WATER INDUSTRY TECHNICAL STANDARDS

MRWA Specification No: 07-01

Melbourne Retail Water Agencies
(Including City West Water, South East Water & Yarra Valley Water)

Coating of Steel Pipes and Fittings for Corrosion Protection
Coating of Steel Pipes and Fittings for Corrosion Protection

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Please note that MRWA Specification No 07-01 Version 1 or information contained within the Specification must only be used in conjunction with the Melbourne Retail Water Agencies Edition of the WSAA Water Supply Code of Australia WSA 03-2002 Second ed. Version 2.3, of the Water Services Association of Australia.

INFORMATION

For further information and to advise of possible errors, omissions and changes required for future revisions, please fill out a Document Improvement Request Form and submit to standards@citywestwater.com.au.

INTENDED AUDIENCE

This MRWA Specification is intended for Water Agency personnel, consultant engineers and contractors engaged in field repair and joint reinstatement of steel pipes, including Sintakote pipes and fabricated fittings.
## DOCUMENT CONTROL INFORMATION

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Coating For Steel Pipes And Fittings For Corrosion Protection MRWA 07-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document Issue</td>
<td>1</td>
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</table>

## DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Issue</th>
<th>Revision</th>
<th>Date Approved</th>
<th>Change</th>
<th>Reasons for change</th>
<th>Comments</th>
</tr>
</thead>
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<td>1</td>
<td>01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCOPE</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>STANDARDS</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>COATING SYSTEMS AND USES</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>SURFACE PREPARATION</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>PRIMING OF SURFACES</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>APPLICATION OF COATING SYSTEM</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>QUALITY ACCEPTANCE</td>
<td>14</td>
</tr>
</tbody>
</table>
1 SCOPE

This Specification details the materials and methods to be used for the coating of steel pipes and associated items including:

- welded joints and bends in steel (Sintakote) pipelines;
- steel fittings, such as bends, branches, manholes and insulating joints;
- repair of damaged fusion bonded polyethylene (Sintakote) coatings;
- all uncoated steel pipes

The Specification applies to fabrication, construction and maintenance of steel pipelines.

These coating systems are compatible with factory applied coatings, fusion-bonded polyethylene (ie Sintakote) and epoxy (ie Dulux Bildcote).

The particular coating system to be applied shall be nominated in the relevant Drawings and Specifications, or be as designated below.

2 STANDARDS

The following standards and specifications are referred to:

AS

1627.4-2005 Metal finishing - Preparation and pretreatment of surfaces - Abrasive blast cleaning of steel

1627.2-2002 Metal finishing - Preparation and pretreatment of surfaces - Power tool cleaning

MRWA Edition of WSAA Water Supply Code of Australia WSA 03-2002-2.3

WAT–1251-M External Corrosion Protection Coating

WAT–1251-M illustrates deemed-to-comply external corrosion protection methods for steel pipe and fittings.

WAT–1404 Typical Steel Fabrication – Access Opening

WAT–1404 shows a typical access MH for steel pipe. Requirements and locations should be shown on Design Drawings.
WAT-1408 Joint Corrosion Protection Cement Mortar Lined Steel Pipe. DN 300 TO DN 1200

WAT–1408 shows typical corrosion protection options for welded joints. Protective tape, mastic or coatings should comply with the Water Agency’s requirements or default Purchase Specification.

WSAA Purchase Specifications

WSA PS 320 Sleeving Polyethylene for Ductile Iron Pipes & Fittings

3 COATING SYSTEMS AND USES

The particular coating system to be applied will be nominated in the relevant Drawings and Specifications, or shall be as designated below.

Details of materials and application procedures are given in clause 4.

Materials and equipment detailed in this Specification are available from the Approved Suppliers nominated on the Water Agency’s Approved Products Catalogue.

The systems and their uses are detailed below.

3.1 Heat Shrink Sleeves

Heat shrink sleeves shall be used for the following:

i. field coating of externally welded pipe joints;
ii. field coating of perforation repairs (where practicable);
iii. field and factory coating of bends, branches and specials (where applicable); and
iv. repair of major damage to coatings.

For details of Heat Shrink Sleeve materials and application refer to clause 6.1.

3.2 Butyl Mastic Tape System

Butyl Mastic Tape System shall be used to coat fittings which, because of their complex shape or size cannot be easily coated with Heat Shrink Sleeves (eg, ferrules, electrical connections to pipes, domestic tappings and service insulating joints).

For details of Butyl Mastic Tape materials and application refer to clause 6.2.
3.3 Petrolatum Tape Wrapping System

Petrolatum Tape Wrapping System shall be used for the coating of flanged joints, expansion joints, gibault joints and valves.

For details of Petrolatum Wrapping Materials and Application refer to clause 6.3.

Tyco Water does not recommend petrolatum tape protection systems to be used for repair or field joint coating of Sintakote. This is primarily due to their very poor resistance to soil stresses.

3.4 Bitumen Tape System

Bitumen Tape Systems shall be used to coat field joints and repair pipe where the use of Heat Shrink Sleeves is not possible or practical for example where a naked flame cannot be used or where access to the pipe is limited or difficult.

For details of Bitumen Tape Material and Application refer to clause 6.4.

3.5 Pipeline Repair Patch

An approved pipeline repair patch shall be used for the repair of minor damage to Sintakote pipe where a fault is less than 20 mm in area and extends less than 25% of the pipe circumference.

For details of Material and Application refer to clause 6.5.

3.6 Ultra High Build Epoxy Repair Kit

Approved Ultra High Build Epoxy Repair Cartridges shall be used to repair damage to Cold Tar Epoxy Coatings. Ultra High Build Epoxy Repair Kit consists of a two part system supplied in a cartridge with gun. For ease of application the material is mixed as required and spread into the damaged area.

For details of Ultra High Build Epoxy Material and Application refer to clause 6.6.

4 SURFACE PREPARATION

Prior to the application of any protective coating system the steel surface and any adjacent coating shall be prepared as described below.

4.1 General

The surfaces to receive the protective coating shall be:

- all areas of exposed steel;
- all areas coated with a shop primer alone;
all areas of loose or unsound coating; and
a margin of 100 mm on top of sound coating surrounding section listed above.

4.2 Pipe Fittings and Specials

All sharp edges, burrs, slag, weld spatter and other sharp surface irregularities shall be removed.

Any loose or unsound coating shall be removed. The edges surrounding exposed steel shall be bevelled by rasping, scraping or grinding.

Exposed steel shall be prepared by solvent cleaning and wire brushing to Class Sa2 of AS 1627.2. Where this is impracticable or does not produce the specified standard, surfaces shall be prepared by power-tool cleaning to Class Sa2 of AS 1627.2. Power-tool cleaning is appropriate when a higher quality surface preparation grade is required and when blast cleaning is not required or practicable.

When power-tool cleaning does not produce the specified standard, surfaces shall be abrasive blast cleaned to Class Sa2 of AS 1627.4.

4.3 New Pipelines and Mains with Sound Coating

All sharp edges, burrs, slag, weld spatter and other sharp surface irregularities shall be removed.

Any loose or unsound coating shall be removed. The edges surrounding the exposed steel shall be bevelled by rasping, scraping or grinding.

In the case of Sintakote the surface shall be roughened by wire brushing. The edge of the Sintakote shall be bevelled by rasping, scraping or grinding. Any factory applied red primer shall be removed from the Sintakote surface.

All loose scale and foreign matter including dirt, oil, grease and water shall also be removed.

Exposed steel shall be prepared by solvent cleaning and wire brushing to Class Sa2 of AS 1627.2. Where this is impracticable or does not produce the specified standard, surfaces shall be prepared by power-tool cleaning to Class Sa2 of AS 1627.2. Power-tool cleaning is appropriate when a higher quality surface preparation grade is required and when blast cleaning is not required or practicable.

When power-tool cleaning does not produce the specified standard, surfaces shall be abrasive blast cleaned to Class Sa2 of AS 1627.4.
4.4 Existing Steel Pipes with Unsound Coating

Any loose or unsound coating shall be removed. The edges surrounding the exposed steel shall be bevelled by rasping, scraping or grinding.

All loose scale and foreign matter including dirt, oil, grease and water shall be removed.

Exposed steel shall be prepared by solvent cleaning and wire brushing to Class Sa2 of AS 1627.2. Where this is impracticable or does not produce the specified standard, surfaces shall be prepared by power-tool cleaning to Class Sa2 of AS 1627.2. Power-tool cleaning is appropriate when a higher quality surface preparation grade is required and when blast cleaning is not required or practicable.

When power-tool cleaning does not produce the specified standard, surfaces shall be abrasive blast cleaned to Class Sa2 of AS 1627.4.

4.5 Working on Enamel External Coated Steel Mains

Where the work involves the maintenance or removal of coal tar enamel that may contain asbestos or other toxic substances, such work shall only be undertaken by pre-qualified Applicators holding a PCC Class 5 Certificate.

Contractors undertaking works on these mains shall:

- Develop and submit a work method statement and job safety (risk) analysis for the specific works to the Water Agency at least 10 working days prior to the commencement of works.
- Possess a license to handle and remove asbestos.
- Carry out works in accordance with OH&S (Asbestos) Regulations.

5 PRIMING OF SURFACES

The appropriate primer when required shall be applied by brush or hand on to the entire prepared area, including bare and primed steel and the prepared margin over the adjacent pipe coating.

This shall be done immediately after preparation of the steel surface in accordance with clause 4.

Brushes or rollers containing butyl or primer shall be rinsed in the solvent recommended.

**Caution:** Some primers and solvents are flammable and must be removed from the work area before a gas torch is lit.

Where the primed surface has been contaminated with dust, the surface shall be cleaned and reprimed.
The appropriate coating system, as detailed in clause 6, shall be applied as soon as possible to the clear, primed surfaces ensuring manufacturer’s application procedures are followed.

### 6 APPLICATION OF COATING SYSTEM

#### 6.1 Heat Shrink Sleeves

##### 6.1.1 Materials

- Heat shrink sleeves. The approved heat shrink sleeves shall be wrap-around type. Wrap-around sleeves are available pre-cut to length from the manufacturer or in bulk roll form. A sleeve pre-cut to the correct length shall be used or a sleeve of correct length as specified by the sleeve manufacturer shall be cut from a roll. The sleeve shall be wide enough to extend for a minimum of 100 mm over sound coating on either side of the area to be coated (450 mm and 600 mm wide sleeves are available).

- Butyl Mastic Filler. The filler used to profile and fill voids shall be a butyl mastic tape as per 6.2.1.

- Closure Patches are pre-attached by the manufacturer to pre-cut sleeves. Where bulk roll material is used closure patches shall be compatible with the wrap-around heat shrink sleeve width of either 450 mm or 600 mm.

- Heating Torches. The heating torch shall be an approved gas burner assembly with a wide tipped nozzle or equivalent tip.

##### 6.1.2 Application

**Materials shall be applied in accordance with the manufacturer’s instructions and this Specification.**

Surface shall be prepared as per clause 4. Where welds or weld collar edges are not bevelled, a circumferential strip of butyl mastic shall be pressed into place around the weld to fill any void and profile the step.

The prepared pipe area shall be heated to approximately 65° C. Sleeves shall overlap a minimum of 100 mm on barrel coatings or adjoining sleeves, prior to shrinking.

##### 6.1.3 Spark Test

The coating system shall be free of faults when tested with a 5kV High Voltage spark tester. The coating shall be free from moisture prior to testing.
6.1.4 Repairs

Where a fault is less than 20 mm in area and extends less than 25% of the pipe circumference, the fault shall be patched with butyl mastic and a Repair Patch (clause 6.2). Larger faults shall be patched by applying a heat shrink sleeve (clause 6.1).

In all cases the covering patch shall extend in all directions for a minimum of 100 mm from the edge of the fault.

6.2 Butyl Mastic Tape System

6.2.1 Materials

The approved Butyl Mastic Tape System consists of Self-Amalgamating Butyl Mastic Tape in combination with Butyl Primer and PVC Over Wrap Tape. It is used as a complete system for wrapping irregular shaped steel or primer and mastic is used to fill voids and profile under Heat Shrink Sleeves and Bitumen Tape Systems.

6.2.2 Application

Materials shall be applied in accordance with the manufacturer’s instructions and this Specification.

Surface shall be prepared as per clause 4.

Primer shall be applied by brush over the entire surface to be coated ensuring no runs or sags are evident and allowed to tack dry.

Any voids, holes and weld areas shall be filled by moulding the mastic into them by hand and flaring off all high spots.

The Butyl Mastic Tape shall then be applied over the whole of the primed surfaces and the tape strips shall be overlapped by 55%. Wrapping should where possible begin and end at the 3 or 9 position facing downward.

Mastic surfaces shall be smoothed by hand and pressed down until each strip is firmly bonded to the substrate and the adjoining strip (ensure that air is not trapped under the mastic during application).

The PVC Over Wrap Tape shall then be applied over the Butyl Mastic Tape starting 25 mm from the edge of the Butyl Mastic Tape and shall be overlapped by 55%.

6.2.3 Spark Test

The coating system shall be free of faults when tested with a 5kV High Voltage spark tester. The coating shall be free from moisture prior to testing.
6.2.4 Repairs

Coating faults shall be patched as described in 6.2.2. The covering shall extend for a minimum of 100 mm in all directions from the edge of the fault.

6.3 Petrolatum Wrapping System

6.3.1 Materials

Materials are Petrolatum Primer, Petrolatum Mastic, Petrolatum Tape and PVC Over Wrap or approved equivalent.

6.3.2 Application

Materials shall be applied in accordance with the manufacturer’s instructions and this Specification.

Surface shall be prepared as per clause 4.

Primer shall be applied by hand or brush over the entire surface to be coated.

Any voids, holes or gaps shall be filled by moulding the mastic into them by hand. Bolt heads, nuts and other sharp edges shall be covered with mastic to provide a smooth profiled shape suitable for subsequent tape wrapping. Where a half face gasket is used between flanges, the gap shall be filled.

The Petrolatum Tape shall be spirally applied over the whole of the primed and mastic coated surfaces, with tape strips being overlapped by a minimum of 55%. Wrapping should always begin and end at the 3 or 9 position facing downward.

The PVC Over Wrap Tape shall be applied over the Petrolatum Tape starting 25 mm in front of the Petrolatum Tape again with a 55% overlap. Wrapping should always begin and end at the 3 or 9 position facing downward.

6.3.3 Spark Test

The coating system shall be free of faults when tested with a 5kV High Voltage spark tester. The coating shall be free from moisture prior to testing.

6.3.4 Repairs

Faults shall be patched with Petrolatum tape in accordance with clause 6.3.1. The covering patch shall extend for a minimum of 100 mm in all directions from the fault.

6.4 Bitumen Tape System

6.4.1 Materials

An approved Bitumen Tape System consists of Bitumen Tape, Bitumen Primer and Butyl Mastic. In some cases PVC Over Wrap Tape may also be utilised for neat appearance or extra mechanical protection.
6.4.2 Application

Materials shall be applied in accordance with the manufacturer’s instructions and this Specification.

Surface shall be prepared as per clause 4.

Primer shall be applied by brush to the entire surface to be coated ensuring no sags or runs and allowed to tack dry.

Any voids, holes or irregular shapes shall be filled and profiled by moulding the butyl mastic into them to provide a smooth profiled shape suitable for subsequent tape wrapping.

The Bitumen Tape shall be spirally applied over the whole of the primed and mastic coated surfaces, with tape strips being overlapped by a minimum of 55%. Wrapping should always begin and end at the 3 or 9 position facing downward.

Where required PVC Over Wrap Tape can be applied over the Bitumen Tape to provide a neat appearance or further mechanical protection. Wrapping should always begin and end at the 3 or 9 position facing downward.

6.4.3 Spark Test

The coating system shall be free of faults when tested with a 5kV High Voltage spark tester. The coating shall be free from moisture prior to testing.

6.4.4 Repairs

Faults shall be patched with Bitumen Tape System in accordance with clause 6.4.1. The covering patch shall extend for a minimum of 100 mm in all directions from the fault.

6.5 Pipeline Repair Patch

(For repairs of minor damage to Polyethylene Coating–Sintakote Pipe)

6.5.1 Materials

Approved Polyethylene Repair Patch Material is supplied in a Bulk roll. Patches are cut from this material to suit the individual repair. It is used with PCS Butyl Mastic and Butyl Primer as per clause 6.2. PVC Over Wrap Tape may also be utilised for neat appearance or extra mechanical protection.

6.5.2 Application

Materials shall be applied in accordance with the manufacturer’s instructions and this Specification.

Surface shall be prepared as per clause 4.

Primer shall be applied by brush to the entire surface to be coated ensuring no sags or runs and allowed to tack dry.
The Damaged area shall be filled and profiled to the height of the surrounding coating by moulding the butyl mastic into the void.

A Patch shall be cut to cover damaged area extending 100 mm in all directions beyond the damaged section onto the existing pipe coating.

The Area to be patched shall then be preheated ensuring no damage to the existing coating and the Patch shrunk on as per manufacturer’s instructions.

Where required, PVC Over Wrap Tape can be applied over the Pipeline Repair Patch. PVC Over Wrap Tape shall be wrapped circumferentially around the pipe to provide a neat appearance and increased sheer resistance. Wrapping should always begin and end at the 3 or 9 position facing downward.

6.6 **Ultra High Build Epoxy Repair Cartridge**
(For repairs of minor damage to Cold Tar Epoxy Pipe)

6.6.1 **Materials**

Ultra High Build Epoxy Repair Cartridge

The Cartridge is a two part cartridge requiring a dispensing gun.

6.6.2 **Application**

Materials shall be applied in accordance with the manufacturer’s instructions and this Specification.

Surface shall be prepared as per clause 4.

Material shall be dispensed in an amount required from the gun onto prepared pipe and thoroughly mixed for two minutes.

It shall then be used to fill and spread over damaged area ensuring it overlaps onto existing coating by 100 mm.

7 **QUALITY ACCEPTANCE**

For new pipeline construction, the final acceptance of the quality afforded by the pipe coating shall be as follows:

After burial of the main, the Cathodic Protection contractor shall undertake a Direct Current Voltage Gradient (DCVG) survey to establish the condition of the pipeline coating as constructed.

The coating defect is expressed as a %IR loss. The coating defect %IR is an electrical parameter related to the indicative magnitude of coating defect (holiday) on underground pipelines, which is related to the amount of current flowing to the coating defects.
The %IR severity is related to the size of the damage to the pipeline coating. For further information refer to draft AS 4827.1.

The DCVG survey shall record all defects with a 1% or greater IR loss.

The location of each defect shall be recorded by:

- Peg Number;
- %IR;
- Defect size;
- Chainage; and
- Distance from the nearest landmark or permanent feature.

A report indicating all faults located shall be provided to the CWW representative.
## DOCUMENT IMPROVEMENT REQUEST

**Coating of Steel Pipes and Fittings for Corrosion Protection**  
**MRWA Specification No 07-01**

### FROM:
- Name:
- Position/Title:
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### PROPOSED IMPROVEMENT

<table>
<thead>
<tr>
<th>Part</th>
<th>Clause</th>
<th>Page No</th>
<th>Proposed Improvement</th>
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<tr>
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Outcome of Review:

Comment/Decision:

Name and signature of approving authority: Date: