designed to provide a minimum clear person access opening (CO) size as defined in Table 1.1. A typical assembly structure shall comprise a cover and frame assembly incorporated into a reinforced concrete (RC) surround - access chambers and pipeline conveyance valve pits in accordance with SPS 700 - or top slab - wastewater pumping stations and associated valve pits in accordance with SPS 702 (pre-cast) and the standard drawings for in-situ RC structures. The Standard Drawings listed in Appendix A illustrate typical arrangements for cover and RC surrounds and top slabs.

2.5.1 Cover Insertion Depth

Cover and frame design shall assure a cover insertion depth and fit in a mating frame that:

- Complies with cover deflection and permanent set requirements;
- Minimises the capacity or tendency of cover flexure and ‘bounce’ where exposed to frequent, repetitive heavy - particularly multi-wheeled - vehicular traffic;
- Complies with load bearing and lifting weight safety requirements;
- Does not compromise any performance characteristic requirement at cover locking positions, by virtue of strength or dimensional discontinuities.

2.5.2 Multi-part Cover Configuration for Test Purposes

Each part of a multi-part cover assembly shall be positioned relative to its support frame in accordance with the cover assembly manufacturer installation instructions with no cover-to-cover or cover-to-frame gap exceeding 3 mm. Multi-part cover testing for compliance with sustained load bearing, permanent set and deflection performance requirements (as specified in WSA 132 or EN 124, as applicable) shall be undertaken with a single (typical of all multi) cover part positioned in a test configuration where the cover spans its longest dimension and is unsupported on either of its long ‘sides’. There shall be **no** general presumption that the asset owner will provide any structural load bearing support across the access opening under any part of a multi-part cover opening span.

NOTE: Where an access chamber or pit design incorporates one or more intermediate loading support beams, the Corporation may consider acceptance of cover parts that have undergone testing with each part positioned in a shorter span test configuration, subject to engineering justification on a project by project basis.

2.6 Cover Deflection and Permanent Set

Cover deflection and permanent set requirements shall be in accordance with those given in Table 4.2 of AS 3996 except that the permissible deflection capability of Class D covers shall not exceed CO/100. Multi-part cover compliance with deflection and permanent set requirements shall be demonstrated by testing as described above.

NOTE: Higher allowable (maximum) cover deflection values may be considered only by specific agreement with the Corporation, on a project by project basis, for applications where a low or nil risk of exposure to moving vehicular traffic has been clearly demonstrated.

The maximum cover permanent set and deflection values shall apply to access cover and frame assemblies when subjected to the serviceability and ultimate limit state design loads nominated in AS 3996 Table 3.1 for load testing in accordance with AS 3996 Clause 4.2.

2.7 Cover Skid Resistance

The upper surfaces of access covers shall have a raised pattern in accordance with WSA 132. The raised pattern and finish for all cover load classes of shall be slip-resistant in accordance with the requirements shown in WSA 132 Table 4.1.

2.8 Cover Lifting, Sealing and Security

2.8.1 Lifting Force

The maximum force required to manually lift, open or close a cover shall not exceed 20 kg. The lift weight per cover panel shall not exceed 2000 N, in accordance with the safe lifting capacity of Corporation handling, lifting and transportation (e.g. Kervek/Hiab) equipment.

At least two lifting points shall be incorporated into each discrete cover part, duly positioned to facilitate the ready use of unseating tools and lifting equipment for cover opening. The safe load rating for each lifting point shall be marked in close proximity to the lifting point.

NOTE: It should be noted that the safe maximum allowable force for manual lifting is 300 N per lifting point (or 600N per cover part for a two person lift).

2.8.2 Cover Access and Fixing Security

Cover lifting 'keyhole' and mating (system owner) key design shall be configured to reasonably minimise the risk of routine accessibility by passers-by or vandals. Product design drawings shall detail keyhole configuration and their positions relative to all access cover edges

Where a specific application requires fixing in place of an access cover, fixing/fastening arrangements shall be designed and supplied as an integral part of the cover assembly. Fixing and fastening details, load performances and dimensional configuration shall also be nominated on the product design drawings.

Cover and frame design shall ensure that assembly fixing/fastening arrangements will mechanically secure the cover against the frame all round and, where water and gas tightness is required, will tightly seal the cover against the frame all round.

The length of fastener thread engagement in solid frame structural components shall not be less than nominal fastener diameters. Fasteners shall not protrude beyond frame undersides.

NOTE: Keyhole customization for optimal visitor and vandal 'proofing' may not be feasible using the arrangement shown in AS 3996 Figure 3.1.

2.8.3 Water and Gas Tightness

For acceptance, access cover/frame assemblies shall be gas and water tight in accordance with the watertightness and gas-tightness requirements of AS 3996. Assembly interface seal design shall incorporate mechanically robust and durable materials, fixings and a configuration whereby seal retention performance is assured for the required cover assembly operating life, notwithstanding the frequency of cover opening for routine periodic maintenance. The use of adhesives alone, without any mechanically reinforcement or fixings, to retain seals on a selected assembly surface shall not be permissible.

2.9 Freedom from Defects

The treatment and acceptability of small cover and frame assembly surface imperfections shall be in accordance with the requirements of WSA 132.

3 Marking and Packaging

3.1 Marking

The marking requirements of AS 3996 Clause 1.6 for an access cover shall apply and shall be supplemented with clear and permanent markings as follows:

- Substitution of the text “AS 3996” with that representing the primary product standard e.g. EN 124, WSA 132, WSA 133 or other (agreed) relevant standard, together with the particular load classification nominated in accordance with the primary product standard;
- The directional orientation of an AS 3996 defined Class D cover relative to traffic flow;

3.2 Packaging

Product shall be packaged with appropriate protection, which shall prevent damage or defects as a result of handling, storage or transportation. Packaging material shall have a minimum expected life in outside storage conditions of 12 months from the date of delivery.

3.3 Identification Marking

Where requested in a Purchasing Schedule, each supplied item shall be identified by prominently and durably denoting the identification markings on the outside of any protective packaging and, wherever requested in a Purchasing Schedule, each supplied item shall be identified in a conspicuous position with the following information:

- a. Material Master Record number (MMR);
- b. Contract number; or
- c. Purchase order number.

4 Transportation, Handling and Storage

4.1 General

Transportation, handling and storage facilities shall be designed to prevent Product damage or defects and to maintain Product free of deleterious matter. Lifting elements shall be designed and installed in accordance with lifting element designer/supplier requirements in conformity with the requirements of the appropriate regulatory authority.

Product shall not be dropped off elevated vehicle platforms or sites. Mechanical handling equipment shall be in accordance with AS 2550.1, AS 2550.3, AS 2550.5 and AS 2550.11 and shall be appropriate to the loads to be lifted. Manual handling shall be in accordance with the National Standard for Manual Handling and the National Code of Practice for Manual Handling, published by National Occupational Health and Safety Commission, Australia. Product restraint during transportation shall be in accordance with Load Restraint Guide—Guidelines for Safe Carriage of Loads on Road Vehicles, published jointly by the Federal Office of Road Safety and the National Road Transport Commission, Australia.

NOTE: Lifting elements in direct contact with Product should be corrosion-resistant and should be installed so that reinforcement corrosion is not induced. They should preferably be of a non-abrasive design e.g. elastomeric or fabric webbing straps. During transportation, Product restraints should be checked for tension at regular intervals of travel and should not be released until the transporting vehicle is resting in a secure stable disposition on level ground.

4.2 Preservation of Product in Storage

Product shall be stored in original Product packaging in accordance with the published requirements of the manufacturer, prior to installation. Sensitive component materials shall be protected from extended exposure to direct sunlight and high temperatures e.g. elastomeric components shall be stored in accordance with the general principles of and guidance in AS 1646. Designated Product storage areas shall be of sufficient size to accommodate Product deliveries and shall be flat, reasonably level and free of combustible vegetation, sharp stones or projections that could cause Product damage or defects.

5 Conformity with Requirements

5.1 General

Conformity with the requirements of this specification shall be demonstrated in accordance with the conformity testing requirements outlined in Clause 6 “Verification of Conformity with this Standard” of WSA 132 for ductile iron covers.

Product conformity shall be assessed in accordance with WSAA Technical Note WSA TN-08 which sets out the requirements for:

- Conformity of product testing facilities with the requirements of AS/NZS ISO/IEC 17025;
- Product certification system/scheme design in accordance with AS/NZS ISO/IEC 17067 and the scheme criteria in ISO/IEC TR 17026, aimed at ongoing verification of conformity for the duration of the certification period (previously known as ISO Type 5 product certification);
- The provision of assurance that the Conformity Assessment (or Certification) Body (CAB) has been accredited to meet the requirements of AS/NZS ISO/IEC 17065.

Product shall be deemed to conform with requirements where test outcomes have been formally verified by a Product Assessor or certified by a Conformity Assessment Body (CAB) in accordance with the requirements of a product standard acceptable to the Corporation. Otherwise, it shall be classified as non-compliant Product.

NOTE: For acceptance, performance testing and calibration laboratories should be accredited as meeting the requirements of AS/NZS ISO/IEC 17025 by a signatory member of the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA). The scope of laboratory/facility accreditation should include the competencies and capabilities required to execute the particular product testing and calibration work to be undertaken.

5.2 Certification of Product

Products, in respect of which conformity with a particular nominated product Standard(s) is claimed, shall, for acceptance, be assessed in accordance with an acceptable product certification system and shall be subject to the issue of a certificate of conformity with the nominated Standard(s) by a duly accredited CAB.

The certification system or scheme with which product conformity is claimed shall:

- be based on ISO/IEC TR 17026, Conformity assessment -- Example of a certification scheme for tangible products and shall be in accordance with the fundamentals of AS/NZS ISO/IEC 17067 and with the guiding principles of ISO/IEC Guide 28;
- include product type testing from independently sampled production;
- require the manufacturer’s production processes and associated controls to be part of a quality management system that has been certified as meeting the requirements of AS/NZS ISO 9001, Quality management systems - Requirements; and shall
- include subsequent verification that the manufacturer routinely continues to maintain effective production control and product conformity with the nominated product Standard(s), at intervals not exceeding 12 months.

NOTE: Evidence of Product conformity with the specified requirements may be by means of a Product Verification Report provided by a Product Assessor including reference to a current relevant water industry appraisal report or certificate issued by WSAA.

5.3 Product Re-verification

Product conformity with the Specification shall be subject to re-verification by a Product Assessor when, during the agreed Product supply period, there occurs any:

- substantive change in Product design, material formulation or performance
- Product failure to perform in operational service to the nominated performance specification.

Re-verification shall require the issue of a new or supplementary Product Verification Report. Product components and test outcomes that are not significantly affected by the Product change or failure may be excluded from the scope of re-verification where already been reported in a current valid Product Verification Report that is acceptable to the Corporation.

5.4 Acceptance Criteria

For acceptance, Product shall be supplied as specified in the Purchasing Schedule.

Prior to the implementation of any arrangement to supply Product, the Supplier shall, in accordance with specified requirements:

- nominate applicable Product Warranty terms; and
- provide documentary verification in the form of a current valid Certificate, an acceptable inspection and test plan (ITP) or Product Verification Report as appropriate to the Product; and
- detail each element of Product that does not comply with the specified requirements together with the extent of non-compliance.

NOTE : Where a project specification includes Technical Compliance Schedules, the nature and extent of all non-conformances should be provided in accordance with the appropriate Schedules.

5.5 Non-conforming Product

5.5.1 General

Product whose design, workmanship or performance fails to conform to the specified requirements shall be clearly tagged and quarantined by the Supplier as non-compliant and shall be subject to rejection for return to and replacement by the Supplier.

5.5.2 Manufacturing Repairs (In-process)

The Manufacturer shall make provision in its production Quality System and in its ITP for sufficient hold points whenever Product defects are encountered. Production work on non-compliant components shall cease and repair work shall not re-commence until the following details have been confirmed by the Corporation in writing that:

- repair of the non-compliant components in lieu of their replacement is acceptable; and
- proposed repair procedures are acceptable; and
- any proposal to vary the terms of the original Product Warranty as a consequence of the in-process repair is acceptable.

5.5.3 Product Warranty

The Supplier shall replace non-compliant Product with Product that conforms to the acceptance criteria or shall repair or rectify all faults, damage or losses caused by defective Product. Except as may otherwise be specified, the Product Warranty shall indemnify and keep indemnified the Corporation against all losses suffered by the Corporation as a result of non-compliant Product for a period no less than 24 months after Product delivery or 12 months after Product installation, whichever period elapses first.

5.5.4 Product Repair

All reasonable proposals for repair or remedy of defects will be considered, provided that each proposal is accompanied by a methodology statement that accords with the performance objectives of this Specification, as determined by the Corporation. For acceptance, a proposal for repair or remedy of Product defects shall not void or otherwise diminish the provisions of the Product Warranty.

5.5.5 Access to the Place of Manufacture

The Corporation shall be afforded access, at all reasonable times, to all places of manufacture of Product and shall be authorised to arrange or undertake such testing there as the Corporation deems appropriate to the agreed design proving or testing regime.

6 Appendix A: Reference Drawings (Informative)

The following drawing lists have been extracted from the standard and example drawing lists that are associated with the requirements of design standards DS50 and DS51 in order to illustrate configuration concepts for typical access covers in Corporation wastewater and drainage applications.

DS 50 - Design and Construction Requirements for Gravity Sewers DN 150 to DN 600	
DRAWING	TITLE
AA01-3-1	Example Note Sheet for Reticulation Plans (<i>Note 10 provides access cover selection guidance</i>)
AA01-27-1	Circular Precast Concrete Access Chambers for DN150 & DN225 Sewers up to 12m Deep Sht 1 of 3
AA01-34-1	Square Plastic Lined Concrete Access Chambers for DN300 & DN375 Sewers up to 12m Deep - Sheet 1 of 2
AA01-35-1	Square Plastic Lined Concrete Access Chambers for DN450 to DN600 Sewers up to 12m Deep – Sheet 1 of 2
AA01-51-1	Circular Plastic Lined Precast Concrete Access Chambers for DN300 & DN375 Sewers up to 12m Deep – General Arrangement
AA01-51-2	Circular Plastic Lined Precast Concrete Access Chambers for DN450 to DN600 Sewers up to 12m Deep – General Arrangement
AA01-55-1	Circular Precast Concrete Access Chambers - Micro Tunnelling for DN150 & DN225 PVC less than 12.0m Deep
AA01-76-1	Access Chamber Covers – Reinforced Concrete Surrounds to Cast Iron Covers and Frames
AA01-78-1	Maintenance Shafts for DN150 and DN225 Sewers
AA01-78-2	Cast Iron/Ductile Iron Covers for Maintenance Shafts

DS 51 - Design and Construction of Wastewater Pumping Stations & Pressure Mains (4 to 180 l/s capacity)	
DRAWING	TITLE
EMERGENCY STORAGE	
CA01-5-1	Emergency Storage Tank Details
CA01-5-3	Type 40 Pumping Stations And Smaller Emergency Overflow Details
CA01-5-4	Type 90 Pumping Stations - Emergency Overflow Details
CA01-5-5	Pumping Stations With Pump Rate Not Exceeding 14L/S, Emergency Overflow Details – Bubble Up Access Chamber Discharge
TYPE 6 PUMPING STATION	
CA01-8-1	General Arrangement And Details
TYPE 10 PUMPING STATION	
CA01-9-20	No Valve Pit - General Arrangement
CA01-9-21	No Valve Pit - General Arrangement – Decontactor
CA01-9-23-1	Precast Slab And Cover – Temporary Guardrail System
CA01-9-23-2	Precast Slab And Cover – Permanent Guardrail System
CA01-9-28	Control And Alarm Hole Covers
TYPE 10 PUMPING STATION (Prevention of Falls)	
CA01-9-29	Grating Arrangement And Notes
CA01-9-30	Grating Details
TYPE 40 PUMPING STATION (DN 150 pipework with valve pit)	
CA01-10-6-1	Precast Slabs And Covers – Temporary Guardrail System
CA01-10-6-3	Precast Slabs And Covers – Permanent Guardrail System
CA01-10-9	Valve, Control And Alarm Hole Covers
TYPE 40 PUMPING STATION (Prevention of Falls)	
CA01-10-14	Temp. And Perm. Guardrail System – Grating Arrangement And Notes
CA01-10-15	With Temp. or Perm. Guardrail System – Grating Details
TYPE 40 PUMPING STATION (DN 100 pipework without valve pit)	
CA01-10-22-1	Precast Slabs And Covers – Temporary Guardrail System
CA01-10-22-2	Precast Slabs And Covers – Permanent Guardrail System
TYPE 40 PUMPING STATION (with electrical decontactor, DN100 pipework and without valve pit)	
CA01-15-20	Electrical Decontactor Up To 22Kw - General Arrangement No. 1 – DN100 Pipework
CA01-15-21	Electrical Decontactor 22Kw To 37Kw - General Arrangement No. 2 – DN100 Pipework
TYPE 90 PUMPING STATIONS	
CA01-20-14	Control And Alarm Hole Covers
CA01-20-17	Inlet Access Chamber Details

TYPE 90 PUMPING STATIONS (Pump Well - Prevention of Falls)	
CA01-20-8-1	Pump Well – Top Slab With Temporary Guardrail System - Arrangement
CA01-20-8-3	Pump Well – Top Slab With Permanent Guardrail System - Arrangement
CA01-20-19-1	Grating Arrangement And Notes
CA01-20-19-2	Grating Details
TYPE 90 PUMPING STATIONS (Valve Pit – Prevention of Falls)	
CA01-20-7-2	Valve Pit – Circular – Precast Slab And Covers – Structural Details – Temporary Guardrail System
CA01-20-7-4	Valve Pit – Circular – Precast Slab And Covers – Structural Details – Permanent Guardrail System
CA01-20-23	Temp & Perm Guardrail System – Grating Arrangement & Notes
CA01-20-24	Temp Or Perm Guardrail System – Grating Details
PRESSURE MAINS (Air/Scour Valve and Flowmeter Pit Arrangements)	
CA01-52-2	DN300 Pressure Mains (other than PE) - Air Valve Arrangement and Details
CA01-52-3	DN375/400 Pressure Mains (other than PE) - Air Valve Arrangement and Details
CA01-52-5	DN315, 355, 450, 560 & 630 PE Pressure Mains - Air Valve Arrangement and Details
CA01-54-2	DN80 To DN300 Pressure Mains (other than PE) - Scour Valves - Deep Valve Pit (Depth to IL 2.3m and greater)
CA01-54-3	DN200 To DN300 Pressure Mains (other than PE) - Scour Valves - Shallow Valve Pit (Depth to IL less than 2.3m)
CA01-54-4	DN375/400 Pressure Mains (other than PE) - Scour Valves - Shallow Valve Pit (Depth to IL less than 2.3m)
CA01-54-5	DN375/400 Pressure Mains (other than PE) - Scour Valves - Deep Valve Pit (Depth to IL 2.3m and greater)
CA01-54-7	DN250 - DN630 PE Pressure Mains - Scour Valves - Deep Valve Pit (Depth to IL 2.3m and greater)
CA01-54-8	DN250 To DN630 PE Pressure Mains - Scour Valves - Shallow Valve Pit (Depth to IL less than 2.3m)
CA01-56-2	Type 90 Pumping Stations, Mobile Pump Connection And Air Release Point
CA01-57-1	Magnetic Flow Meter Installation – Shallow Arrangement
CA01-57-2	Magnetic Flow Meter Installation – Deep Arrangement
PRESSURE MAINS (Air and Scour Point Arrangements - No Pits)	
CA01-52-1	DN80 To DN250 Pressure Mains - Air Release Point Arrangement & Details
CA01-52-4	DN125, DN180 & DN250 PE Pressure Mains - Air Release Point Arrangement & Details
CA01-54-1	DN80 To DN150 Pressure Mains (other than PE) – Scour Points - Arrangement without Valve Pit (Depth to IL less than 4m)
CA01-54-6	DN125 & DN180 PE Pressure Mains - Scour Points - Arrangement without Valve Pit (Depth to IL less than 4m)
CA01-56-1	Type 10 And Type 40 Pumping Stations, Mobile Pump Connection And Air Release Point
REDUCED PRESSURE ZONE (RPZ) (Backflow Prevention Device)	
CA01-70-1	Arrangement And Installation Details – Fenced Site
CA01-70-1-2	Arrangement And Installation Details – Unfenced Site

7 Appendix B: Material Master Records (Informative)

The following Material Master Records comprise Corporation catalogue numbers that are unique to the particular products tabulated herein for the purposes of Corporation activities or work.

MMR	PURCHASE ORDER LONG TEXT (Top Assembly – 2 Part Concrete Infilled)
21238	Access Chamber; Top Assembly; Cover and Frame; Flush Fitting; Rectangular 2 Part Ductile Iron Cover (Concrete Infilled); 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 230mm (Minimum).
21237	Access Chamber; Top Assembly; Cover and Frame; Flush Fitting; Rectangular 2 Part Ductile Iron Cover (Concrete Infilled); 610mm x 980mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 230mm (Minimum); PVC Lined - Gas/Water Proof.
21235	Access Chamber; Top Assembly; Cover and Frame; Rectangular 2 Part Ductile Iron Cover (Concrete Infilled); 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 200mm. (Note: Surround Rebate 30mm Lower for Pavement Matching).
21236	Access Chamber; Top Assembly; Cover and Frame; Rectangular 2 Part Ductile Iron Cover (Concrete Infilled); 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 200mm; PVC Lined - Gas/Water Proof. (Note: Surround Rebate 30mm Lower for Pavement Matching).

MMR	PURCHASE ORDER LONG TEXT (Top Assembly – 2 Part Solid Top)
20220	Access Chamber; Top Assembly; Cast Iron Cover and Frame; Rectangular 2 Part Solid Top Cover with Flat Bottom; 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 230mm (Minimum); Bolted Down. Note: To be Manufactured in Accordance to Water Corporation Drawing AA01-76-1.
18086	Access Chamber; Top Assembly; Cast Iron Cover and Frame; Rectangular 2 Part Solid Top Cover with Flat Bottom; 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 230mm (Minimum). Note: To be Manufactured in Accordance to Water Corporation Drawing AA01-76-1.
20219	Access Chamber; Top Assembly; Cast Iron Cover and Frame; Rectangular 2 Part Solid Top Cover with Flat Bottom; 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 230mm (Minimum); PVC Lined - Gas/Water Proof; Bolted Down. Note: To be Manufactured in Accordance to Water Corporation Drawing AA01-76-1.
18225	Access Chamber; Top Assembly; Cast Iron Cover and Frame; Rectangular 2 Part Solid Top Cover with Flat Bottom; 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 230mm (Minimum); PVC Lined - Gas/Water Proof. Note: To be Manufactured in Accordance to Water Corporation Drawing AA01-76-1.

MMR	PURCHASE ORDER LONG TEXT (Top Assembly – 2 Part Solid Top)
20222	Access Chamber; Top Assembly; Cast Iron Cover and Frame; Rectangular 2 Part Solid Top Cover with Flat Bottom; 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 205mm; PVC Lined - Gas/Water Proof; Bolted Down. (Note: Surround Rebate 25mm Lower for Pavement Matching). Note: To be Manufactured in Accordance to Water Corporation Drawing AA01-76-1.
20221	Access Chamber; Top Assembly; Cast Iron Cover and Frame; Rectangular 2 Part Solid Top Cover with Flat Bottom; 610mm x 970mm Clear Opening; Heavy Duty (AS 3996 Class D); C/W Reinforced Concrete Surround 1430mm x 1070mm x 205mm; Bolted Down. (Note: Surround Rebate 25mm Lower for Pavement Matching). Note: To be Manufactured in Accordance to Water Corporation Drawing AA01-76-1.

END OF DOCUMENT