

SUPERSEDED

Technical Specification

**Transport and Main Roads Specifications
MRTS26 Manufacture of Fibre Reinforced Concrete
Drainage Pipes**

October 2012

SUPERSEDED

Copyright



<http://creativecommons.org/licenses/by/3.0/au/>

© State of Queensland (Department of Transport and Main Roads) 2014

Feedback: Please send your feedback regarding this document to: mr.techdocs@tmr.qld.gov.au

Contents

1	Introduction	1
2	Administration requirements.....	1
3	References.....	1
4	Quality system requirements	1
4.1	Hold Points, Witness Points and Milestones	1
5	Material	2
6	Design and manufacture.....	2
6.1	Design.....	2
6.1.1	<i>Design life.....</i>	<i>2</i>
6.1.2	<i>Durability and exposure conditions</i>	<i>2</i>
6.1.3	<i>Design loads.....</i>	<i>2</i>
6.1.4	<i>Strength requirements.....</i>	<i>3</i>
6.2	Manufacture.....	3
7	Supply	4
7.1	General	4
7.2	Prior to delivery of pipes to the site.....	4
7.3	With the delivery of each batch of pipes.....	4
8	Inspection and delivery.....	4
9	Product marking	4
10	Installation	4

1 Introduction

This Technical Specification applies to the manufacture of fibre reinforced concrete drainage pipes used for the conveyance of stormwater which does not place the pipe under internal pressure.

This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements* and other Technical Specifications as appropriate.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Administration requirements

Fibre reinforced concrete drainage pipes shall be manufactured only by a manufacturer that is registered by Transport and Main Roads.

The requirements for registration are outlined in the document SMP – PC01. For a copy of this document and information regarding registered manufacturers refer to:

Queensland Department of Transport and Main Roads (DTMR)
Bridge Construction, Maintenance, and Asset Management (BCMAM)
GPO Box 1412
Brisbane Qld 4001

3 References

Table 3 lists documents referenced in this Technical Specification.

Table 3 – Referenced documents

Reference	Title
AS/NZS 3725:2007	Design for Installation of Buried Concrete Pipes
AS 4139:2003	Fibre Reinforced Concrete Pipes and Fittings
AS 5100:2004	Bridge Design
SMP-PC01	Procedures Manual: Registration of Approved Suppliers of Precast Concrete Products

4 Quality system requirements

4.1 Hold Points, Witness Points and Milestones

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications*.

The Hold Points, Witness Points and Milestones applicable to this Specification are summarised in Table 4.1.

Table 4.1 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
Clause 6.2 (c)		Load testing of pipes	
Clause 6.2 (d)		Dimensional checking of pipes	

Clause	Hold Point	Witness Point	Milestone
Clause 7.2	1. Delivery of pipes to site		Supply of information
Clause 8		Inspection of manufactured pipes	

5 Material

Material used in the manufacture of fibre reinforced concrete drainage pipes shall comply with AS 4139. In addition cement, supplementary cementitious materials, and aggregates shall comply with MRTS70 and be supplied in accordance with MRTS70.

6 Design and manufacture

6.1 Design

6.1.1 Design life

The design life of fibre reinforced concrete drainage pipes shall be 100 years. The design life means that 95% of the production shall remain in a serviceable condition with negligible maintenance for 100 years.

6.1.2 Durability and exposure conditions

Pipes supplied and manufactured in accordance with this Specification shall be suitable for Exposure Class B2 and C environments in accordance with AS 5100.5. For potential and or acid sulphate soil environments (PASS/ASS) exposure classifications shall be as defined in Table 6.1.2. Fibre reinforced concrete pipes manufactured in accordance with this Specification will require no additional protection for exposure classifications B2 and C with pipes to be installed in Exposure Class C1 and C2 environments requiring full protection or isolation from the environment as specified by the designer or pipe supplier, and as approved by DTMR BCMAM.

Table 6.1.2 – Concrete exposure classifications for FRC pipes in (PASS / ASS)

SO ⁴ in groundwater (mg/l or ppm)	Acidity (pH)			
	< 3.5	≥ 3.5 to < 4.5	≥ 4.5 to < 5.5	≥ 5.5
< 1500	C2	C1	C	B2
≥ 1500 to < 3000	C2	C1	C	B2
≥ 3000 to < 6000	C2	C2	C	B2
≥ 6000	C2	C2	C2	C

6.1.3 Design loads

The design loads for fibre reinforced concrete drainage pipes shall be based on AS 3725 amended as follows:

- a) Clause 6.5.2 of AS 3725 shall be deleted and replaced by:
 - loads shall be calculated in accordance with the methods in AS 5100
 - design loads for pipes are W80, A160, SM1600 and HLP400, and
 - distribution of live loads shall be in accordance with AS 5100

- b) figures 10 to 12 of AS 3725 are deleted, and
- c) live load pressures shall be as detailed in Table 6.1.3.

Table 6.1.3 – Live load pressure for AS 5100 Highway Loads

Depth (m)	Wheel Load Pressure (kPa)	Depth (m)	Wheel Load Pressure (kPa)
0.40	246	2.80	19
0.60	129	3.00	18
0.80	78	3.20	17
1.00	52	3.40	17
1.20	39	3.60	16
1.40	30	3.80	16
1.60	24	4.00	15
1.80	23	4.20	15
2.00	22	4.40	14
2.20	21	4.60	14
2.40	20	4.80	13
2.60	19	5.00	13

6.1.4 Strength requirements

All pipes manufactured in accordance with this Specification shall comply with the rigid pipe strength requirements of Clause 11.1(a) of AS 4139, with the load regression factor (R) determined in a manner consistent with the design life of 100 years as defined by Clause 6.1.1 of this Specification.

6.2 Manufacture

Fibre reinforced concrete drainage pipes shall be manufactured in accordance with AS 4139 with the following exceptions:

- a) long term design loads shall be as per Table 1 of AS 4139 for Load Classes 1 to 4. For higher load classes check availability and appropriateness with the manufacturer
- b) jointing between pipe lengths shall be flexible elastomeric double V ring joints as defined in Appendix M Figure (b) of AS 4139
- c) one pipe per 100 pipes or part thereof of each size and class shall be load tested in accordance with Clause 11.1 of AS 4139 **Witness Point**
- d) one pipe per 50 pipes or part thereof each size and class shall be tested for internal diameter, wall thickness, pipe length, squareness of ends, and straightness in accordance with the dimension and tolerance requirements of Clause 10 of AS 4139 **Witness Point**
- e) the design diameter as defined in AS 4139 shall not be less than 95% of the nominal diameter specified on the drawings for all classes of pipes
- f) testing for restrictions on chemical content as described in Section 6.1.7 of AS 4139 shall be at 6 monthly intervals, and
- g) the manufacturer's stated value for water absorption shall not exceed 25.

7 Supply

7.1 General

The Contractor shall provide to the Administrator the information specified in Clauses 7.2 and 7.3, obtained from the fibre reinforced concrete pipe manufacturer and included in the quality records, in accordance with the times specified.

7.2 Prior to delivery of pipes to the site

The following information shall be provided to the Administrator 3 weeks before any pipes are delivered to the site. **Milestone** No pipes shall be delivered to the site until written acceptance has been obtained from the administrator: **Hold Point 1**

- a) the type of fibre used in the pipe
- b) the test methods and values used to control the properties of the fibre
- c) drawings showing critical dimensions of the pipes and joints including wall thickness for different classes of pipe
- d) the methods of manufacture and testing
- e) the type of cement used
- f) the water absorption value
- g) the values of C and R, as defined by AS 4139 and amended loads, with test data (not more than two years old and for the current material formulation) establishing these values and the results of any screening evaluation performed, and
- h) a sampling and acceptance plan demonstrating compliance with AS 4139.

7.3 With the delivery of each batch of pipes

With each batch of pipes delivered to the site the Contractor shall provide a conformance report, issued by the fibre reinforced concrete pipe manufacturer, confirming that the pipes supplied comply with the requirements of AS 4139 and this Standard along with copies of test results as described in Clause 6.2(c) and (d) for the pipes supplied.

8 Inspection and delivery

Fibre reinforced concrete pipes shall remain available for inspection either at the place of manufacture, or on site before installation, for a minimum of seven days after notification to the Administrator. **Witness Point**

9 Product marking

In addition to the requirements in AS 4139, all pipes manufactured in accordance with this Specification will be marked "MRTS26 (10/12)" or other agreed identification acceptable to Transport and Main Roads, Bridge Construction, Maintenance and Asset Management.

10 Installation

Pipes shall be installed as specified in MRTS03 *Drainage, Retaining Structures and Protective Treatments*. Pipes shall not be installed until all test results as described in Clause 6.2(c) and (d) have

been provided and are conforming for the batch of pipes manufactured. The maximum angle of deflection of joints is two degrees.

SUPERSEDED

SUPERSEDED