Assets Planning and Delivery Group
Engineering

Strategic Product Specification

SPS 100

Steel Pipe for Waterworks Purposes

VERSION 0
REVISION 9

AUGUST 2022

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 appropriate Clause of 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 Water Standards, , Advisory, Engineering, as appropriate to the application and to the particular enquiry. Future Specification changes, if any, will be issued to registered Specification users as and when published.

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.

It is the responsibility of the user to ensure they are using the current version of this document.

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REVISION STATUS

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

REVISION STATUS						
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2	0/7	24/06/15		Minor Technical Editorials	KR	DV
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8	0/7	24/06/15	All	Aligned with current Inventory	IP	DV
8	**0/9**	**1/8/22**		**Aligned with current Inventory Check before specifying special pipe types**	**JD**	**JD**
8	**0/9**	**9/8/22**		**Realigned with current MMR Listings, split Tables to specific pipe types**	**IP**	**JD**

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Strategic Product Specification

SPS 100

Steel Pipe for Waterworks Purposes

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1 Scope and General Requirements

1.1 Scope

1.1.1 General

This Specification sets out the requirements for manufacture, supply, handling and delivery of coated and lined steel pipe, hereinafter referred to as Product or the product. Steel pipe is primarily intended to convey drinking water but can be adapted to convey some grades of non-drinking water, seawater or brine by upgrading certain characteristics of pipe lining systems. Pipe and pipe jointing systems shall be suitable for the fabrication of a range of common pipeline fittings from short pipe segments.

1.1.2 Service Conditions

The pipe is intended to contain or convey water that generally complies with the Australian Drinking Water Guidelines (2011) in buried and above ground applications in Western Australia. Appendices A and B respectively set out additional pipe enhancements for seawater and brine conveyance applications. The coated and lined steel pipe shall be designed for a service life expectancy in excess of 100 calendar years when used for waterworks purposes and installed in accordance with the Manufacturers recommendations. The pipe is not intended for applications that involve gas, steam, oil, strong acids or any fluid having a temperature in excess of 55°C.

1.1.3 Warranty

All coated and lined steel pipe product supplied shall be supported by a Product Warranty as defined herein.

1.2 Referenced Standards

Due to the ever-changing status of referenced Standards, the year of publication of the respective Standards has been omitted. References to a Standard or to specific clauses of a Standard shall be taken to relate to the most recent issue of that Standard as confirmed by the Standard publisher and defined by the Corporation. This Specification makes reference to the following Standards:

API	
5L	API Specification 5L for line pipe (as referenced in AS 1579)
AS	
1281	Cement mortar lining of steel pipes and fittings
1579	Arc-welded steel pipes and fittings for water and waste-water
1646	Elastomeric seals for waterworks purposes
681.1	Material requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanized Rubber
3894.1	Site testing of protective coatings – Non-conductive coatings – Continuity testing – High voltage (‘brush’) method
3894.2	Site testing of protective coatings – Non-conductive coatings – Continuity testing – Wet sponge method
3894.3	Site testing of protective coatings – Determination of dry film thickness
4087	Metallic flanges for waterworks purposes
4321	Fusion-bonded medium-density polyethylene coating and lining for pipes and fittings
AS/NZS	
1365	Tolerances for flat-rolled steel products
1554	Structural steel welding

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1554.1	Welding of steel structures
1594	Hot-rolled steel flat products
2566.1	Buried flexible pipelines – Structural design
2566.1	Supplement 1 Buried flexible pipelines – Structural design – Commentary
2566.2	Buried flexible pipelines – Installation
3678	Structural steel – Hot-rolled plates, floorplates and slabs
4020	Products for use in contact with drinking water

AS/NZS/ISO

9001	Quality management systems – requirements

SAA

HB18.23	Guidelines for third-party certification and accreditation - Guide 23-Methods of indicating conformity with standards for third-party certification systems (ISO/IEC Guide 23)
HB18.28	Conformity assessment - Guidance on a model third-party certification system for products (ISO/IEC Guide 28)

1.3 Definitions and Notation

The following definitions are intended to clarify the terminology used in this Specification. The relevant definitions given in AS 1579, AS 1281, AS 4321, AS 1646 AS/NZS 4020 and API 5L shall also apply.

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 Certification Body in accordance with the third party product certification system described in HB 18.28, including associated Product licence schedules.

1.3.3 Certification Body

An independent (or third party) organisation duly accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) to operate Certification Schemes and more commonly known over recent years as a Conformity Assessment Body (CAB).

1.3.4 Certification Mark

A proprietary mark of product conformity issued in accordance with HB 18.23.

1.3.5 Certification Scheme

A third party product certification system operated in accordance with HB 18.28.

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.

1.3.6 Compliant Product

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

1.3.7 Corporation

The Water Corporation of Western Australia.

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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 engineering and operational performance requirements 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, including product design, is subjected to systematic engineering assessment to determine Product fitness for prescribed end uses and to evaluate conformity of its production systems with specified standards and requirements. Product Appraisal includes verification of the extent of compliance in accordance with the requirements of a relevant 'Technical Compliance Schedule'.

1.3.13 Product Assessor

An organization, 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 Certification Body to evaluate compliance of these systems with specified product standards and tests, in accordance with Certification Scheme rules.

1.3.15 Product Verification Report

A formal report wherein a Product Assessor evaluates the extent of Product compliance 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.

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1.3.16 Product Warranty

A formal express undertaking by a Supplier that indemnifies the Corporation against the consequences of supplied Product failure to comply 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 whereby manufactured products and equipment are evaluated and, where they comply with specified requirements, authorised for use in Corporation infrastructure and duly registered in the Strategic Products Register.

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.

1.4 Technical Definitions

1.4.1 Maximum Working Temperature

The maximum permissible temperature of Product in service whether caused by a fluid being contained in or conveyed by the product, by ambient conditions or by any combination thereof.

1.4.2 Coating

A corrosion-inhibiting medium applied to Product item surfaces that are intended for exposure to an external environment including buried soil.

1.4.3 Lining

A corrosion-inhibiting medium applied to Product item surfaces that are intended for exposure to an internal fluid conveyed by or retained in the product.

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1.4.4 Coating or Lining Defect

A detectable weakness or discontinuity in a coating or lining which renders suspect its ability to protect Product substrates from corrosion during expected Product service life.

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2 Manufacturing and Design

2.1 Pipe Structure

2.1.1 Material Properties

Steel pipe shall be manufactured in accordance with AS1579. Pipe of a specified nominal size shall have an outside diameter, wall steel thickness and minimum steel yield strength in accordance with Table 2.1. Pipe coating systems, lining systems and elastomeric seals shall be manufactured in accordance with the further requirements of this Specification.

TABLE 2.1 – Dimensional and Mechanical Properties

Nominal Size (DN)	Outside Diameter (mm)	Steel Thickness (mm)	Minimum Yield Strength (MYS) (MPa)
100	114	4.8 (See Note 1)	300
150	168	5	300
200	219	5	300
250	273	5	300
300	324	5	300
400	406	5	300
500	508	5	300
600	610	6	300
700	711	6	300
800	813	7	300
900	914	7	300
1000	1016	8	300
1200	1219	9	250
1400	1422	11	250
1400	1422	11	300 (See Note 2)

NOTES:

1) DN 100 steel pipe may be Grade B to API Specification 5L.

2) DN 1200 and DN 1400 pipe that is manufactured from steel plate having a MYS of 300 MPa should be marked with an indelible white stripe along the entire pipe length, in addition to standard pipe manufacturer markings, to differentiate it from Product made from steel plate with a standard MYS rating of 250 MPa.

3) The steel plate thicknesses in this Table do not apply to pipe offtakes fabricated from cut pipe lengths. Steel plate thickness for DN 100/150 pipe off-takes, for example, should not be less than 8.6/11 mm respectively.

4) Pipe wall steel may be of higher thickness values or yield strengths, subject to agreement between Corporation and Supplier.

5) Other sizes may be agreed between the Supplier and Corporation, eg DN1600

2.1.2 Dimensional Tolerances

The dimensional tolerances of steel plate for pipe shall comply with the requirements of AS/NZS 1365. Pipe dimensional tolerances shall be in accordance with the requirements of AS1579.

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2.2 Protection from Corrosion

2.2.1 General

Corrosion protection systems for the internal and external surfaces of the steel pipe shall be designed to sustain the performance of the coated and lined pipe at the nominated service levels for the specified conveyance applications, pipe end uses and design life, when exposed to the above ground and buried environments of Western Australia. Internal pipe surface corrosion protection systems shall be enhanced in accordance with Appendices A and B respectively for seawater and brine conveyance applications.

2.2.2 Internal Lining

The internal surfaces of the steel pipe shall be lined with cement mortar lining in accordance with AS 1281, unless otherwise specified. The lining surface shall have a uniform smooth finish that will yield a Colebrook White surface roughness coefficient k value not exceeding 0.15 mm in order to minimise hydraulic head losses in lined steel pipelines.

Wherever fusion-bonded medium-density polyethylene (MDPE) lining is specified, it shall be in accordance with AS4321.

NOTE: Alternative lining product of equal or superior performance, corrosion resistance and ease of field repair characteristics may be acceptable, subject to the provision of a favourable Product Verification Report by a Product Assessor.

2.2.3 Lining Seal Coat

Wherever required for specific applications, the internal surfaces of the cement mortar lining shall be sealed by means of a seal coat of an acceptable formulation and proven seal characteristics. The seal coat shall form a barrier between the lining and pipe contents for the purpose of preventing alkalinity loss from the cementitious lining material and consequent increase in water alkalinity. Pipe seal coat shall, for other than seawater and brine applications, be as recommended by the pipeline manufacturer, and of 100 micron minimum thickness and 200 micron maximum thickness duly applied in accordance with the seal coat manufacturer's recommendations.

The seal coat shall have a current AS4020 certification. A copy shall be supplied by the manufacturer to the Corporation with each order.

NOTE: Lining seal coat product should comply with recognised national or international product and test standards that are acceptable to the Corporation. Product acceptability should be subject to the provision of a favourable Product Verification Report by a Product Assessor.

2.2.4 External Coating

The external surfaces of the steel pipe shall be protected with a fusion-bonded medium-density polyethylene coating in accordance with AS 4321.

NOTE: Alternative coating product of equal or superior thickness, adhesion, durability, toughness, corrosion resistance and ease of field repair may be acceptable, subject to the provision of a favourable Product Verification Report by a Product Assessor.

2.3 Pipe Joints

2.3.1 General

Pipe joints shall be designed for flexible rubber ring (RRJ – also known as elastomeric seal), weld-restrained rubber ring (RRJ-WR), welded with plain ends (WJ-PE), welded with slip-in spherical (WJ-SSJ) or flanged joint configurations as may be specified in project documentation.

NOTE: Alternative jointing system designs (e.g. elastomeric seal joints with bonding studs for cathodic protection system bonding straps) may be required on specific projects. Where required, the additional design and performance characteristics of special jointing systems should be in accordance with the performance requirements of the relevant project specifications.

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2.3.2 Joint Angular Deflection

Each steel pipeline joint (other than RRJ_WR) shall be capable of sustained operation at the maximum allowable operating pressure (MAOP) that corresponds to 72% of the required minimum yield strength (MYS) given in Table 2.1, when subjected to the minimum joint angular deflections given in Table 2.2.

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TABLE 2.2 - Minimum Joint Angular Deflection

Nominal Diameter (DN)	Rubber Ring Joint (RRJ) (Degrees)	Field Fillet Welded Joint (Degrees)	Weld Restrained Rubber Ring Joint (RRJ-WR) (Degrees)
100		Butt weld joint only	
150		3	N/A
200		3	N/A
250		3	N/A
300	3	3	1.1
400	3	3	1.1
500	3	3	1.1
600	2.6	3	1.1
700	2.2	3	1.1
800	1.9	3	1.1
900	1.7	3	1.1
1000	1.5	3	1.1
1200	1.2	3	1.1
1400	1.0	2.8	1.1

2.4 Gaskets and Seals

Pipe elastomeric joint seals shall be EPDM or NBR, as appropriate to the infrastructure application, in accordance with AS 1646 - including the AS 681 (based on EN 681) group of elastomeric seal product standards referenced in AS 1646.

2.5 Protection of Drinking Water

Pipe structural material, lining and lining seal coatings shall comply with AS/NZS 4020 for an applied scaling factor of 1.0. Pipe elastomeric joint seals and lubricants shall comply with AS/NZS 4020 for an applied scaling factor of 0.01.

2.6 Product Markings

Product shall be marked in accordance with AS 1579 and AS 4321. The Corporation Material Master Record (MMR) number for each product item shall also be indelibly marked on each pipe end in compliance with the standard for product marking required by AS 1579. The date of manufacture of each coated and lined steel pipe shall be the “Date of coating” marked in accordance with AS 4321, except as may otherwise be expressly agreed between the Supplier and the Corporation.

2.7 Product Design Support

An appropriate Product design and technical support service shall be provided by the Manufacturer within Western Australia. This shall include the availability of recommended procedures and guidelines for coated and lined steel pipe handling, bedding, installation, backfill, repair, welding, disinfection and field pressure testing, all duly printed in the English language.

NOTE: Manufacturer support should include the provision or recommendation of a dedicated training module containing the key elements of coated and lined steel pipe installation requirements for delivery. The training module should be aligned with the relevant competency outcomes of the NTIS Unit of Competency—Construct/install drains, pipes and associated fittings and should result in formal accreditation of all personnel who are required to lay or install steel pipelines.

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3 Performance and Testing

3.1 Sampling and Testing

Product shall be sampled and tested in accordance with a minimum sampling and testing frequency plan in accordance with this Specification including conformity with the requirements of AS 1579, AS 1281, AS 4321, AS 1646, API 5L (where relevant) and AS/NZS 4020 except as may otherwise be agreed by the Corporation.

3.2 Access to Place of Manufacture and Storage

The Officer shall have access, at all reasonable times, to the places of manufacture and storage of Product or Product components for the purposes of inspection, quality audit and compliance testing of Product.

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4 Transportation, Handling and Storage

4.1 Protection from Damage

4.1.1 General

Product shall be transported, handled and stored so as to prevent damage by impact, rough handling, crushing, piercing by sharp objects, contact with aggressive chemicals or by extended exposure to high temperature sources. Product items shall not be lifted by hooking at ends or by dropping off elevated vehicle platforms or sites. Where wire ropes or chains are used, these shall not come into direct contact with Product.

Transportation, handling and storage facilities and arrangements shall be designed to:

- Comply with the relevant requirements of Section 2 of AS/NZS 2566.2; and
- Maintain pipe ovality within the tolerances permitted by AS 1579; and
- Maintain cement mortar lining in accordance with the requirements of AS 1579; and
- Maintain product free of deleterious matter of animal, vegetable or mineral origin.

4.1.2 Protection from Heat and Sun

Due allowance shall be made in all transportation, handling and storage arrangements for the shrinkage, deformation, thermal and creep characteristics of elastomeric, coating and lining components of Product. Elastomeric, coating and lining components shall be protected from damage arising from intermittent and sustained Product exposure to direct sunlight and high temperature hazards.

4.1.3 Lifting of Product

Mechanical equipment and slings intended for Product lifting shall be in accordance with AS 2550.1 and AS 2550.5 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.

4.1.4 Transportation and Load Restraint

All loading and unloading operations shall be carried out in a manner that ensures the stability of Product, of lifting equipment and of transporting vehicles. Product shall be secured for transport by straps, bolsters or other appropriate means 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.

Product load restraints shall be adequately secured to the transporter to prevent movement or displacement relative to the transporter or to other Product during transportation. Load restraint mechanisms shall be checked for tension at regular intervals not exceeding 300 kilometres of travel and shall not be released until the transporting vehicle is resting in a secure stable disposition on level ground. In the case of rail transport, cushioned pipe end protection of an acceptable design shall be provided to prevent damage from shunting shocks.

4.2 Product Storage

4.2.1 Pre-delivery Storage

Accumulated Product shall be stored in a dedicated and secure storage area in the Perth Metropolitan area, herein defined as the Main Pipe Storage Area, before transportation to nominated project delivery sites, except as may otherwise be specified.

4.2.2 Preservation of Joint Seals

Elastomeric joint seals shall be protected from extended exposure to direct sunlight, high temperatures or other damage in accordance with the recommendations of the Manufacturer.

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4.2.3 Storage Site Specifications

Pipe storage areas including the Main Pipe Storage Area shall be of sufficient size to accommodate deliveries of Product that accumulate prior to installation or use. Storage areas shall comply with the relevant requirements of Section 2 of AS/NZS 2566.2.

NOTE: Storage areas should be designed to dissipate build-up of high Product temperature by the provision of adequate ventilation, cooling and wetting facilities as appropriate. Protection of stored Product from damage may be by means of under-cover storage, by covering with a fine mesh shade material, by the application of a cooling or wetting medium or by any combination thereof. Protection systems should be arranged so as to provide an uniform degree of protection around and between stored Product items.

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5 Quality Assurance

5.1 Certification

5.1.1 Certification of Product

Compliance with this Specification shall be certified by means of an ISO Type 5 Product Certification Scheme i.e. a scheme that meets the criteria described in HB 18.28 (ISO/IEC Guide 28), conducted by a JAS-ANZ accredited Certification Body. Each Certificate shall expressly attest compliance of all Product items with the nominated Standards. Wherever specified, Certificates shall be submitted to the Officer nominated for this purpose. Product shall be marked in accordance with the requirements of the Certification Body.

NOTE: Compliance of Product including related accessories and services with nominated Standards and specified requirements may be verified by means of a Product Verification Report provided by a Product Assessor. The Product Verification Report should identify all relevant Certificates of Product compliance, duly issued in accordance with Certification Scheme rules.

5.1.2 Quality System

The processes for manufacture, testing, supply, transportation, handling, delivery and storage of Product to be supplied in accordance with this Specification shall form part of a documented Quality System. The System shall be certified by a Certification Body as complying with the requirements of AS/NZS ISO 9001 and shall provide for identification and traceability, control of production and delivery to the specified destination, customer verification and control of documents and records.

5.1.3 Product Re-verification

Product compliance 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, provided that these outcomes have already been reported in a current valid Product Verification Report that is acceptable to the Corporation.

Wherever the requirements of the Specification apply to a Product supply period in excess of three years, continuing acceptance of Product shall be subject to re-verification. The purpose of re-verification shall be to confirm the continuing compliance of Product quality and production control processes with the requirements of the Specification

5.2 Compliance and Acceptance

5.2.1 Means of Demonstrating Compliance

Compliance with this Specification shall be demonstrated by means of Product Appraisal and issue by a Product Assessor of a Product Verification Report that confirms compliance. Otherwise, Product shall be deemed non-compliant and ineligible for registration as Product authorized for use in Corporation infrastructure.

NOTE 1: Where a project includes design work including Product design, Product Appraisal may form part of the project design review process and the Product Assessor may be a member of the project design review team.

NOTE 2: A Product Verification Report should verify the extent of compliance with the Specification including all relevant 'Technical Compliance Schedule' Appendices and the currency of a Certificate where relevant to the Product.

5.2.2 Acceptance Criteria

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

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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 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 the Specification includes Technical Compliance Schedules, the nature and extent of all non-compliances should be recorded in the appropriate Schedules to be submitted for acceptance.

5.3 Non-compliant Product

5.3.1 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.

5.3.2 Manufacturing Repairs (In-process)

Welding, the use of fillers and other repairs shall not be permissible on Product which is in the course of production. Accordingly, details of any defect which the Manufacturer considers can be repaired; together with details of proposed repair procedures shall be submitted in writing for determination by the Corporation.

The Manufacturer shall make provision in its production Quality System and in the appropriate ITP's for sufficient hold points whenever significant defects occur. Production work on non-compliant components shall cease and repair work shall not commence until it has been confirmed by the Corporation in writing that:

(a) repair of the non-compliant components in lieu of their replacement is acceptable; and

(b) proposed repair procedures are acceptable; and

(c) any proposal to vary the terms of the original Product Warranty is acceptable.

5.3.3 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.

5.3.4 Product Repair

All reasonable proposals for repair or remedy of defects will be considered, provided that each such 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.

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6 Appendix A: Pipe Enhancement Specification for Seawater Applications

6.1 Application

This Appendix shall apply to MSCL pipe in sizes DN600 through DN1400 for seawater applications where seawater total dissolved solids < 35,000 mg/L.Non-metallic Materials

6.2 Cement Mortar Lining (CML)

The following requirements shall apply to cement mortar lining:

- "AV Syntec 600M" shall be applied to the pipe bore prior to CML application.
- Cement shall be type GP.
- CML thickness shall be 16 +/-4 mm and (not less than AS1281 thickness).
- At least seven days of factory curing shall be applied, with water added daily.
- Bitumen seal coat at least 100 μm thick shall be applied to the CML after CML water curing is completed.

6.3 Transport

End cap protection shall be maintained during storage, transport and installation.

6.4 Construction

The pipeline shall not be left unsealed for more than 4 hours. Water shall be applied to pipe internal lined surfaces as required on site to maintain a wetted internal pipe surface and mitigate shrinkage cracking.

CML in the vicinity of pipe joints shall be inspected after pipe joining and damaged CML shall be repaired in accordance with the manufacturer's repair specification. Internal joint repairs shall be carried out with Renderoc HB40, HB70 in accordance with the manufacturer's repair specification.

6.5 Hydrostatic Testing

The completed pipeline shall be hydrostatically tested with drinking water which shall be left in pipeline for at least two weeks after test completion.

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7 Appendix B: Pipe Enhancement Specification for Brine Applications

7.1 Application

This Appendix shall apply to MSCL pipe in sizes DN600 through DN1400 for brine applications where brine total dissolved solids < 70,000 mg/L.

7.2 Cement Mortar Lining (CML)

The following requirements shall apply to cement mortar lining:

- "AV Syntec 600M" shall be applied to the pipe bore prior to CML application.
- Cement type and thickness shall be capable of sustained exposure to brine that has total dissolved solids < 70,000 mg/L without any loss of lining performance over the warranted life of the pipeline.
- At least seven days of factory curing shall be applied, with water added daily.
- Bitumen seal coat at least 100 μm thick shall be applied to the CML after CML water curing is completed.

7.3 Transport

End cap protection shall be maintained during storage , transport and installation.

7.4 Construction

The pipeline shall not be left unsealed for more than 4 hours. Water shall be applied to pipe internal lined surfaces as required on site to maintain a wetted internal pipe surface and mitigate shrinkage cracking.

CML in the vicinity of pipe joints shall be inspected after pipe joining and damaged CML shall be repaired in accordance with the manufacturer's repair specification. Internal joint repairs shall be carried out with Renderoc HB70 in accordance with the manufacturer's repair specification.

7.5 Hydrostatic Testing

The completed pipeline shall be hydrostatically tested with drinking water which shall be left in pipeline for at least two weeks after test completion.

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8 Appendix C: Material Master Records (Informative)

The following Material Master Records (MMR) comprise Corporation catalogue numbers that are unique to the particular products described for the purposes of Corporation activities or work.

Notes

1. The MMR list is a snapshot at the time of SPS publication

2. For clarifications, contact Procurement & Property (Lead - Materials Management, Snr Adv - Materials Management or Snr Adv - Cataloguing).

3. Any pipe that is:

- plain end or
- uncoated or
- unlined or
- PE lined or
- DN1600 or
- Higher yield stress or extra wall thickness

is not frequently used and cannot be assumed to be available. Check before specifying.

MMR	Purchase Order Long Text	BUOM
	MDPE Coated Cement Mortar Lined SIJ	
18683	Pipe, Metallic; Mild Steel (Grade 300); DN150; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 9m Nominal Length.	LG
18684	Pipe, Metallic; Mild Steel (Grade 300); DN200; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 9m Nominal Length.	LG
19134	Pipe, Metallic; Mild Steel (Grade 300); DN250; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 9m Nominal Length.	LG
18997	Pipe, Metallic; Mild Steel (Grade 300); DN300; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 9m Nominal Length.	LG
18135	Pipe, Metallic; Mild Steel (Grade 300); DN400; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16723	Pipe, Metallic; Mild Steel (Grade 300); DN500; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16724	Pipe, Metallic; Mild Steel (Grade 300); DN600; 6mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16725	Pipe, Metallic; Mild Steel (Grade 300); DN700; 6mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16726	Pipe, Metallic; Mild Steel (Grade 300); DN800; 7mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16727	Pipe, Metallic; Mild Steel (Grade 300); DN900; 7mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16649	Pipe, Metallic; Mild Steel (Grade 300); DN1000; 8mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16645	Pipe, Metallic; Mild Steel (Grade 250); DN1200; 9mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
16728	Pipe, Metallic; Mild Steel (Grade 250); DN1400; 11mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG

MDPE Coated Cement Mortar Lined RRJ

18996	Pipe, Metallic; Mild Steel (Grade 300); DN300; 5mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 9m Nominal Length.	LG
16641	Pipe, Metallic; Mild Steel (Grade 300); DN400; 5mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
13868	Pipe, Metallic; Mild Steel (Grade 300); DN500; 5mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
14945	Pipe, Metallic; Mild Steel (Grade 300); DN600; 6mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
13867	Pipe, Metallic; Mild Steel (Grade 300); DN700; 6mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
18518	Pipe, Metallic; Mild Steel (Grade 300); DN800; 7mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
18980	Pipe, Metallic; Mild Steel (Grade 300); DN900; 7mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
18979	Pipe, Metallic; Mild Steel (Grade 300); DN1000; 8mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
19055	Pipe, Metallic; Mild Steel (Grade 250); DN1200; 9mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
19133	Pipe, Metallic; Mild Steel (Grade 250); DN1400; 11mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG

MDPE Coated Cement Mortar Lined RRJ-WR

22731	Pipe, Metallic; Mild Steel (Grade 300); DN300; 5mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 9m Nominal Length.	LG
22208	Pipe, Metallic; Mild Steel (Grade 300); DN400; 5mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
20607	Pipe, Metallic; Mild Steel (Grade 300); DN500; 5mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
20608	Pipe, Metallic; Mild Steel (Grade 300); DN600; 6mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
20609	Pipe, Metallic; Mild Steel (Grade 300); DN700; 6mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
20610	Pipe, Metallic; Mild Steel (Grade 300); DN800; 7mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length	LG
20611	Pipe, Metallic; Mild Steel (Grade 300); DN900; 7mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
20602	Pipe, Metallic; Mild Steel (Grade 300); DN1000; 8mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
20603	Pipe, Metallic; Mild Steel (Grade 250); DN1200; 9mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG
22457	Pipe, Metallic; Mild Steel (Grade 250); DN1400; 11mm Steel Wall Thickness; Rubber Ring Joint (RRJ); Welded Restraint (WR); MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG

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MDPE Coated Cement Mortar Lined Int Seal RRJ

19954	Pipe, Metallic; Mild Steel (Grade 300); DN700; 6mm Steel Wall Thickness; Rubber Ring Joint (RRJ): MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19956	Pipe, Metallic; Mild Steel (Grade 300); DN800; 7mm Steel Wall Thickness; Rubber Ring Joint (RRJ): MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19953	Pipe, Metallic; Mild Steel (Grade 300); DN900; 7mm Steel Wall Thickness; Rubber Ring Joint (RRJ): MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19959	Pipe, Metallic; Mild Steel (Grade 300); DN1000; 8mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19950	Pipe, Metallic; Mild Steel (Grade 250); DN1200; 9mm Steel Wall Thickness; Rubber Ring Joint (RRJ): MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19960	Pipe, Metallic; Mild Steel (Grade 250); DN1400; 11mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG

MDPE Coated Cement Mortar Lined Int Seal SIJ

19955	Pipe, Metallic; Mild Steel (Grade 300); DN700; 6mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19957	Pipe, Metallic; Mild Steel (Grade 300); DN800; 7mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19958	Pipe, Metallic; Mild Steel (Grade 300); DN900; 7mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19961	Pipe, Metallic; Mild Steel (Grade 300); DN1000; 8mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19951	Pipe, Metallic; Mild Steel (Grade 250); DN1200; 9mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG
19962	Pipe, Metallic; Mild Steel (Grade 250); DN1400; 11mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 12m Nominal Length.	LG

MDPE Coated Cement Mortar Lined HSS SIJ

20100	Pipe, Metallic; High Strength Steel (Grade 300); DN1400; 11mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG

MDPE Coated Cement Mortar Lined HSS RRJ

20099	Pipe, Metallic; High Strength Steel (Grade 300); DN1400; 11mm Steel Wall Thickness; Rubber Ring Joint; MDPE Coated; Cement Mortar Lined; 12m Nominal Length.	LG

MDPE Coated Cement Mortar Lined P/E

19068	Pipe, Metallic; Mild Steel (Grade 300); DN100; 5mm Steel Wall Thickness; Plain End; MDPE Coated; Cement Mortar Lined; 6m Nominal Length.	LG

MDPE Coated MDPE Lined RRJ

19152	Pipe, Metallic; Mild Steel (Grade 300); DN400; 5mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; MDPE Lined; 6m Nominal Length.	LG

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U/Coated Cement Mortar Lined P/E

19069	Pipe, Metallic; Mild Steel (Grade 300); DN100; 5mm Steel Wall Thickness; Plain End; Uncoated; Cement Mortar Lined; 6m Nominal Length.	LG
20771	Pipe, Metallic; Mild Steel (Grade 250); DN100; 8.56mm Steel Wall Thickness; Plain End; Uncoated; Cement Mortar Lined; 6m Nominal Length.	LG
20772	Pipe, Metallic; Mild Steel (Grade 250); DN150; 10.97mm Steel Wall Thickness; Plain End; Uncoated; Cement Mortar Lined; 6m Nominal Length.	LG
20773	Pipe, Metallic; Mild Steel (Grade 250); DN200; 12.7mm Steel Wall Thickness; Plain End; Uncoated; Cement Mortar Lined; 6m Nominal Length.	LG
20774	Pipe, Metallic; Mild Steel (Grade 250); DN250; 12.7mm Steel Wall Thickness; Plain End; Uncoated; Cement Mortar Lined; 6m Nominal Length.	LG
20775	Pipe, Metallic; Mild Steel (Grade 300); DN300; 12.7mm Steel Wall Thickness; Plain End; Uncoated; Cement Mortar Lined; 6m Nominal Length.	LG

U/Coated Cement Mortar Lined SIJ

18886	Pipe, Metallic; Mild Steel (Grade 300); DN150; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 9m Nominal Length.	LG
19918	Pipe, Metallic; Mild Steel (Grade 300); DN200; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 9m Nominal Length.	LG
19919	Pipe, Metallic; Mild Steel (Grade 300); DN250; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 9m Nominal Length.	LG
18156	Pipe, Metallic; Mild Steel (Grade 300); DN300; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 9m Nominal Length.	LG
18948	Pipe, Metallic; Mild Steel (Grade 300); DN400; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
18797	Pipe, Metallic; Mild Steel (Grade 300); DN500; 5mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
18708	Pipe, Metallic; Mild Steel (Grade 300); DN600; 6mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
19304	Pipe, Metallic; Mild Steel (Grade 300); DN700; 6mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
19305	Pipe, Metallic; Mild Steel (Grade 300); DN800; 7mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
18950	Pipe, Metallic; Mild Steel (Grade 300); DN900; 7mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
19306	Pipe, Metallic; Mild Steel (Grade 300); DN1000; 8mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
18805	Pipe, Metallic; Mild Steel (Grade 250); DN1200; 9mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG
19920	Pipe, Metallic; Mild Steel (Grade 250); DN1400; 11mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 12m Nominal Length.	LG

U/Coated U/Lined HSS SIJ

20184	Pipe, Metallic; High Strength Steel (Grade 300); DN1400; 11mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Unlined; 12m Nominal Length.	LG

Non-MMR's (For Future Reference Purposes Only)

N/A	Pipe, Metallic; Mild Steel (Grade 250); DN1600; 12.7mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined; 13m Nominal Length.	LG
N/A	Pipe, Metallic; Mild Steel (Grade 250); DN1600; 12.7mm Steel Wall Thickness; Rubber Ring Joint (RRJ); MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 13m Nominal Length.	LG
N/A	Pipe, Metallic; Mild Steel (Grade 250); DN1600; 12.7mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined; 13m Nominal Length.	LG
N/A	Pipe, Metallic; Mild Steel (Grade 250); DN1600; 12.7mm Steel Wall Thickness; Slip-In (Welded) Joint; MDPE Coated; Cement Mortar Lined with Internal Seal Coating; 13m Nominal Length.	LG
N/A	Pipe, Metallic; Mild Steel (Grade 250); DN1600; 12.7mm Steel Wall Thickness; Slip-In (Welded) Joint; Uncoated; Cement Mortar Lined; 13m Nominal Length.	LG

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