

TECHNICAL NOTE

TECHNICAL INFORMATION FROM THE CONCRETE PIPE ASSOCIATION OF AUSTRALASIA

Page 1

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UPDATE – SMALL BOX CULVERTS & AS 1597.1

The Australian Standard AS1597.1-2010 **“Precast reinforced concrete box culverts – small”** was revised in 2010 for the first time since 1974. The Concrete Pipe Association of Australasia worked alongside Australian Standards to assist with the ultimate release of an up to date specification to benefit the construction industry in Australia.

The revision of the Standard means that there are a number of significant changes and additions that will affect manufacturers, designers, specifiers and contractors. This Technical Note will outline the significant sections of the document that will impact industry and alert specifiers and contractors of changes related to manufactured product.

1. The previous version of AS1597.1 was released in 1974. The 2010 version standardises the following practices that currently take place and new requirements for the manufacture and design of small box culverts:

- It states that culverts manufactured in accordance with the Standard can expect to achieve a design life in excess of 100 years.
- The maximum height of fill for a culvert under a road is 2m and under a railway is 5m.
- Materials used for small box culvert manufacture are now referenced to the current material Standards.
- A table of truncated preferred internal dimensions for small box culverts is provided. CCAA manufacturers will be looking to align their production in line with the new Standard (see Table 2.5 from AS 1597.1 below).

TABLE 2.5

PREFERRED INTERNAL DIMENSIONS – CULVERT UNITS

Size class	Nominal span (mm)	Nominal height (mm)
300 × 225	300	225
450 × 300	450	300
600 × 300	600	300
600 × 450	600	450
900 × 300	900	300
900 × 600	900	600
1200 × 300	1200	300
1200 × 600	1200	600
1200 × 900	1200	900
1200 × 1200	1200	1200

NOTES:

1: The size class is designated as ‘the nominal span’ × ‘the nominal height’ in millimetres, for example ‘450 × 300’.

2: Other size culverts may be made to a specific order.

3: Actual size should be checked with manufacturers.



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- Ductility Class L reinforcement is specifically referenced as being suitable for use in box culverts when designed and tested in accordance with the Standard. Alternatively, when designed by calculation, Class L reinforcement must meet the requirements of the appropriate clauses in AS3600-2009.
- Performance test loads have increased and are based on AS5100 design loads. This includes:
 - Proving load (previously known as Proof Load) – 112 kN (was 90 kN)
 - Ultimate load – 202 kN (was 135kN)
- The sampling scheme for routine testing now includes alternative acceptance criteria based on numbers produced.
- The four culvert types currently manufactured in Australia, including link slabs, are now covered by the Standard.

2. The specification in the Standard for durability has been aligned with the concrete bridge Standard AS5100. The major changes include:

- Durability details have been updated to align with AS5100 and to reflect current design requirements. This includes:
 - Specification of durable concrete materials (e.g. aggregate durability, restriction on chemical content, use of blended cement).
 - With blended cements the Standard allows individual authorities to specify minimum percentages for supplementary cementitious materials.
 - Exposure classifications, concrete strength and cover to reinforcement. This includes:
 - B1 classification 40 MPa, 30mm cover 50 MPa, 25mm cover
 - B2 classification 40 MPa, 45mm cover 50 MPa, 35mm cover
 - C classification 50 MPa, 50mm cover
- Minimum curing requirements for various methods (e.g. time, maturity, concrete strength) have been updated to reflect current practice and requirements.
- Provisions for moist, membrane and accelerated curing have all been provided in the Standard.

3. The Standard now includes an installation section which details the requirements for:

- Excavation geometry, foundation preparation, placement of precast units, compaction, backfilling, and construction loads.

With the introduction of any new Standard a reasonable period of time is required to phase out previous manufacture and specification methods. However, CPAA members are well advanced in updating their quality processes and manufacturing requirements to comply with the new version of AS1597.1.

It is expected that specifiers and contractors throughout Australia will also amend current practice to comply with the latest requirements outlined in the Standard.

The latest version of **AS1597.1-2010 "Precast reinforced concrete box culverts – small"** is now available through SAI Global on www.saiglobal.com or through your organisation's direct link to Standards Australia.

