PRODUCT SPECIFICATIONS FOR PRODUCTS AND MATERIALS

Numerical Listing

WSA PS – 211	**Polyvinylchloride, Unplasticised (PVC-U) Pressure Pipes for Pressure Applications - Water Supply and Sewerage**
WSA PS – 212	**Ductile Iron Fittings (CIOD) for Plastics Pressure Pipe for Pressure and Non-Pressure Applications - Water Supply and Sewerage**
WSA PS – 213	**PVC Pressure Fittings, Moulded and Post-Formed for Pressure Applications - Water Supply and Sewerage**
WSA PS – 214	**Copper (Cu) Property Service Pipes for Pressure Applications – Water Supply**
WSA PS – 215	**Polyethylene (PE) Property Service Pipes for Pressure Applications – Water Supply**
WSA PS – 216	**Polyethylene (PE) Fabricated Fittings for Pressure Applications - Water Supply and Sewerage**
WSA PS – 217	**Acrylonitrile Butadiene Styrene (ABS) Pipes for Pressure Applications - Water Supply and Sewerage**
WSA PS – 230	**Polyvinylchloride, Unplasticised (PVC-U) Pipes and Fittings for Non-Pressure Applications – Sewerage and Drainage**
WSA PS – 231	**Vitrified Clay (VC) Pipes and Fittings for Non-Pressure Applications – Sewerage**
WSA PS – 232	**Obsolete (see WSA PS – 205S)**
WSA PS – 233	**Reinforced Concrete (RC) Plastics-Lined Pipes for Non-Pressure Applications – Sewerage**
WSA PS – 234	**Obsolete (see WSA PS – 200 or WSA PS – 202S)**
WSA PS – 235	**Couplings, Metal-Banded Flexible, for Non-Pressure Applications - Sewerage**
WSA PS – 236	**Variable Bend, Post-Formed PVC-U Fittings for Non-Pressure Applications – Sewerage**
WSA PS – 237	**Centrifugally Cast Glass Reinforced Plastics (CC-GRP) Pipes and Fittings (ISO Sized) for Pressure and Non-Pressure Applications – Water Supply**
WSA PS – 237S	**Centrifugally Cast Glass Reinforced Plastics (CC-GRP) Pipes and Fittings (ISO Sized) for Pressure and Non-Pressure Applications - Sewerage**
WSA PS – 238	**Acrylonitrile Butadiene Styrene (ABS) Pipes and Fittings for Non-Pressure Applications – Sewerage**
WSA PS – 239	**Obsolete (see WSA PS – 201 or WSA PS – 212)**
WSA PS – 240	**Polypropylene (PP), Ribbed Construction, Pipe and Fittings for Non-Pressure Applications – Sewerage**

WSA PS – 241	**Polyethylene (PE), Ribbed Construction, Pipes and Fittings for Non-Pressure Applications – Sewerage**
WSA PS – 242	**Polyethylene (PE), Plain Wall, Pipes and Fittings for Non-Pressure Applications - Sewerage**
WSA PS – 243	**Polyvinylchloride, Unplasticised (PVC-U) Fittings (EN 1401) for Non-Pressure Applications - Sewerage**
WSA PS – 244	**Ductile Iron Fittings (CIOD) with Restrained Flexible Joints for Ductile Iron Pipe in Pressure and Non-Pressure Applications – Water Supply and Sewerage**
WSA PS – 245	**Ductile Iron Fittings with Restrained Flexible Joints for Polyethylene Pipe of Nominal Sizes 90 to 710 in Pressure Applications – Water Supply and Sewerage**
WSA PS – 246	**Pre-Tapped Connectors for Pressure Applications – Water Supply**
WSA PS – 247	**Metallic Bodied Mechanical Compression Joint Fittings for Pressure Applications With Polyethylene (PE) Pipe – Water Supply and Sewerage**
WSA PS – 260	**Gate Valves, Resilient Seated for Pressure Applications – Water Supply and Sewerage**
WSA PS – 261	**Gate Valves, Metal Seated for Pressure Applications – Water Supply and Sewerage**
WSA PS – 262	**Extension Spindles for Gate Valves**
WSA PS – 263	**Butterfly Valves for Pressure Applications – Water Supply**
WSA PS – 264	**Non-Return (Reflux) Valves for Pressure Applications – Water Supply and Sewerage**
WSA PS – 265	**Air Valves for Pressure Applications - Water Supply**
WSA PS – 266	**Knife Gate Valves for Pressure Applications - Water Supply and Sewerage**
WSA PS – 267	**Hydrants (Spring) for Pressure Applications - Water Supply**
WSA PS – 268	**Automatic Control Valves for Pressure Applications – Water Supply**
WSA PS – 269	**Extension Spindles for Valves (Other than Gate Valves)**
WSA PS – 270	**Mechanical Couplings, Non-End Thrust Restraint for Pressure Applications – Water Supply and Sewerage**
WSA PS – 271	**Ductile Iron Wide Tolerance Mechanical Couplings and Flange Adapters With End Thrust Restraint for Pressure Applications – Water Supply and Sewerage**
WSA PS – 272	**Obsolete (see WSA PS – 244)**
WSA PS – 273	**Vacuum Interface Valves for Pressure Applications – Sewerage**

WSA PS – 274	Ball Valves for Pressure Applications – Water Supply
WSA PS – 275	Air Valves for Pressure Applications - Sewerage
WSA PS – 276	Obsolete (see WSA PS – 274)
WSA PS – 278	Gate Valves, Resilient Seated, with Integral Polyethylene (PE) Ends for Pressure Applications – Water Supply and Sewerage
WSA PS – 279	European Gate Valves, Resilient Seated for Pressure Applications – Water Supply
WSA PS – 280	Reflux Valves - Sewerage
WSA PS – 290	Ductile Iron Access Covers and Frames for Water Supply and Sewerage to WSA 132
WSA PS – 291	Ductile Iron Access Covers and Frames for Water Supply and Sewerage to EN 124-2
WSA PS – 292	Macro-Composite Access Covers and Frames for Water Supply and Sewerage to WSA 133
WSA PS – 293	Thermoplastic Access Covers and Frames for Water Supply and Sewerage
WSA PS – 294 – Under Review	Composite Access Covers and Frames for Water Supply and Sewerage
WSA PS – 310	Tapping Bands – Mechanical for Pressure Applications – Water Supply
WSA PS – 311	Obsolete (see WSA PS – 270)
WSA PS – 312	Flange Gaskets and O-Rings
WSA PS – 313	Repair and Off-Take Clamps for Pressure Applications – Water Supply
WSA PS – 314	Steps for Underground Man Entry Chambers – Water Supply and Sewerage
WSA PS – 315	Fixed Ladders for Man Entry Structures – Water Supply and Sewerage
WSA PS – 316	Obsolete (see WSA PS – 315)
WSA PS – 317	Obsolete (see WSA PS – 315)
WSA PS – 318	Marking Tape, Detectable
WSA PS – 319	Marking Tape, Non-Detectable
WSA PS – 320	Sleeving, Polyethylene (PE) for Ductile Iron Pipes and Fittings – Water Supply and Sewerage
WSA PS – 321	Terminal Maintenance Shafts (TMS) – Polyvinylchloride, Unplasticised (PVC-U) for Non-Pressure Applications – Sewerage

WSA PS – 322	Terminal Maintenance Shafts (TMS) – Polyethylene (PE) for Non-Pressure Applications – Sewerage
WSA PS – 323	Maintenance Holes (MH) – Pre-Cast Concrete for Non-Pressure Applications – Sewerage
WSA PS – 324	Casing Spacers
WSA PS – 325	Vent Shaft – Educt for Non-Pressure Applications - Sewerage
WSA PS – 326	Vent Shaft – Induct for Non-Pressure Applications - Sewerage
WSA PS – 327	Tapping Bands, Mechanical for Use with Polyethylene (PE) Mains for Pressure Applications – Water Supply
WSA PS – 328	Obsolete (see WSA PS – 315)
WSA PS – 329	Tapping Bands, Electrofusion for Use with Polyethylene (PE) Mains for Pressure Applications – Water Supply and Sewerage
WSA PS – 330	Obsolete (see WSA PS – 337 and WSA PS – 338)
WSA PS – 331	Maintenance Chambers (MC) - Pre-Cast Concrete for Non-Pressure Applications – Sewerage
WSA PS – 333	Pre-Cast Concrete Conical Bases for Concrete Maintenance Holes (MH) for Non-Pressure Applications – Sewerage
WSA PS – 334	Vitrified Clay (VC) Maintenance Holes (MH), Maintenance Chambers (MC) and Maintenance Shafts (MS) for Non-Pressure Applications – Sewerage
WSA PS – 335	Pipeline Cold-Applied Liquid Adhesives and Prefabricated Tapes
WSA PS – 336	Pipeline Heat-Shrinkable, Cross-Linked Polyolefin Coatings
WSA PS – 337	Maintenance Chambers (MC) – Polypropylene (PP) for Non-Pressure Applications – Sewerage
WSA PS – 338	Maintenance Chambers (MC) – Polyethylene (PE) for Non-Pressure Applications – Sewerage
WSA PS – 339 – Under review	Maintenance Holes (MH) – Polyethylene (PE) for Non-Pressure Applications – Sewerage
WSA PS – 340 – Under review	Maintenance Holes (MH) – Polypropylene (PP) for Non-Pressure Applications – Sewerage
WSA PS – 341	Terminal Maintenance Shafts (TMS) – Polypropylene (PP) for Non-Pressure Applications – Sewerage
WSA PS – 342 – Under review	Maintenance Holes (MH) – Glass Reinforced Plastics (GRP) for Non-Pressure Applications – Gravity Sewerage
WSA PS – 343	Tracer Wire, Detectable

WSA PS – 350	**Compaction Sand For Pipe Embedment**
WSA PS – 351	**Processed Aggregates for Pipe Embedment**
WSA PS – 352	**Controlled Low Strength Materials (CLSM) for Pipe Embedment**
WSA PS – 353	**Rock, Fine Crushed for Roadbase**
WSA PS – 354	**Rock, Coarse Crushed for Roadbase**
WSA PS – 355	**Geotextile Filter Fabric**
WSA PS – 356	**Piles**
WSA PS – 357	**Concrete, Pre-Mixed, Normal Class**
WSA PS – 358	**Concrete, Pre-Mixed, Special Class**
WSA PS – 359	**7mm Processed Aggregate for Pipe Embedment**
WSA PS – 360	**Embedment / Concrete Sand**
WSA PS – 361	**Embedment / 5 mm Minus Fine Crushed Rock**
WSA PS – 362	**Well Graded Crushed Rock for Pipe Embedment**
WSA PS – 363	**Trench Fill Materials**
WSA PS – 364	**Graded Recycled Materials for Pipe Embedment**
WSA PS – 365	**Recycled Materials for Trench Fill**
WSA PS – 366	**Graded and Single Sized Recycled Materials for Pipe Embedment**
WSA PS – 367	**Steel Reinforcing Materials for Concrete**
WSA PS – 368	**Recycled Glass Sand for Pipe Embedment**
WSA PS – 369	**Bottom Ash Sand for Pipe Embedment**
WSA PS – 400	**Submersible Electric Pumps for Sewage Pumping Stations**
WSA PS – 401	**Grinder Pumps and Related Components for Pressure Sewerage**
WSA PS – 402	**Collection Tanks for Pressure and Vacuum Sewerage**
WSA PS – 403	**ISO End Suction Centrifugal Pumps for Water Supply Booster Pumping Stations**
WSA PS – 404	**ISO End Suction Centrifugal Motor Pumps for Water Supply Booster Pumping Stations**

PRODUCT SPECIFICATIONS FOR PRODUCTS AND MATERIALS

Alphabetical Listing

CONCRETE

WSA PS – 357	**Concrete, Pre-Mixed, Normal Class**
WSA PS – 358	**Concrete, Pre-Mixed, Special Class**
WSA PS – 367	**Steel Reinforcing Materials for Concrete**

CORROSION PROTECTION

WSA PS – 335	**Pipeline Cold-Applied Liquid Adhesives and Prefabricated Tapes**
WSA PS – 336	**Pipeline Heat-Shrinkable, Cross-Linked Polyolefin Coatings**

COUPLINGS

WSA PS – 235	**Couplings, Metal-Banded Flexible, for Non-Pressure Applications - Sewerage**
WSA PS – 271	**Ductile Iron Wide Tolerance Mechanical Couplings and Flange Adapters, End Thrust Restraint, for Pressure Applications – Water Supply and Sewerage**
WSA PS – 270	**Mechanical Couplings, Non-End Thrust Restraint for Pressure Applications – Water Supply and Sewerage**

DUCTILE IRON PIPE AND FITTINGS

WSA PS – 200	**Ductile Iron Pipes (CIOD) for Pressure Applications - Water Supply and Sewerage**
WSA PS – 201	**Ductile Iron Fittings (CIOD) for Pressure and Non-Pressure Applications - Water Supply and Sewerage**
WSA PS – 202	**Ductile Iron Pipes and Fittings (ISO Sized) for Pressure Applications - Water Supply**
WSA PS – 202S	**Ductile Iron Pipes and Fittings (ISO Sized) for Pressure and Non-Pressure Applications - Sewerage**
WSA PS – 212	**Ductile Iron Fittings (CIOD) for Plastics Pressure Pipe for Pressure and Non-Pressure Applications – Water Supply and Sewerage**
WSA PS – 244	**Ductile Iron Fittings (CIOD) with Restrained Flexible Joints for Ductile Iron Pipe in Pressure and Non-Pressure Applications – Water Supply and Sewerage**
WSA PS – 245	**Ductile Iron Fittings with Restrained Flexible Joints for Polyethylene Pipe of Nominal Sizes 90 to 710 in Pressure Applications – Water Supply and Sewerage**
WSA PS – 320	**Sleeving, Polyethylene (PE) for Ductile Iron Pipes and Fittings – Water Supply and Sewerage**

EMBEDMENT MATERIALS

WSA PS – 369	**Bottom Ash Sand for Pipe Embedment**

WSA PS – 352	Controlled Low Strength Materials (CLSM) for Pipe Embedment
WSA PS – 350	Compaction Sand for Pipe Embedment
WSA PS – 360	Embedment / Concrete Sand
WSA PS – 361	Embedment / 5 mm Minus Fine Crushed Rock
WSA PS – 364	Graded Recycled Materials for Pipe Embedment
WSA PS – 366	Graded and Single Sized Recycled Materials for Pipe Embedment
WSA PS – 351	Processed Aggregates for Pipe Embedment
WSA PS – 368	Recycled Glass Sand for Pipe Embedment
WSA PS – 362	Well Graded Crushed Rock for Pipe Embedment
WSA PS – 359	7mm Processed Aggregate for Pipe Embedment

EXTENSION SPINDLES

WSA PS – 262	Extension Spindles for Gate Valves
WSA PS – 269	Extension Spindles for Valves (Other than Gate Valves)

FILAMENT WOUND GLASS REINFORCED PLASTICS (FW-GRP) PIPE AND FITTINGS

WSA PS – 205	Filament Wound Glass Reinforced Plastics (FW-GRP) Pipes and Fittings for Pressure Applications - Water Supply
WSA PS – 205S	Filament Wound Glass Reinforced Plastics (FW-GRP) Pipes and Fittings for Pressure and Non-Pressure Applications - Sewerage
WSA PS – 206J	Filament Wound Glass Reinforced Plastics (FW-GRP) Pipes for Pressure and Non-Pressure Applications – Water Supply and Sewerage – Installed using Trenchless Installation Methods

FLANGE GASKETS AND O-RINGS

WSA PS – 312	Flange Gaskets and O-Rings

GEOTEXTILE FILTER FABRIC

WSA PS – 355	Geotextile Filter Fabric

HYDRANTS

WSA PS – 267	Hydrants (Spring) for Pressure Applications - Water Supply

LADDERS

WSA PS – 315	Fixed Ladders for Man Entry Structures – Water Supply and Sewerage

MAINTENANCE CHAMBERS / HOLES / SHAFTS

WSA PS – 338	Maintenance Chambers (MC) – Polyethylene (PE) for Non-Pressure Applications – Sewerage
WSA PS – 337	Maintenance Chambers (MC) – Polypropylene (PP) for Non-Pressure Applications – Sewerage
WSA PS – 331	Maintenance Chambers (MC) – Pre-Cast Concrete for Non-Pressure Applications – Sewerage
WSA PS – 342 – Under review	Maintenance Holes (MH) - Glass Reinforced Plastics (GRP) for Non-Pressure Applications – Sewerage
WSA PS – 339 – Under review	Maintenance Holes (MH) – Polyethylene (PE) for Pressure Applications – Sewerage
WSA PS – 340 – Under review	Maintenance Holes (MH) – Polypropylene (PP) for Pressure Applications – Sewerage
WSA PS – 323	Maintenance Holes (MH) – Pre-Cast Concrete for Non-Pressure Applications – Sewerage
WSA PS – 333	Pre-Cast Concrete Conical Bases for Concrete Maintenance Holes (MH) for Non-Pressure Applications – Sewerage
WSA PS – 322	Terminal Maintenance Shafts (TMS) – Polyethylene (PE) for Non-Pressure Applications – Sewerage
WSA PS – 341	Terminal Maintenance Shafts (TMS) – Polypropylene (PP) for Non-Pressure Applications – Sewerage
WSA PS – 321	Terminal Maintenance Shafts (TMS) – Polyvinylchloride, Unplasticised (PVC-U) for Non-Pressure Applications – Sewerage
WSA PS – 334	Vitrified Clay (VC) Maintenance Holes (MH), Maintenance Chambers (MC) and Maintenance Shafts (MS) for Non-Pressure Applications – Sewerage

MARKING TAPE/TRACER WIRE

WSA PS – 318	Marking Tape, Detectable
WSA PS – 319	Marking Tape, Non-Detectable
WSA PS – 343	Tracer Wire, Detectable

PILES

WSA PS – 356	Piles

POLYETHYLENE (PE) PIPE AND FITTINGS

WSA PS – 208	Plastics Moulded Fittings for Pressure Applications with PE Pipe – Water Supply and Sewerage
WSA PS – 207	Polyethylene (PE) Pipes for Pressure Applications – Water Supply and Sewerage

WSA PS – 215	**Polyethylene (PE) Property Service Pipes for Pressure Applications – Water Supply**
WSA PS – 216	**Polyethylene (PE) Fabricated Fittings for Pressure Applications – Water Supply and Sewerage**
WSA PS – 242	**Polyethylene (PE), Plain Wall, Pipes and Fittings for Non-Pressure Applications – Sewerage**
WSA PS – 241	**Polyethylene (PE), Ribbed Construction, Pipes and Fittings for Non-Pressure Applications – Sewerage**
WSA PS – 247	**Metallic Bodied Mechanical Compression Joint Fittings for Pressure Applications with Polyethylene (PE) Pipe – Water Supply and Sewerage**

POLYPROPYLENE PIPE AND FITTINGS

WSA PS – 240	**Polypropylene (PP), Ribbed Construction, Pipes and Fittings for Non-Pressure Applications – Sewerage**

POLYVINYLCHLORIDE, MODIFIED (PVC-M) PIPE

WSA PS – 209	**Polyvinylchloride, Modified (PVC-M) Pressure Pipes for Pressure Applications – Water Supply and Sewerage**

POLYVINYLCHLORIDE, ORIENTED (PVC-O) PIPE

WSA PS – 210	**Polyvinylchloride, Oriented (PVC-O) Pressure Pipes for Pressure Applications – Water Supply and Sewerage**

POLYVINYLCHLORIDE, UNPLASTICISED (PVC-U) PIPE AND FITTINGS

WSA PS – 211	**Polyvinylchloride, Unplasticised (PVC-U) Pressure Pipes for Pressure Applications – Water Supply and Sewerage**
WSA PS – 243	**Polyvinylchloride, Unplasticised (PVC-U) Fittings (EN 1401) for Non-Pressure Applications – Sewerage**
WSA PS – 213	**PVC Pressure Fittings, Moulded and Post-Formed for Pressure Applications – Water Supply and Sewerage**
WSA PS – 230	**Polyvinylchloride, Unplasticised (PVC-U) Pipes and Fittings for Non-Pressure Applications – Sewerage and Drainage**
WSA PS – 236	**Variable Bend, Post-Formed PVC-U Fittings for Non-Pressure Applications – Sewerage**

PRE-TAPPED CONNECTORS

WSA PS – 246	**Pre-Tapped Connectors for Pressure Applications – Water Supply**

PROPERTY SERVICE PIPE

WSA PS – 214	**Copper (Cu) Property Service Pipes for Pressure Applications – Water Supply**
WSA PS – 215	**Polyethylene (PE) Property Service Pipes for Pressure**

	Applications – Water Supply
PUMPS	
WSA PS – 401	**Grinder Pumps and Related Components for Pressure Sewerage**
WSA PS – 403	**ISO End Suction Centrifugal Pumps for Water Supply Booster Pumping Stations**
WSA PS – 404	**ISO End Suction Centrifugal Motor Pumps for Water Supply Booster Pumping Stations**
WSA PS – 400	**Submersible Electric Pumps for Sewage Pumping Stations**
REINFORCED CONCRETE (RC) PIPE	
WSA PS – 233	**Reinforced Concrete (RC) Plastics-Lined Pipes for Non-Pressure Applications – Sewerage**
ROADBASE	
WSA PS – 354	**Rock, Coarse Crushed for Roadbase**
WSA PS – 353	**Rock, Fine Crushed for Roadbase**
SLEEVING	
WSA PS – 320	**Sleeving, Polyethylene(PE) for Ductile Iron Pipes and Fittings – Water Supply and Sewerage**
STEEL PIPES AND FITTINGS	
WSA PS – 203	**Steel Pipes for Pressure and Non-Pressure Applications – Water Supply and Sewerage**
WSA PS – 204	**Steel Fittings for Pressure and Non-Pressure Applications - Water Supply and Sewerage**
STEEL REINFORCING MATERIALS	
WSA PS – 367	**Steel Reinforcing Materials for Concrete**
STEPS / STEP IRONS	
WSA PS – 314	**Steps for Underground Man Entry Chambers – Water Supply and Sewerage**
TAPPING BANDS	
WSA PS – 329	**Tapping Bands – Electrofusion, for Use with Polyethylene (PE) Mains for Pressure Applications – Water Supply**
WSA PS – 327	**Tapping Bands – Mechanical, for Use with Polyethylene (PE) Mains for Pressure Applications – Water Supply**
WSA PS – 310	**Tapping Bands – Mechanical for Pressure Applications - Water Supply**
TRENCH FILL MATERIALS	
WSA PS – 365	**Recycled Materials for Trench Fill**

WSA PS – 363	**Trench Fill Materials**

VALVES

WSA PS – 275	**Air Valves for Pressure Applications – Sewerage**
WSA PS – 265	**Air Valves for Pressure Applications – Water Supply**
WSA PS – 268	**Automatic Control Valves for Pressure Applications – Water Supply**
WSA PS – 274	**Ball Valves for Pressure Applications – Water Supply**
WSA PS – 263	**Butterfly Valves for Pressure Applications – Water Supply**
WSA PS – 279	**European Gate Valves, Resilient Seated for Pressure Applications – Water Supply**
WSA PS – 262	**Extension Spindles for Gate Valves**
WSA PS – 269	**Extension Spindles for Valves (Other than Gate Valves)**
WSA PS – 261	**Gate Valves, Metal Seated for Pressure Applications – Water Supply and Sewerage**
WSA PS – 260	**Gate Valves, Resilient Seated for Pressure Applications – Water Supply and Sewerage**
WSA PS – 278	**Gate Valves, Resilient Seated with Integral Polyethylene (PE) Ends for Pressure Applications – Water Supply and Sewerage**
WSA PS – 266	**Knife Gate Valves for Pressure Applications – Water Supply and Sewerage**
WSA PS – 264	**Non-Return (Reflux) Valves for Pressure Applications – Water Supply and Sewerage**
WSA PS – 273	**Vacuum Interface Valves for Pressure Applications – Sewerage**
WSA PS – 280	**Reflux Valves – Sewerage**
WSA PS – 312	**Flange Gaskets and O-Rings**

VENT SHAFTS

WSA PS – 325	**Vent Shaft – Educt for Non-Pressure Applications – Sewerage**
WSA PS – 326	**Vent Shaft – Induct for Non-Pressure Applications – Sewerage**

VARIABLE BENDS

WSA PS – 236	**Variable Bend, Post-Formed PVC-U Fittings for Non-Pressure Applications – Sewerage**

VITRIFIED CLAY (VC) PIPE AND FITTINGS

WSA PS – 231	**Vitrified Clay (VC) Pipes and Fittings for Non-Pressure Applications – Sewerage**

OVERVIEW

Product Specifications (WSA PS – nnn) are default specifications for "standard" products used to construct infrastructure conforming to Water Services Association of Australia (WSAA) Codes:

WSA 02	Gravity Sewerage Code of Australia
WSA 03	Water Supply Code of Australia
WSA 04	Sewage Pumping Station Code of Australia
WSA 06	Vacuum Sewerage Code of Australia
WSA 07	Pressure Sewerage Code of Australia

The Specifications are generic and the format recognises that individual Water Agencies may want to add or vary "standard" requirements for particular products. It is anticipated that adopting agencies will independently publish changed or additional product specifications.

Project-specific variations to these Specifications or alternative specifications may be permitted by an Agency; these are not covered by this document.

The Specifications may:

(a) facilitate procurement of products;

(b) be referenced in a project specification;

(c) be included in product lists on project design drawings; and

(d) underpin the process for appraising products.

In some cases more than one specification is provided for a product to accommodate variations across Australia e.g. quarry products or recycled materials used for embedment and trench fill are not always available at all locations.

It is an individual Water Agency's responsibility to nominate Specifications most appropriate to its needs. It is a Designer's responsibility to nominate Specifications most appropriate to project at hand and to close out any Agency or project-specific requirements. An example of a prepared Product Specification is attached.

To facilitate this task, copies of Product Specifications are available in Word format upon written request to codes@wsaa.asn.au.

Quality Assurance

Each Product Specification nominates default quality assurance requirements for the product. At the time of placing an order, it is recommended that the purchaser (e.g. constructor) require the product supplier to declare that products delivered conform to the nominated Product Specification. The declaration should be additional to the default quality assurance requirement for the product.

Packaging, Transportation and Delivery

Product Specifications do not specify packaging, transportation and delivery requirements. It is deemed that the supplier is responsible for ensuring that products are not damaged in any way by packaging, transport and unloading at the purchaser's

nominated reception location. It is assumed that purchasers' procurement processes address this requirement.

Products Information and Guidance

Information regarding product attributes and functionality is available to Water Agencies, designers, constructors, manufacturers and suppliers on the WSAA website: https://www.wsaa.asn.au/Codes/Pages/Products-and-Material-Information-and-Guidance.aspx

DISCLAIMER

These Product Specifications are produced by the Water Services Association of Australia Limited ("WSAA") for use by members of WSAA and other parties. They are intended to provide general information in relation to the subject matter and include information obtained from a number of sources.

Over time, changes in industry standards and legislative requirements, as well as technical advances and other developments or factors relevant to the information contained in these specifications, may have affected the accuracy of that information. Accordingly, caution should be exercised in relation to the use of the information in these specifications.

Any views expressed do not represent the views or policy of WSAA, or any member of WSAA. No responsibility is accepted by WSAA, the editor, author, individual contributors or the suppliers of information, for the accuracy of any information contained in these specifications and/or or the consequences of any person relying upon any such information.

PRODUCT SPECIFICATION XXX

DUCTILE IRON PIPE FOR XYZ SEWERAGE PROJECT

1 GENERAL REQUIREMENTS

(a) Ductile iron spigot-socket and flanged pipes shall be PN 35 and flange class respectively complying with AS/NZS 2280:2014/Amdt 1:2015.

(b) Pipes shall be cement mortar lined using Type SR cement to AS/NZS 2280:2014/Amdt 1:2015.

(c) Pipes shall be externally coated with bituminous or synthetic resin coating to AS/NZS 2280:2014/Amdt 1:2015.

(d) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(e) Flange gaskets shall comply with WSA 109:2011.

2 QUALITY ASSURANCE

(a) Ductile iron pipes shall have product certification (ISO Type 5) to AS/NZS 2280:2014/Amdt 1:2015.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

3 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Packaging, transportation and delivery requirements	Include details as appropriate to project

PRODUCT SPECIFICATION

WSA PS - 200 DUCTILE IRON PIPES (CIOD) FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

200.1 SCOPE

This specification covers ductile iron pipes having “cast iron outside diameters” (CIOD) for pressure applications in water supply[1] and pressure sewerage.

Pipes without flanges may be used with pipelines up to and including PN 35. Pipes with flanges may be used up to the maximum pressure rating of the flange, generally PN 16.

200.2 REQUIREMENTS

(a) Ductile iron spigot-socket pipes shall comply with AS/NZS 2280:2014/Amdt 1:2015.

(b) For drinking water applications, all cement lined pipes ≤DN 300 are to be supplied with internal seal coat. For cement lined pipes >DN 300, a seal coat is required where residence times exceed 72 hours at any point following pipeline commissioning.

(c) Pipes shall be cement mortar lined[2] to AS/NZS 2280:2014/Amdt 1:2015.

(d) Pipes shall be externally coated with bituminous or synthetic resin coating to AS/NZS 2280:2014/Amdt 1:2015.

(e) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(f) Pipes, joint seals, flange gaskets[3] and jointing lubricant shall comply with AS/NZS 4020:2005.

(g) Where pipes do not comply with AS/NZS 4020:2005, they shall be marked with ‘NOT SUITABLE FOR DRINKING WATER’ in accordance with Clause 1.8.4 of AS/NZS 2280:2014/Amdt 1:2015.

(h) Spigot-socket pipe shall be Pressure Class PN 35 unless project specific approval is given by Hunter Water to use PN20 pipe.[4]

200.3 QUALITY ASSURANCE

(a) Ductile iron pipes shall have product certification (ISO Type 5) to AS/NZS 2280:2014/Amdt 1:2015.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(d) All products shall be marked in accordance with the conformity assessment body’s requirements.

200.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[4]	
Seal coating of the cement mortar lining	
Alternative type of cement for cement mortar lining[2]	

Specialised external coatings	
Restrained joint seals	
Alternative elastomeric material for joint seals	

NOTES:

1 Includes drinking water and recycled water supply.

2 For applications where the sewage being conveyed has a sulphate content >500 mg/L, Type SR cement should be used.

3 Flange gaskets and O-rings should be supplied to WSA PS–312.

4 PN 35 is the standard Pressure Class for many pressure applications. PN 20 may be a suitable alternative in some applications, but should only be used with Water Agency approval. Flange Class pipe may be required for structural purposes as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS – 201 DUCTILE IRON FITTINGS (CIOD) FOR PRESSURE AND NON-PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

201.1 SCOPE

This specification covers ductile iron fittings for use with ductile iron pipes[1] in pressure and non-pressure applications in water supply [2] and sewerage.

Fittings without flanges may be used with pipelines up to and including PN 35. Fittings with flanges may be used up to the maximum pressure rating of the flange, generally PN 16.

201.2 REQUIREMENTS

(a) Ductile iron fittings shall comply with AS/NZS 2280:2014/Amdt 1:2015.

(b) Fittings shall be coated and lined with fusion bonded polymer in accordance with AS/NZS 4158:2003/Amdt 1:2005.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Ductile iron fittings, joint seals and flange gaskets[3] and jointing lubricant shall comply with AS/NZS 4020:2005.

(e) Where fittings do not comply with AS/NZS 4020:2005, each fitting shall be marked with 'NOT SUITABLE FOR DRINKING WATER' in accordance with Clause 1.8.4 of AS/NZS 2280:2014/Amdt 1:2015.

(f) Fittings shall be lined and coated with fusion bonded polymer in accordance with AS/NZS 4158. Project specific approval must be obtained from Hunter Water to use alternative coating and lining eg. Cement mortar lining or bituminous coating to AS/NZS 2280:2014.

201.3 QUALITY ASSURANCE

(a) Ductile iron fittings shall have product certification (ISO Type 5) to AS/NZS 2280:2014/Amdt 1:2015.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(e) All products shall be marked in accordance with the conformity assessment body's requirements.

201.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Fitting types (configurations)[4]	
Fitting types (e.g. compact lightweight)[5]	
Restrained flexible joints	
Alternative elastomeric materials for joint seals	

201.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Restrained joint seals	
Alternative lining and coating	

NOTES:

1 See WSA PS–212 for ductile iron fittings for use with plastics pipes in water supply and sewerage.

2 Includes drinking water and recycled water supply.

3 Flange gaskets and O-rings should be supplied to WSA PS-312.

4 End configurations of fittings (e.g. socketed or spigoted or flanged) shall be as specified in the Project Specification or on the Design Drawings.

5 Some manufacturers can supply lightweight, thinner wall, shorter effective length fittings with extended socket depths that comply with this Specification.

PRODUCT SPECIFICATION

WSA PS - 202 DUCTILE IRON PIPES AND FITTINGS (ISO SIZED) FOR PRESSURE APPLICATIONS - WATER SUPPLY

202.1 SCOPE

This specification[1] covers ISO sized ductile iron pipes[2] and fittings for use in water supply[3].

202.2 REQUIREMENTS

(a) Ductile iron pipes and fittings shall comply with EN 545:2010.

(b) Pipes and fittings shall be externally coated with bitumen or synthetic resin coating in accordance with EN 545:2010.

(c) Pipes shall be cement mortar lined in accordance with EN 545:2010.

(d) Elastomeric joint seals shall be EPDM complying with EN 681-1:1996.

(e) Pipes, fittings, joint seals and gaskets[4] and jointing lubricant shall comply with AS/NZS 4020:2005.

(f) The use of ISO sized pipes and fittings shall only be permitted on a project specific basis by Hunter Water.

202.3 QUALITY ASSURANCE

(a) Ductile iron pipes and fittings shall have product certification (ISO Type 5) to EN 545:2010.

(b) For lined and / or coated pipes and fittings, the schedule of the certificate issued by the conformity assessment body shall include reference to the relevant coating/lining process.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to EN 681-1:1996.

(d) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(e) All products shall be marked in accordance with the conformity assessment body's requirements.

202.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
Fitting types (configurations)	
Restrained flexible joints	
Seal coating of the cement mortar lining	
Epoxy or other coatings to EN 545:2010	
Alternative elastomeric material for joint seals	

NOTES – see over

NOTES:

1 Use of this specification requires approval by the Water Agency.

2 Pipes manufactured to this specification are not directly compatible with fittings manufactured to AS/NZS 2280:2014. In some cases special adapter elastomeric seals may be used but their suitability would need to be tested to verify performance.

3 Includes drinking water and recycled water supply.

4 Flange gaskets and O-rings should be supplied to WSA PS–312.

PRODUCT SPECIFICATION

WSA PS - 202S DUCTILE IRON PIPES AND FITTINGS (ISO SIZED) FOR PRESSURE AND NON-PRESSURE APPLICATIONS - SEWERAGE

202S.1 SCOPE

This specification[1] covers ISO sized ductile iron pipes[2] and fittings for use in pressurised and non-pressurised pipes conveying sewage.

202S.2 REQUIREMENTS

(a) Ductile iron pipes and fittings shall comply with EN 598:2007+A1:2009.

(b) Pipes and fittings shall be externally coated with bitumen or synthetic resin coating in accordance with EN 598:2007+A1:2009.

(c) Pipes shall be cement mortar lined in accordance with EN 598:2007+A1:2009.

(d) Elastomeric joint seals shall be EPDM complying with EN 681-1:1996.

(e) The use of ISO sized pipes and fittings shall only be permitted on a project specific basis by Hunter Water.

202S.3 QUALITY ASSURANCE

(a) Ductile iron pipes and fittings shall have product certification (ISO Type 5) to EN 598:2007+A1:2009.

(b) For lined and/or coated pipes and fittings, the schedule of the certificate issued by the conformity assessment body shall include reference to the relevant coating/ lining process.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to EN 681-1:1996.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

202S.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
Fitting types (configurations)	
Alternative type of cement for cement mortar lining of pipes[3]	
Restrained flexible joints	
Epoxy or other coatings to EN 598:2007+A1:2009	
Alternative elastomeric material for joint seals	

NOTES:

1 Use of this specification requires approval by the Water Agency.

2 Pipes manufactured to this specification are not directly compatible with fittings manufactured to AS/NZS 2280:2014/Amdt 1:2015. In some cases special adapter elastomeric seals may be used but their suitability would need to be tested to verify performance.

3 For applications where the sewage being conveyed has a sulphate content >500 mg/L, Type SR cement should be used.

PRODUCT SPECIFICATION

WSA PS - 203 STEEL PIPES FOR PRESSURE AND NON-PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

203.1 SCOPE

This specification covers steel pipes for pressure and non-pressure applications in water supply[1] and sewerage. This specification does not cover field joint welding requirements[2].

203.2 REQUIREMENTS

(a) Steel pipes shall comply with AS 1579:2001 and be hydrostatically tested.

(b) Pipes, joint seals, flange gaskets and O-rings[3], and jointing lubricant shall comply with AS/NZS 4020:2005. Where pipes do not comply with AS/NZS 4020:2005, each pipe shall be marked with 'NOT SUITABLE FOR WATER SUPPLY' in accordance with Clause 1.4 of AS 1579:2001.

(c) For drinking water applications, all cement lined pipes ≤DN 300 are to be supplied with internal seal coat. For cement lined pipes >DN 300 a seal coat is required where residence times exceed 72 hours at any point following pipeline commissioning.

(d) Pipes shall be cement mortar lined in accordance with AS 1281:2001.

(e) For buried applications, pipes shall be externally coated with fusion bonded medium-density polyethylene complying with AS 4321:2001.

(f) Elastomeric ring joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

203.3 QUALITY ASSURANCE

(a) Steel pipes and fittings shall have product certification (ISO Type 5) to AS 1579:2001.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Flange gaskets and O-rings shall have certificates of compliance to WSA 109:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

203.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Rated pressure[4] (Pressure Class, PN)	
Outside diameter, mm	
Seal coating of cement mortar lining of pipes and fittings	
External protective coating for above ground installations	
Jointing requirements including end configurations and flange classes (16 to 35)[5]	

Cathodic protection bonding lugs (for elastomeric seal joints only)	
Alternative methods to hydrostatic testing e.g. non-destructive testing (NDT)	
Alternative internal linings	
Zinc metal spray on the internal surfaces of the socket end of slip-in welded joints ≤ DN 750 (≥ 150 µm ZMS onto a blasted surface with a seal coat)	
Alternative elastomeric material for joint seals	
Alternative external coatings for buried applications	

NOTES:

1 Includes source water, drinking water and recycled water supply.

2 Refer to WTIA Technical Note No. 25 Welding Specification for the Water Industry.

3 Flange gaskets and O-rings should be supplied to WSA PS–312.

4 Rated pressure shall be calculated by the pipe designer in accordance with Clause 2.1 of AS 1579:2001.

5 Jointing requirements and flange classes shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS - 204 STEEL FITTINGS FOR PRESSURE AND NON-PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

204.1 SCOPE

This specification covers steel fittings for pressure and non-pressure applications in water supply[1] and sewerage. This specification does not cover field joint welding requirements[2].

204.2 REQUIREMENTS

(a) Steel fittings shall comply with AS 1579:2001 and may be manufactured from non-hydrostatically tested pipe (See Clause 2.2 of AS 1579:2001).

(b) For drinking water applications, all cement lined pipes ≤DN 300 are to be supplied with internal seal coat. For cement lined pipes >DN 300 a seal coat is required where residence times exceed 72 hours at any point following pipeline commissioning.

(c) Fittings shall be cement mortar lined in accordance with AS 1281:2001.

(d) For buried applications, fittings shall be externally coated with fusion bonded medium density polyethylene complying with AS 4321:2001.

(e) Elastomeric ring joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(f) Fittings, joint seals, flange gaskets and O-rings[3], and jointing lubricant shall comply with AS/NZS 4020:2005. Where fittings do not comply with AS/NZS 4020:2005, each fitting shall be marked with 'NOT SUITABLE FOR WATER SUPPLY' in accordance with Clause 1.4 of AS 1579:2001.

204.3 QUALITY ASSURANCE

(a) Steel fittings shall have product certification (ISO Type 5) to AS 1579:2001.

(a) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

204.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Rated pressure[4] (Pressure Class, PN)	
To suit pipe of nominal size(s), mm	
Fitting types (configurations)	
Seal coating of cement mortar lining	
External protective coating for above ground installations	
Jointing requirements including end configurations and flange classes (16 to 35)[5]	
Cathodic protection bonding lugs (for elastomeric seal joints only)	

Alternative internal lining	
Zinc metal spray on the internal surfaces of the socket end of slip-in welded joints ≤ DN 750 (≥ 150 µm ZMS onto a blasted surface with a seal coat)	
Alternative elastomeric material for joint seals	
Alternative external coatings for below ground applications	

NOTES:

1 Includes source water, drinking water and recycled water supply.

2 Refer to WTIA Technical Note No. 25 Welding Specification for the Water Industry.

3 Flange gaskets and O-rings should be supplied to WSA PS–312.

4 The rated pressure of fittings is the responsibility of the designer (Clause 2.3 of AS 1579:2001).

5 Jointing requirements and Flange Classes shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS - 205 FILAMENT WOUND GLASS REINFORCED PLASTICS (FW-GRP) PIPES AND FITTINGS FOR PRESSURE APPLICATIONS - WATER SUPPLY

205.1 SCOPE

This specification covers FW[2]-GRP pressure pipes[1] for water supply[3].

205.2 REQUIREMENTS

(a) FW-GRP pipes and fittings shall comply with AS 3571.2:2009/Amdt 1:2009 (ISO 10639:2004/Amdt 1:2011).

(b) FW-GRP pipes shall be manufactured using the following glass reinforcement types:

(i) Type "C"[5]

(ii) Type "E" glass

(iii) Type "ECR" glass and/or a

(iv) Combination of (i), (ii) and (iii) above.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Pipes, fittings, joint seals, flange gaskets[4] and jointing lubricant shall comply with AS/NZS 4020:2005.

(e) Minimum pressure class of PN 16 and stiffness class of SN10000 shall be used unless project specific approval is given by Hunter Water to use alternative classes.

205.3 QUALITY ASSURANCE

(a) FW-GRP pipes and fittings shall have product certification (ISO Type 5) to AS 3571.2:2009/Amdt 1:2009.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Jointing lubricants shall have product certification (ISO Type 1) to AS/NZS 4020:2005.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

205.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, DN	
Pressure Class[1], PN	
Stiffness Class[1], SN	
Fitting types (configurations)	
Joints and couplings[2]	
Alternative glass type	

Alternative elastomeric material for joint seals	

205.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative resin type	

NOTES:

1 Pressure and stiffness classes shall be as specified in the Project Specification or on the Design Drawings.

2 Manufactured using filament wound process for GRP pipe.

3 Includes source water, drinking water and recycled water supply.

4 Flange gaskets and O-rings should be supplied to WSA PS–312.

5 Type C glass is a non-structural glass used only as a tissue on the inner surface of the pipe.

PRODUCT SPECIFICATION

WSA PS - 205J CENTRIFUGALLY CAST GLASS REINFORCED PLASTICS (CC-GRP) PIPES FOR PRESSURE AND NON-PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE – INSTALLED USING TRENCHLESS INSTALLATION METHODS

205J.1 SCOPE

This specification covers CC[2]-GRP pipe[1] for:

(a) Gravity stormwater/sewerage[3].

(b) Pressure sewerage[4]/water[5].

205J.2 REQUIREMENTS

(a) CC-GRP pipes shall comply with ISO 25780:2011[6].

(b) CC-GRP pipes shall be manufactured using the following glass reinforcement types:

(i) Type “C”

(ii) Type “E” glass

(iii) Type “ECR” glass and/or a

(iv) Combination of (i), (ii) and (iii) above.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Minimum pressure class of PN 16 and stiffness class of SN10000 shall be used unless project specific approval is given by Hunter Water to use alternative classes.

(e) Jointing lubricants shall have product certification (ISO Type 1) to AS/NZS 4020:2005.

(f) CC-GRP pipes shall be manufactured with an opaque inner resin liner layer.

205J.3 QUALITY ASSURANCE

(a) CC-GRP pipes shall have product certification (ISO Type 5) to ISO 25780:2011.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

205J.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, DN	
Pressure Class[4,5], PN	
Stiffness Class[3,4,5], SN	
Design Jacking Load (kN)	
Joints SS Sleeve / FW-GRP couplings	
Alternative elastomeric material for joint	

seals[7]	
Pipe lengths	
Alternative glass type	

NOTES:

1 The use of this specification requires approval by the Water Agency.

2 Manufactured using centrifugally casting process for GRP pipe useful in managing the compressive loads during jacking.

3 Pipes for gravity sewerage are classified by nominal stiffness, SN.

4 Pipes for pressure sewerage are classified by nominal stiffness, SN and nominal pressure, PN.

5 Pipes for source water, drinking water and recycled water supply are classified nominal stiffness, SN and nominal pressure, PN.

6 ISO 25780:2011 – Plastics piping systems for pressure and non-pressure water supply, irrigation, drainage or sewerage – Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin – Pipes with flexible joints intended to be installed using jacking techniques.

7 Flange gaskets and O-rings should be supplied to WSA PS-312.

PRODUCT SPECIFICATION

WSA PS - 205S FILAMENT WOUND GLASS REINFORCED PLASTICS (FW-GRP) PIPES AND FITTINGS FOR PRESSURE AND NON-PRESSURE APPLICATIONS - SEWERAGE

205S.1 SCOPE

This specification covers FW[2]-GRP pipes[1] and fittings for gravity and pressure sewerage.

205S.2 REQUIREMENTS

(a) FW-GRP pipes and fittings shall comply with AS 3571.1:2009/Amdt 1:2009 (ISO 10467:2004/Amdt 1:2012).

(b) FW-GRP pipes and fittings shall be manufactured using the following glass reinforcement types:

(i) Type "C"[6].

(ii) Type "E" glass.

(iii) Type "ECR" and/or a

(iv) Combination of (i), (ii) and (iii) above.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Minimum pressure class of PN 16 and stiffness class of SN10000 shall be used unless project specific approval is given by Hunter Water to use alternative classes.

(e) Jointing lubricants shall have product certification (ISO Type 1) to AS/NZS 4020:2005.

(f) FW-GRP pipes for gravity sewer applications shall be manufactured with an opaque inner resin liner layer.

205S.3 QUALITY ASSURANCE

(a) FW-GRP pipes and fittings shall have product certification (ISO Type 5) to AS 3571.1:2009/Amdt 1:2009.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008(EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

205S.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, DN	
Pressure Class[4], PN	
Stiffness Class[3], SN	
Fitting types (configurations)	
Joints and couplings[5]	
Alternative glass type	

Alternative elastomeric material for joint seals	

205S.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Pipe length, m	
Specific packaging, transportation and delivery requirements	

NOTES:

1 Pressure and stiffness classes shall be as specified in the Project Specification or on the Design Drawings.

2 Manufactured using filament wound process for GRP pipe.

3 Pipes for gravity sewerage are classified by nominal stiffness, SN.

4 Pipes for pressure sewerage are classified by nominal stiffness, SN and nominal pressure, PN.

5 Flange gaskets and O-rings should be supplied to WSA PS–312.

6 Type C glass is a non-structural glass used only as a tissue on the inner surface of the pipe.

PRODUCT SPECIFICATION

WSA PS – 206J FILAMENT WOUND GLASS REINFORCED PLASTICS (FW-GRP) PIPES FOR PRESSURE AND NON-PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE - INSTALLED USING TRENCHLESS INSTALLATION METHODS

206J.1 SCOPE

This specification covers FW[2]-GRP pipe[1] for:

(a) Gravity stormwater/sewerage[3].

(b) Pressure sewerage[4]/water[5].

206J.2 REQUIREMENTS

(a) FW-GRP pipes shall comply with ISO 25780:2011[6].

(b) FW-GRP pipes shall be manufactured using the following glass reinforcement types:

(i) Type “C”

(ii) Type “E” glass

(iii) Type “ECR” glass and/or a

(iv) Combination of (i), (ii) and (iii) above.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Minimum pressure class of PN 16 and stiffness class of SN100000 shall be used unless project specific approval is given by Hunter Water to use alternative classes.

(e) Jointing lubricants shall have product certification (ISO Type 1) to AS/NZS 4020:2005.

(f) FW-GRP pipes shall be manufactured with an opaque inner resin liner layer.

206J.3 QUALITY ASSURANCE

(a) FW-GRP pipes shall have product certification (ISO Type 5) to ISO 25780:2011.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

206J.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, DN	
Pressure Class[4,5], PN	
Stiffness Class[3,4,5], SN	
Design Jacking Load (kN)	
Joints SS Sleeve / FW GRP couplings	

Alternative elastomeric material for joint seals[7]	
Pipe lengths	
Alternative glass type	

NOTES:

1 The use of this specification requires approval by the Water Agency.

2 Manufactured using Filament Wound process for GRP pipe useful in managing the compressive loads during jacking.

3 Pipes for gravity sewerage are classified by nominal stiffness, SN.

4 Pipes for pressure sewerage are classified by nominal stiffness, SN and nominal pressure, PN.

5 Pipes for source water, drinking water and recycled water supply are classified nominal stiffness, SN and nominal pressure, PN.

6 ISO 25780:2011 – Plastics piping systems for pressure and non-pressure water supply, irrigation, drainage or sewerage – Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin – Pipes with flexible joints intended to be installed using jacking techniques.

7 Flange gaskets and O-rings should be supplied to WSA PS-312.

PRODUCT SPECIFICATION

WSA PS - 207 POLYETHYLENE (PE) PIPES FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

207.1 SCOPE

This specification covers polyethylene (PE) pipes[1] for pressure applications in water supply[1,2] and sewerage.

207.2 REQUIREMENTS

(a) PE pipes shall be PE 100 Series 1 complying with AS/NZS 4130:2009/Amdt 1:2009.

(b) Drinking water pipes shall be solid blue or sheathed blue or black with blue stripes.

(c) Recycled water pipes shall be solid purple or sheathed purple or black with purple stripes.

(d) Sewerage pipes shall be solid cream or sheathed cream.

(e) Recycled water pipes shall be legibly and durably marked with letters of at least 10 mm high “RECYCLED WATER – DO NOT DRINK” or equivalent words, repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m.

(f) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

207.3 QUALITY ASSURANCE

(a) PE pipes shall have product certification (ISO Type 5) to AS/NZS 4130:2009/Amdt 1:2009.

(b) All products shall be marked in accordance with the conformity assessment body’s requirements.

207.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[3], PN	
Application[3]	
Pipes or coils	
Colour identification[4] (complete pipe colour or striped or either)	
Alternative pipe compounds e.g. PE 80B	

NOTES:

1 For PE property service pipes see WSA PS–215.

2 Includes mains for drinking water and recycled water supply.

3 Pressure Class and application shall be as specified in the Project Specification or on the Design Drawings.

4 Some water agencies may have a specific colour identification requirement e.g. solid/sheathed complete pipe colour only.

PRODUCT SPECIFICATION

WSA PS - 208 PLASTICS MOULDED FITTINGS FOR PRESSURE APPLICATIONS WITH PE PIPE – WATER SUPPLY AND SEWERAGE

208.1 SCOPE

This specification covers plastics[1] moulded

(a) electrofusion fittings;

(b) mechanical compression joint fittings;

(c) elongated spigot fittings for butt fusion and for use with electrofusion socketed fittings; and

(d) short[2] spigot fittings for butt fusion

in pressure applications with PE pipes in water supply[3] and sewerage.

208.2 REQUIREMENTS

(a) Plastics[1] moulded material of the fitting body[4] shall comply with AS/NZS 4129:2008/Amdt 1:2013.

(b) Mechanical joint elastomeric seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

(d) Joint seals, flange gaskets[5] and jointing lubricant shall comply with AS/NZS 4020:2005.

208.3 QUALITY ASSURANCE

(a) Plastics moulded fittings shall have product certification (ISO Type 5) to AS/NZS 4129:2008/Amdt 1:2013.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

208.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[6], PN	
Type of fitting e.g. mechanical or electrofusion	
Fitting types (configurations)	
Flange standard (e.g. AS/NZS 4331.1:1995 or AS/NZS 4087:2011/Amdt 1:2012 or AS ISO 9624:2008)	
Alternative elastomeric material for joint seals	

NOTES:

1 Plastics moulded material of the fitting body shall be in accordance with Table 1.1 of AS/NZS 4129:2008/Amdt 1:2013.

2 The dimensions of short spigot fittings for butt fusion shall conform to the requirements given in Table 3 (see Figure 2) in EN 12201-3:2001+A1:2012.

3 Includes water supply and recycled water supply.

4 All fittings to AS/NZS 4129:2008/Amdt 1:2013 for applications other than fuel gas are required to comply with AS/NZS 4020:2005. Fittings may be used for drinking water, recycled water and sewerage pipework. Individual colour identification for each application is not required.

5 Flange gaskets and O-rings should be supplied to WSA PS–312.

6 Pressure Class and type of fitting shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS - 209 POLYVINYLCHLORIDE, MODIFIED (PVC-M) PRESSURE PIPES FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

209.1 SCOPE

This specification covers modified polyvinylchloride (PVC-M) pressure pipes for pressure applications in water supply[1] and sewerage.

209.2 REQUIREMENTS

(a) PVC-M pipes shall comply with AS/NZS 4765:2017, Series 2.

(b) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Pipes for sewerage shall be legibly and durably marked with black letters of at least 10 mm high “SEWAGE – DO NOT DRINK” or equivalent, repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m.

(d) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

209.3 QUALITY ASSURANCE

(a) PVC-M pipes shall have product certification (ISO Type 5) to AS/NZS 4765:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-8[3].

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

209.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[2], PN	
Application[2]	
Alternative pipe diameter series i.e. Series 1 (metric)	
Permitted colours for sewerage	
Alternative elastomeric material for joint seals	

209.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Pipe length, if not 6 metres	

NOTES:

1 Includes drinking water and recycled water supply.

2 Pressure Class and application shall be as specified in the Project Specification or on the Design Drawings.

3 Water Services Association of Australia Technical Note (WSA TN-08) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 4765:2017.

PRODUCT SPECIFICATION

WSA PS - 210 POLYVINYLCHLORIDE, ORIENTED (PVC-O) PRESSURE PIPES FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

210.1 SCOPE

This specification covers oriented polyvinylchloride (PVC-O) pressure pipes for pressure applications in water supply[1] and sewerage.

210.2 REQUIREMENTS

(a) PVC-O pipes shall comply with AS/NZS 4441:2017, Series 2.

(b) Elastomeric joint seals shall be EPDM or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Pipes for sewerage shall be legibly and durably marked with black letters of at least 10 mm high “SEWAGE – DO NOT DRINK” or equivalent, repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m.

(d) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

210.3 QUALITY ASSURANCE

(a) PVC-O pipes shall have product certification (ISO Type 5) to AS/NZS 4441:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08[3].

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

210.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[2], PN	
Material classification number[2]	
Application[2]	
Alternative pipe diameter series i.e. Series 1 (metric)	
Alternative elastomeric material for joint seals	

210.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Pipe length if not 6 metres	

NOTES:

1 Includes water supply and recycled water supply.

2 Pressure Class, Materials Classification number and application shall be as specified in the Project Specification or on the Design Drawings.

3 Water Services Association of Australia Technical Note (WSA TN-08) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 4441:2017.

PRODUCT SPECIFICATION

WSA PS – 211 POLYVINYLCHLORIDE, UNPLASTICISED (PVC-U) PRESSURE PIPES FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

211.1 SCOPE

This specification covers unplasticised polyvinylchloride (PVC-U) pressure pipes for pressure applications in water supply[1] and sewerage.

211.2 REQUIREMENTS

(a) PVC-U pipes shall comply with AS/NZS 1477:2017, Series 2.

(b) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Pipes for recycled water shall be legibly and durably marked with black letters of at least 10 mm high “RECYCLED WATER – DO NOT DRINK” or equivalent, repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m.

(d) Pipes for sewerage shall be legibly and durably marked with black letters of at least 10 mm high “SEWAGE – DO NOT DRINK” or equivalent, repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m.

(e) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

211.3 QUALITY ASSURANCE

(a) PVC-U pipe shall have product certification (ISO Type 5) to AS/NZS 1477:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08[3].

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

211.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[2], PN	
Application[2]	
Specific packaging, transportation and delivery requirements	
Alternative pipe diameter series i.e. Series 1 (metric)	
Alternative elastomeric material for joint seals	

211.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Permitted colours for sewerage	
Pipe length if not 6 metres	

NOTES: See over

NOTES:

1 Includes drinking water and recycled water supply.

2 Pressure Class and application shall be as specified in the Project Specification or on the Design Drawings.

3 Water Services Association of Australia Technical Note (WSA TN-08) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 1477:2017.

PRODUCT SPECIFICATION

WSA PS – 212 DUCTILE IRON FITTINGS (CIOD) FOR PLASTICS PRESSURE PIPES FOR PRESSURE AND NON-PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

212.1 SCOPE

This specification[1] covers ductile iron fittings for use with plastics pressure pipes[2] such as PVC-M, PVC-O[3], PVC-U, ABS and GRP in water supply and pressure sewerage.

212.2 REQUIREMENTS

(a) Ductile iron fittings for use with plastics pressure pipes[1,2] shall comply with AS/NZS 2280:2014/Amdt 1:2015.

(b) Elastomeric joint seals shall be EPDM or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Sockets and jointing seals shall be suitable for Series 2 pipes.

(d) Fittings shall be coated and lined with fusion bonded polymer[4] in accordance with AS/NZS 4158:2003/Amdt 1:2005.

(e) Flange gaskets shall comply with WSA 109:2011.

(f) Where fittings do not comply with AS/NZS 4020:2005, each fitting shall be marked with 'NOT SUITABLE FOR DRINKING WATER' or equivalent in accordance with Clause 1.8.4 of AS/NZS 2280:2014/Amdt 1:2015.

(g) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

212.3 QUALITY ASSURANCE

(a) Ductile iron fittings shall have product certification (ISO Type 5) to AS/NZS 2280:2014/Amdt 1:2015.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Flange gaskets shall have product certification (ISO Type 1) to WSA 109:2011.

(e) All products shall be marked in accordance with the conformity assessment body's requirements.

212.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Fitting types (configurations)	
Pressure Class[5], PN	
Jointing seals suitable for an alternative pipe diameter series e.g. Series 1	
Alternative elastomeric material for jointing seals	
Alternative coating and lining	

NOTES: See over

NOTES:

1 Only a limited size range of moulded pressure fittings in PVC-U and other plastics materials is available[6]. Fittings are not moulded from PVC-M or PVC-O. Ductile iron fittings are therefore deemed to be the default option for use with plastics pressure pipes such as PVC, GRP and ABS. Sockets dimensions are generally designed to suit Series 2 pressure pipes, although, in many diameters, Series 1 pressure pipes may be jointed with the use of specially designed jointing seals.

2 Ductile iron fittings are generally unsuitable for use with PE pressure pipes.

3 The use of ductile iron fittings with PVC-O material classifications 450 and 500 should be verified with the pipe manufacturer so that fittings with an adequate socket depth are used.

4 Individual colour identification for each application is not required.

5 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS – 213 PVC PRESSURE FITTINGS, MOULDED AND POST-FORMED FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

213.1 SCOPE

This specification[1] covers moulded pressure fittings and post-formed bends manufactured from PVC-U or PVC-M[2] for use with plastics pressure pipes in water supply[3] and sewerage.

213.2 REQUIREMENTS

(a) Moulded fittings[4,5] manufactured from PVC-U shall comply with AS/NZS 1477:2017.

(b) Sockets and jointing seals shall be suitable for Series 2 pipes.

(c) Post-formed bends[4] manufactured from PVC-U shall comply with AS/NZS 1477:2017.

(d) Post-formed bends[4] manufactured from PVC-M shall comply with AS/NZS 4765:2007.

(e) Elastomeric joint seals shall be EPDM or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(f) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

213.3 QUALITY ASSURANCE

(a) Moulded PVC-U fittings shall have product certification (ISO Type 5) to AS/NZS 1477:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08[7].

(b) Post-formed bends manufactured from PVC shall have product certification (ISO Type 5) to AS/NZS 1477:2017 (PVC-U) or AS/NZS 4765:2017 (PVC-M) as appropriate.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

213.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, DN	
Pressure Class[2, 6], PN	
Alternative elastomeric material for joint seals	

213.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Jointing seals suitable for an alternative pipe diameter series e.g. Series 1	

NOTES: See over

1 Due to the limited availability of moulded plastics pressure fittings (except for PE), WSA PS-212 is the default specification for fittings for use with PVC pressure pipes. The use of this specification usually requires approval by the Water Agency.

2 Moulded fittings are not available in PVC-M and PVC-O and post-formed fittings are not available in PVC-O.

3 Includes drinking water and recycled water supply.

4 Individual colour identification for each application is not required.

5 Moulded PVC fittings are not recommended for pumped systems and for applications where pipe systems are de-rated for fatigue or operating temperature.

6 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

7 Water Services Association of Australia Technical Note (WSA TN-08) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 1477:2017 and AS/NZS 4765:2017.

PRODUCT SPECIFICATION

WSA PS – 214 COPPER (Cu) PROPERTY SERVICE PIPES FOR PRESSURE APPLICATIONS - WATER SUPPLY

214.1 SCOPE

This specification covers copper pipes for pressure applications in property services in water supply[1].

214.2 REQUIREMENTS

(a) Copper pipes shall be Type A and bendable temper BQ complying with AS 1432:2004.

(b) Pipes for property services installed in drinking water only reticulation areas shall be naturally coloured or sheathed blue[2].

(c) Pipes for property services in dual water reticulation areas shall be sheathed blue[1] for drinking water services and purple[3] for recycled water services.

(d) Pipes for recycled water shall be legibly and durably marked with black letters of at least 5 mm high “RECYCLED WATER – DO NOT DRINK” or equivalent, repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m.

(e) Pipes shall comply with AS/NZS 4020:2005.

214.3 QUALITY ASSURANCE

(a) Copper pipes shall have product certification (ISO Type 5) to AS 1432:2004.

(b) All products shall be marked in accordance with the conformity assessment body’s requirements.

214.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Alternative temper e.g. hard drawn or annealed	
Permitted pipe colour for drinking water only reticulation areas	

214.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Pipe length if not 6 metres	

NOTES:

1 Includes drinking water and recycled water supply.

2 Blue shall be defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 200 80 25 or 210 80 25 and no lighter than 200 90 10 or 210 90 10, respectively.

3 Purple is defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. It is equivalent to being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac in accordance with AS 2700:2011 (NZS 7702:1989AA).

4 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

PRODUCT SPECIFICATION

WSA PS – 215 POLYETHYLENE (PE) PROPERTY SERVICE PIPES FOR PRESSURE APPLICATIONS – WATER SUPPLY

215.1 SCOPE

This specification covers polyethylene (PE) pipes for pressure applications in property services in water supply[1].

215.2 REQUIREMENTS

(a) PE property service pipes shall be PE 100, PN 16, Series 1 complying with AS/NZS 4130:2009/Amdt 1:2009.

(b) Drinking water property service pipes shall be black with blue stripes.

(c) Recycled water property service pipes shall be solid purple or sheathed purple.

(d) Recycled water property service pipes shall be legibly and durably marked with black letters of at least 10 mm high “RECYCLED WATER – DO NOT DRINK” or equivalent, repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m.

215.3 QUALITY ASSURANCE

(a) Polyethylene pipes shall have product certification (ISO Type 5) to AS/NZS 4130:2009/Amdt 1:2009.

(b) All products shall be marked in accordance with the conformity assessment body’s requirements.

215.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, DN[2]	
Alternative PE compound (e.g. PE 80B)	
Alternative pressure rating	
Alternative colour identification[3] (complete pipe colour or striped)	

NOTES:

1 Includes drinking water and recycled water supply.

2 A minimum diameter of DN 20 is recommended to limit potential taste and odour complaints with small diameter PE pipe.

3 Some water agencies may have a specific colour identification requirement e.g. solid/sheathed complete pipe colour only.

PRODUCT SPECIFICATION

WSA PS – 216 POLYETHYLENE (PE) FABRICATED FITTINGS FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

216.1 SCOPE

This specification[1] covers polyethylene (PE) fabricated pressure fittings for pressure applications with PE pipes in water supply and sewerage.

216.2 REQUIREMENTS

(a) Apply weld and geometry de-rating factors to fabricated PE fittings[2] in accordance with PIPA Industry Guideline POP006 Issue 5.01:2003.

(b) Mechanical joint elastomeric seals shall be EPDM or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Fittings and joint seals shall comply with AS/NZS 4020:2005.

(d) The internal weld beads of fabricated fittings with weld reinforcement in excess of 5 mm shall be removed.

(e) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

216.3 QUALITY ASSURANCE

(a) PE pipe used in the fabrication of PE fittings shall have product certification (ISO Type 5) to AS/NZS 4130:2009/Amdt 1:2009.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

216.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure rating[3,4], PN	
Type of fitting (i.e. mechanical or electrofusion)	

NOTES:

1 Use of this specification requires approval by the Water Agency.

2 Fittings may be used for drinking water, recycled water and sewerage pipework. Individual colour identification for each application is not required.

3 Pressure Class and type of fitting shall be as specified in the Project Specification or on the Design Drawings.

4 The fatigue de-rating of the fitting shall be as nominated in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS - 217 ACRYLONITRILE BUTADIENE STYRENE (ABS) PIPES FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

217.1 SCOPE

This specification covers acrylonitrile butadiene styrene (ABS) pressure pipes in pressure applications for water supply[1] and sewerage.

217.2 REQUIREMENTS

(a) ABS pipes shall comply with AS/NZS 3518:2013, Series 2.

(b) Elastomeric joint seals shall be EPDM or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Solvent cement and priming fluid shall comply with AS/NZS 3879:2011 and AS/NZS 4020:2005.

(d) Minimum classes required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

217.3 QUALITY ASSURANCE

(a) ABS pipe shall have product certification (ISO Type 5) to AS/NZS 3518:2013.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Solvent cements and priming fluids shall have product certification (ISO Type 5) to AS/NZS 3879:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

217.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure rating[2], PN	
Permitted joint type	
Alternative pipe colour[3] to grey e.g. blue or purple	
Alternative elastomeric material for joint seals	

217.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative pipe diameter series i.e. Series 1 (metric)	
Pipe length, if not 6 metres	

NOTES:

1 Includes drinking water and recycled water supply.

2 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

3 Series 1 and 2 pipes are grey.

PRODUCT SPECIFICATION

WSA PS - 230 POLYVINYLCHLORIDE, UNPLASTICISED (PVC-U) NON-PRESSURE PIPE AND FITTINGS

230.1 SCOPE

This specification covers PVC-U non-pressure pipe and fittings, including solvent cements and priming fluids, for use in gravity sewerage and drainage.

230.2 REQUIREMENTS

(a) PVC-U pipe and fittings shall comply with AS/NZS 1260:2017.

(b) PVC-U pipes and fittings shall be marked 'BEP PVC' or the words 'BEST ENVIRONMENTAL PRACTICE PVC'.

(c) Pipes shall be Stiffness Class SN8 (for DN 150 and above) and SN10 (for DN 100).

(d) Fittings shall be Stiffness Class SN8 or higher.

(e) Joints:

(i) Elastomeric seals shall comply be EPDM or CR or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(ii) Solvent cement and priming fluid for use with tapered socketed fittings shall be Type N[1] or Type G[2] complying with AS/NZS 3879:2011.

(iii) Solvent cement for use with parallel socketed fittings shall comply with manufacturer's requirements.

(iv) A threaded spigot and socket joint with an elastomeric sealing ring system that accommodates tensile and compressive loads to manufacturer's requiements[3].

230.3 QUALITY ASSURANCE

(a) PVC-U non-pressure pipes and fittings shall have product certification (ISO Type 5) to AS/NZS 1260:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08[4].

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Solvent cements shall have product certification (ISO Type 5) to AS/NZS 3879:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

230.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Limitations on wall construction (plain wall, ribbed, solid core sandwich construction or foam core sandwich construction)	
Joint type (elastomeric seal or solvent cement or threaded spigot and socket joint with an elastomeric seal[3])	

Alternative pipe stiffness Class (e.g. SN16)	
Alternative elastomeric material for joint seals (e.g. NBR)	

NOTES:

1 Type N is used for jointing PVC pipe systems with tapered/interference fit joints which will not be subjected to internal pressure or other applications where high bond strength is not required.

2 Type G is used for joining PVC and ABS pressure or non-pressure pipes where parallel/no or low interference fit joints are used and where a high bond strength and ability to fill small gaps is required.

3 Restrained joint and seal ring systems are designed to accommodate tensile and compressive loads, installation using trenchless methods where pipes may be “pushed” or “pulled” into place depending on the installation methodology.

4 Water Services Association of Australia Technical Note (WSA TN-08) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 1260:2017.

PRODUCT SPECIFICATION

WSA PS – 231 VITRIFIED CLAY (VC) PIPES AND FITTINGS FOR NON-PRESSURE APPLICATIONS - SEWERAGE

231.1 SCOPE

This specification covers vitrified clay (VC) pipes and fittings for use in gravity sewerage.

231.2 REQUIREMENTS

(a) VC pipes, fittings and jointing assemblies shall comply with EN 295-1:2013.

(b) Special fittings, adaptors and compatible accessories shall comply with EN 295-4:2013.

(c) Elastomeric joint seals shall comply with EN 681-1:1996[1], EPDM or CR or SBR.

(d) The minimum crushing strength / Class number shall be:

Nominal Size DN	Crushing Strength kN/m	Minimum Class Number
150	34	Not applicable
200-250	Note 2	160
300-450	Note 2	120
≥500	Note 2	95

231.3 QUALITY ASSURANCE

(a) Vitrified clay pipe and fittings, including jointing assemblies, shall have product certification (ISO Type 5) to EN 295-1:2013 (Sampling in accordance with EN 295-2:1991).

(b) Special fittings, adaptors and compatible accessories shall have product certification (ISO Type 5) to EN 295-4:2013.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to EN 681-1:1996.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

231.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Class number[3].	
Joint type (sleeve, spigot/socket).	
Alternative elastomeric material for joint seals e.g. TPE to EN 681-2:2000.	

NOTES:

1 EN 681-1:1996 is identical to AS 681.1:2008.

2 Crushing strength shall comply with EN 295.1:1991 for the specified Class number.

3 Class number shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS – 233 REINFORCED CONCRETE (RC) PLASTICS-LINED PIPES FOR NON-PRESSURE APPLICATIONS - SEWERAGE

233.1 SCOPE

This specification[1] covers non-pressure reinforced pre-cast concrete plastics-lined pipes for gravity sewerage.

233.2 REQUIREMENTS

(a) Reinforced concrete plastics-lined pipes shall comply with WSA 113:2002.

(b) Aggregates shall conform to the requirements of AS/NZS 4058:2007.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Pipes shall be routinely tested in accordance with Clause 4.3 of AS/NZS 4058:2007 at a frequency defined in Appendix A of AS/NZS 4058:2007 for the following tests listed in Table 4.1 of AS/NZS 4058:2007:

  (i) Crack load.

  (ii) Ultimate load.

  (iii) Hydrostatic pressure.

  (iv) Dimensional accuracy.

  (v) Cover.

  (vi) Joint assembly.

(e) Lifting holes are not required.

233.3 QUALITY ASSURANCE

(a) Reinforced concrete plastics-lined pipes shall have product certification (ISO Type 1) to WSA 113:2002.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

233.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pipe load Class[2]	
Configuration of bends	
External coatings for aggressive soils (e.g. acid sulphate soils)	
Lifting holes (if required)	
Alternative aggregates (e.g. calcareous[3,4])	
Additional sacrificial cover over reinforcement	
Alternative elastomeric material for joint seals	

NOTES:

1 This specification applies to pipes that will be installed in a trench. For pipe jacking, requirements for collars, joints and end-squareness shall be negotiated with the pipe manufacturer.

2 Load Class number shall be as specified in the Project Specification or on the Design Drawings.

3 Calcareous aggregate is defined as having an acid solubility greater than 98% when tested in accordance with Clause 5.3.1 of AWWA B100:2009.

4 Calcareous aggregates may not be available in all locations.

PRODUCT SPECIFICATION

WSA PS - 235 COUPLINGS, METAL-BANDED FLEXIBLE, FOR NON-PRESSURE APPLICATIONS - SEWERAGE

235.1 SCOPE

This specification covers metal-banded flexible couplings for gravity sewers.

235.2 REQUIREMENTS

(a) Metal-banded flexible couplings shall comply with AS/NZS 4327:1995 or BS[1] EN 295-4:2013.

(b) Couplings shall have metal shear rings or bands.

(c) Couplings to AS/NZS 4327:1995 shall be type B.

(d) Couplings to BS[1] EN 295-4:2013 shall be Type 2A.

235.3 QUALITY ASSURANCE

(a) Metal-banded flexible couplings shall have product certification (ISO Type 5) to AS/NZS 4327:1995 or BS[1] EN 295-4:2013.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

235.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Need for adaptor bushes (required where difference between OD of pipe and ID of coupling is greater than 16 mm)	
Alternative product type—(e.g. BS[1] EN 295-4:2013 Type 2B)	

NOTE:

1 DIN versions of the EN standards are also acceptable.

PRODUCT SPECIFICATION

WSA PS – 236 VARIABLE BEND, POST-FORMED PVC-U FITTINGS FOR NON-PRESSURE APPLICATIONS - SEWERAGE

236.1 SCOPE

This specification covers post-formed variable bend non-pressure fittings manufactured from PVC for use with maintenance chambers, shafts and PVC-U sewer pipes.

236.2 REQUIREMENTS

(a) Post-formed variable bend non-pressure fittings manufactured from PVC-U shall comply with WSA 115:2003.

(b) Elastomeric joint seals shall be EPDM or CR or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

236.3 QUALITY ASSURANCE

(a) Post-formed variable bend non-pressure fittings shall have product certification (ISO Type 1) to AS/NZS 1260:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08[2].

(b) Post-formed variable bend non-pressure fittings shall have a certificate of compliance to WSA 115:2003 issued by the conformity assessment body that has undertaken product certification as required in (a).

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

236.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Stiffness Class[1], SN	
Swept bend angle, degrees	
Alternative elastomeric materials for joint seals	

NOTE:

1 Stiffness Class shall be as specified in the Project Specification or on the Design Drawings.

2 Water Services Association of Australia Technical Note (WSA TN-8) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 1260:2017.

PRODUCT SPECIFICATION

WSA PS - 237 CENTRIFUGALLY CAST GLASS REINFORCED PLASTICS (CC-GRP) PIPES AND FITTINGS (ISO SIZED) FOR PRESSURE AND NON-PRESSURE APPLICATIONS – WATER SUPPLY

237.1 SCOPE

This specification[1] covers CC[2]-GRP pipes[3] and fittings[4] for non pressure[5] and pressure applications[6] water supply.

237.2 REQUIREMENTS

(a) CC-GRP pipes and fittings shall comply with ISO 10639:2004/Amdt 1:2011[7].

(b) CC-GRP pipes and fittings shall be manufactured using either of the following glass reinforcement types:

(i) Type “C” glass;

(ii) Type “E” glass;

(iii) Type “ECR” glass and/or a

(iv) Combination of (i), (ii) and (iii) above.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Minimum pressure class of PN 16 and stiffness class of SN 10000 shall be used unless project specific approval is given by Hunter Water to use alternative classes.

(e) The use of ISO sized pipes and fittings shall only be permitted on a project specific basis by Hunter Water.

(f) CC-GRP pipes, CC-GRP fittings and jointing lubricants shall have product certification (ISO Type 1) to AS/NZS 4020:2005.

237.3 QUALITY ASSURANCE

(a) CC-GRP pipes and fittings shall have product certification (ISO Type 5) to ISO 10639:2004/Amdt 1:2011.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

237S.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[5], PN	
Stiffness Class[3], SN	
Joints and couplings	
Alternative glass type	
Alternative elastomeric material for joint seals	

NOTES:

1 The use of this specification requires approval by the Water Agency.

2 Manufactured using centrifugally casting process for CC- GRP pipe.

3 Includes the GRP couplings that are supplied with CC-GRP pipe.

4 Pipes manufactured to this specification are not directly compatible with fittings manufactured to AS/NZS 2280:2014/Amdt 1:2015. In some cases special adapter elastomeric seals many be used but their suitability would need to be tested to verify performance.

5 Pipes for non pressure water supply are classified by nominal stiffness, SN.

6 Pipes for pressure water supply are classified by nominal stiffness, SN and nominal pressure, PN.

7 ISO 10639:2004/Amdt 1:2011 – Plastics piping systems for pressure and non-pressure water supply -- Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin.

PRODUCT SPECIFICATION

WSA PS - 237S CENTRIFUGALLY CAST GLASS REINFORCED PLASTICS (CC-GRP) PIPES AND FITTINGS (ISO SIZED) FOR PRESSURE AND NON-PRESSURE APPLICATIONS - SEWERAGE

237S.1 SCOPE

This specification[1] covers CC[2]-GRP pipes[3] and fittings[4] for non pressure[5] and pressure applications[6] sewerage.

237S.2 REQUIREMENTS

(a) CC-GRP pipes and fittings shall comply with ISO 10467:2004/Amdt 1:2012[7].

(b) CC-GRP pipes and fittings shall be manufactured using either of the following glass reinforcement types:

(i) Type “C” glass;

(ii) Type “E” glass;

(iii) Type “ECR” glass and/or a

(iv) Combination of (i), (ii) and (iii) above.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Minimum pressure class of PN 16 and stiffness class of SN 100000 shall be used unless project specific approval is given by Hunter Water to use alternative classes.

(e) The use of ISO sized pipes and fittings shall only be permitted on a project specific basis by Hunter Water.

(f) Jointing lubricants shall have product certification (ISO Type 1) to AS/NZS 4020:2005.

(g) CC-GRP pipes shall be manufactured with an opaque inner resin liner layer.

237S.3 QUALITY ASSURANCE

(a) CC-GRP pipes and fittings shall have product certification (ISO Type 5) to ISO 10467:2004/Amdt 1:2012.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

237S.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[4], PN	
Stiffness Class[3], SN	
Joints and couplings	
Alternative glass type	
Alternative elastomeric material for joint seals	

NOTES:

1 The use of this specification requires approval by the Water Agency.

2 Manufactured using centrifugally casting process for CC- GRP pipe.

3 Includes the GRP couplings that are supplied with CC-GRP pipe.

4 Pipes manufactured to this specification are not directly compatible with fittings manufactured to AS/NZS 2280:2014. In some cases special adapter elastomeric seals many be used but their suitability would need to be tested to verify performance.

5 Pipes for gravity sewerage are classified by nominal stiffness, SN.

6 Pipes for pressure sewerage are classified by nominal pressure, PN.

7 ISO 10467:2004/Amdt 1:2012 – Plastics piping systems for pressure and non-pressure drainage and sewerage -- Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin.

PRODUCT SPECIFICATION

WSA PS – 238 ACRYLONITRILE BUTADIENE STYRENE (ABS) PIPES AND FITTINGS FOR NON-PRESSURE APPLICATIONS - SEWERAGE

238.1 SCOPE

This specification covers acrylonitrile butadiene styrene (ABS) pipes and fittings for non-pressure applications in sewerage.

238.2 REQUIREMENTS

(a) ABS pipes and fittings shall comply with WSA 117:2004.

(b) Pipes Stiffness Class shall be SN8 or higher.

(c) Fittings Stiffness Class shall be SN6 or higher.

(d) Elastomeric seals shall be EPDM or CR or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(e) Solvent cement and priming fluid for use with socketed fittings shall be Type G complying with AS/NZS 3879:2011.

238.3 QUALITY ASSURANCE

(a) ABS pipes and fittings shall have product certification (ISO Type 5) to WSA 117:2004.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

238.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Stiffness Class, SN	
Joint type (elastomeric seal or solvent cement).	
Alternative elastomeric materials for joint seals (e.g. NBR)	

238.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative pipe stiffness class	

PRODUCT SPECIFICATION

WSA PS – 240 POLYPROPYLENE (PP), RIBBED CONSTRUCTION, PIPES AND FITTINGS FOR NON-PRESSURE APPLICATIONS - SEWERAGE

240.1 SCOPE

This specification covers polypropylene (PP) ribbed-construction non-pressure pipes and fittings for use in gravity sewerage.

240.2 REQUIREMENTS

(a) PP pipes and fittings shall be Type B ID Series complying with AS/NZS 5065:2005/Amdt 1:2010.

(b) Pipe Stiffness Class shall be SN10.

(c) Elastomeric joint seals shall be EPDM or CR or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

240.3 QUALITY ASSURANCE

(a) PP pipes and fittings shall have product certification (ISO Type 5) to AS/NZS 5065:2005/Amdt 1:2010.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements

240.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Dimensions (e.g. Type B OD Series)	
Stiffness Class[1], SN	
Alternative elastomeric materials for joint seals (e.g. NBR)	

240.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Length,m	

NOTE:

1 Where not SN10, Stiffness Class shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS – 241 POLYETHYLENE (PE), RIBBED CONSTRUCTION, PIPES AND FITTINGS FOR NON-PRESSURE APPLICATIONS - SEWERAGE

241.1 SCOPE

This specification covers polyethylene (PE) ribbed-construction non-pressure pipes and fittings for use in gravity sewerage.

241.2 REQUIREMENTS

(a) PE pipes and fittings shall be Type B ID Series complying with AS/NZS 5065:2005/Amdt 1:2010.

(b) Pipe Stiffness Class shall be SN10.

(c) Elastomeric joint seals shall be EPDM or CR or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

241.3 QUALITY ASSURANCE

(a) PE pipes and fittings shall have product certification (ISO Type 5) to AS/NZS 5065:2005/Amdt 1:2010.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements

241.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Dimensions (e.g. Type B OD Series)	
Stiffness Class[1], SN	
Alternative elastomeric materials for joint seals (e.g. NBR)	

NOTE:

1 Where not SN10, Stiffness Class shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS – 242 POLYETHYLENE (PE), PLAIN WALL, PIPES AND FITTINGS FOR NON-PRESSURE APPLICATIONS - SEWERAGE

242.1 SCOPE

This specification covers polyethylene (PE) plain wall non-pressure pipes and fittings for use in gravity sewerage.

242.2 REQUIREMENTS

(a) PE pipes and fittings shall be plain wall SDR 17 OD Series complying with AS/NZS 5065:2005/Amdt 1:2010.

(b) Elastomeric joint seals shall be EPDM or CR or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

242.3 QUALITY ASSURANCE

(a) PE pipes and fittings shall have product certification (ISO Type 5) to AS/NZS 5065:2005/Amdt 1:2010.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements

242.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Dimensions (e.g. Type B OD Series)	
SDR[1]	
Alternative elastomeric materials for joint seals (e.g. NBR)	

NOTE:

1 Where not SDR 17, standard dimension ratio shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS - 243 POLYVINYLCHLORIDE, UNPLASTICISED (PVC-U) FITTINGS (EN 1401) FOR NON-PRESSURE APPLICATIONS - SEWERAGE

243.1 SCOPE

This specification[1] covers elastomeric sealed PVC-U non-pressure fittings conforming to EN 1401:2009, including solvent cements and priming fluids, for use in gravity sewerage.

243.2 REQUIREMENTS

(a) PVC-U fittings shall comply with EN 1401:2009.

(b) Colour shall be dusty grey (approximately RAL 7037).

(c) Stiffness class shall be SN6 or greater.

(d) Elastomeric joint seals shall be EPDM or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(e) Solvent cement and priming fluid for use with tapered socketed fittings shall be Type N1 or Type G2 complying with AS/NZS 3879:2011.

(f) Solvent cement for use with parallel socketed fittings shall comply with manufacturer's requirements.

243.3 QUALITY ASSURANCE

(a) PVC-U fittings shall have product certification (ISO Type 5) to EN 1401:2009.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Solvent cements for use with tapered socketed fittings shall have product certification (ISO Type 5) to AS/NZS 3879:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

243.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Alternative elastomeric material for joint seals	

NOTE:

1 Fittings are compatible with PVC-U pipes conforming to AS/NZS 1260:2017.

PRODUCT SPECIFICATION

WSA PS - 244 DUCTILE IRON FITTINGS (CIOD) WITH RESTRAINED FLEXIBLE JOINTS FOR DUCTILE IRON PIPE IN PRESSURE AND NON-PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

244.1 SCOPE

This specification covers ductile iron fittings with end thrust restraint for use with ductile iron pipes having “cast iron outside diameters” (CIOD) in pressure and non-pressure applications for water supply[1] and sewerage.

244.2 REQUIREMENTS

(a) Ductile iron fittings shall comply with AS/NZS 2280:2014/Amdt 1:2015.

(b) Fittings shall be polymeric coated to AS/NZS 4158:2003/Amdt 1:2005.

(c) Where fittings do not comply with AS/NZS 4020:2005, each fitting shall be marked with ‘NOT SUITABLE FOR DRINKING WATER’ or equivalent in accordance with Clause 1.8.4 of AS/NZS 2280:2014/Amdt 1:2015; and

(d) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(e) Joint seals, items of restraining systems and jointing lubricant shall comply with AS/NZS 4020:2005.

244.3 QUALITY ASSURANCE

(a) Fittings shall have product certification (ISO Type 5) to AS/NZS 2280:2014/Amdt 1:2015.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

244.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
Alternative elastomeric material for joint seals	

NOTE:

1 Includes drinking water and recycled water supply.

PRODUCT SPECIFICATION

WSA PS - 245 DUCTILE IRON FITTINGS WITH RESTRAINED FLEXIBLE JOINTS FOR POLYETHYLENE PIPE OF NOMINAL SIZES 90 TO 710 IN PRESSURE APPLICATIONS–WATER SUPPLY AND SEWERAGE

245.1 SCOPE

This specification covers ductile iron fittings with end thrust restraint for use with polyethylene (PE) pipes of DN 90 to DN 710 inclusive in pressure applications for water supply[1] and sewerage.

245.2 REQUIREMENTS

(a) Ductile iron fittings shall comply with EN 12842:2012[2] except that:

  (i) fittings shall be polymeric coated to AS/NZS 4158:2003/Amdt 1:2005;

  (ii) fittings shall comply with AS/NZS 4020:2005.

(b) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Joint seals, items of restraining systems and jointing lubricant shall comply with AS/NZS 4020:2005.

245.3 QUALITY ASSURANCE

(a) Fittings shall have product certification (ISO Type 5) to EN 12842:2012.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

245.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
Alternative elastomeric material for joint seals	
Need for stiffener inserts for PE pipe	

NOTE:

1 Includes drinking water and recycled water supply.

2 Thrust restraint mechanisms are not recommended for PVC pipes.

PRODUCT SPECIFICATION

WSA PS - 246 PRE-TAPPED CONNECTORS FOR PRESSURE APPLICATIONS – WATER SUPPLY

246.1 SCOPE

This specification covers pre-tapped connectors for pressure applications when connecting property services to water reticulation mains in water supply[1], except for PE mains.

246.2 REQUIREMENTS

(a) Ductile iron pre-tapped connectors shall comply with AS/NZS 2280:2014/Amdt 1:2015.

(b) Ductile iron pre-tapped connectors shall be polymeric coated to AS/NZS 4158:2003. The colour of the coating for use with recycled water shall be purple[1].

(c) Glass Reinforced Nylon (GRN) pre-tapped connectors shall comply with the dimensional requirements of AS/NZS 2280-2014. The colour of the fitting for use with recycled water shall be purple[1]

(d) GRN pre-tapped connectors shall meet the Type Test requirements of AS/NZS 1477:2006 Clauses 3.3.1, 3.3.2, 3.4.2, 3.4.3, 3.5.1 and 3.5.2.

(e) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(f) The pre-tapped connectors shall be fitted with a minimum of 3 DR brass plugs.

(g) Fittings, joint seals, and jointing lubricant shall comply with AS/NZS 4020:2005.

246.3 QUALITY ASSURANCE

(a) Ductile iron pre-tapped connectors shall have product certification (ISO Type 5) to AS/NZS 2280:2014/Amdt 1:2015.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) GRN pre-tapped connectors shall have 3rd party certification to demonstrate conformance to the Type Test requirements nominated in this specification.

(d) All products shall be marked in accordance with the conformity assessment body's requirements where applicable.

246.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Colour of the fitting	

NOTES:

1 Purple is defined in accordance with RAL[2]DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. It is equivalent to being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac in accordance with AS 2700:1996 (NZS 7702:1989AA).

2 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

PRODUCT SPECIFICATION

WSA PS - 247 METALLIC BODIED MECHANICAL COMPRESSION JOINT FITTINGS FOR PRESSURE APPLICATIONS WITH POLYETHYLENE (PE) PIPE – WATER SUPPLY AND SEWERAGE

247.1 SCOPE

This specification covers metallic bodied mechanical compression joint fittings for use with polyethylene pipe for pressure applications in water supply[1] and sewerage.

247.2 REQUIREMENTS

(a) Fittings shall comply with AS/NZS 4129:2008 and AS/NZS 4020:2005.

247.3 QUALITY ASSURANCE

(a) Fittings shall have product certification (ISO Type 5) to AS/NZS 4129:2008/Amdt 1:2013.

(b) Mechanical joint elastomeric seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996)..

(c) All products shall be marked in accordance with the conformity assessment body's requirements where applicable.

246.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[2], PN	
Fitting types[2] (configurations, end types)	

NOTES:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

2 Pressure Class and type of fitting shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS - 260 GATE VALVES, RESILIENT SEATED FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

260.1 SCOPE

This specification covers resilient seated gate valves[1] for pressure applications in water supply[2,3] and sewerage.

260.2 REQUIREMENTS

(a) Resilient seated valves shall comply with AS/NZS 2638.2:2011.

(b) The direction of rotation of input shaft shall be clockwise to close the valve.

(c) Valves shall be supplied with a spindle cap, which, for water supply applications, shall be coated blue[4] or purple[5] with fusion bonded polymer complying with AS/NZS 4158:2003/Amdt 1:2005.

(d) For socket joint configurations, elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(e) For flanged joint configurations, gaskets shall comply with WSA 109:2011.

(f) Minimum class required by Hunter Water shall be PN 16 for water supply and PN 12 for sewerage.

260.3 QUALITY ASSURANCE

(a) Resilient seated gate valves shall have product certification (ISO Type 5) to AS/NZS 2638.2:2011.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(e) All products shall be marked in accordance with the conformity assessment body's requirements.

260.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[7], PN	
End configuration[8] (e.g. flange/flange, socket/socket)	
Integral by-pass	
Gearbox depending on the size of the value and the differential head on the valve	
Opposite direction of closing i.e. clockwise to close the value	
Spindle cap colour	
Extension spindle[9]	
Handwheel in lieu of spindle cap	

Alternative elastomeric materials for joint seals	

NOTES:

1 Resilient seated gate valves are not designed for throttling purposes.

2 Includes drinking water and recycled water supply. Colour differentiation of valve bodies is not required.

3 All gate valves to AS/NZS 2638.2:2011 are required to comply with AS/NZS 4020:2005.

4 Blue shall be defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 200 80 25 or 210 80 25 and no lighter than 200 90 10 or 210 90 10, respectively.

5 Purple is defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. It is equivalent to being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac in accordance with AS 2700:2011 (NZS 7702:1989AA).

6 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

7 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

8 End configurations and extension spindles shall be as specified in the Project Specification or on the Design Drawings.

9 WSA PS–262 covers extension spindles.

PRODUCT SPECIFICATION

WSA PS – 261 GATE VALVES, METAL SEATED FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

261.1 SCOPE

This specification covers metal seated gate valves[1] for pressure applications in water supply[2] and sewerage.

261.2 REQUIREMENTS

(a) Metal seated gate valves shall comply with AS/NZS 2638.1:2011.

(b) Pressure class shall be PN 16.

(c) The direction of closing shall be clockwise.

(d) Valves shall be supplied with a spindle cap, which, for water supply applications, shall be coated blue[4] or purple[5] with fusion bonded polymer complying with AS/NZS 4158:2003/Amdt 1:2005.

(e) For socket joint configurations, the elastomeric joint seal shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(f) For flanged joint configurations, gaskets shall comply with WSA 109:2011.

(g) Valves and joint seals for water supply shall comply with AS/NZS 4020:2005.

(h) Valves that do not comply with AS/NZS 4020:2005 shall be legibly and durably marked with black letters of at least 10 mm high “SEWAGE – DO NOT DRINK” or equivalent.

261.3 QUALITY ASSURANCE

(a) Metal seated valves shall have product certification (ISO Type 5) to AS/NZS 2638.1:2011.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646 or EN 681.1:1996.

(d) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(e) All products shall be marked in accordance with the conformity assessment body’s requirements.

261.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[6], PN	
End configuration[3] (e.g. flange/flange, socket/socket)	
Gearbox depending on the size of the value and the differential head on the valve	
Opposite direction of closing i.e. clockwise to close the valve	
Spindle cap colour	
Extension spindle[7]	

Handwheel in lieu of spindle cap	
Alternative elastomeric materials for joint seals	

261.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative Pressure Class PN 35	

NOTES:

1 Metal seated gate valves are not designed for throttling purposes.

2 Includes drinking water and recycled water supply. Colour differentiation for valve bodies is not required.

3 End configurations and extension spindles shall be as specified in the Project Specification or on the Design Drawings.

4 Blue shall be defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 200 80 25 or 210 80 25 and no lighter than 200 90 10 or 210 90 10, respectively.

5 Purple is defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. It is equivalent to being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac in accordance with AS 2700:2011 (NZS 7702:1989AA).

6 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

7 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

8 WSA PS–262 covers extension spindles.

PRODUCT SPECIFICATION

WSA PS – 262 EXTENSION SPINDLES FOR GATE VALVES

262.1 SCOPE

This specification covers extension spindles for use with metal and resilient seated gate valves.

262.2 REQUIREMENTS

(a) Extension spindles shall comply[1] with AS/NZS 2638.1:2011 Test J and AS/NZS 2638.2:2011 Test M.

(b) Where extension spindles are fabricated using welding, all welding shall be carried out in accordance with AS/NZS 1554.1:2014 Category GP. Cast iron (including grey and ductile iron) components shall not be welded.

(c) In aggressive soils and ground waters, corrosion resistant materials such as grade 316 stainless steel should be specified.

(d) Where the materials used are not corrosion resistant to soil and ground water (e.g. plain carbon or low alloy steels) the extension spindle shall be coated[2] using bitumen paint or synthetic resin based protection systems or thermal bonded polymeric coatings. Bitumen paint shall comply with AS/NZS 3750.4:1994. Synthetic resin base coatings shall comply with AS/NZS 3750.19:2008. Thermal-bonded polymeric coatings shall comply with AS/NZS 4158:2003/Amdt 1:2005.

262.3 QUALITY ASSURANCE

(a) Extension spindles shall have a certificate of compliance to this specification.

262.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size(s) of valve(s) (DN) on which extension spindles are to be used	
Length(s) of extension spindle(s), m	
A specific corrosion protection system (i.e. bitumen or synthetic resin based protection systems or thermal bonded polymeric coatings) or a corrosion resistant material[2] (e.g. Grade 316 stainless steel)	

NOTES:

1 Where the maximum strength test torques specified in AS/NZS 2638.1:2011 and AS/NZS 2638.2:2011 are not the same for the same nominal size of valve, the higher value shall be used.

2 In aggressive soils and ground waters, corrosion resistant materials such as grade 316 stainless steel should be specified.

PRODUCT SPECIFICATION

WSA PS – 263 BUTTERFLY VALVES FOR PRESSURE APPLICATIONS – WATER SUPPLY

263.1 SCOPE

This specification covers resilient seated wafer, tapped lugged and flanged butterfly valves for use in pressure applications for water supply[1].

263.2 REQUIREMENTS

(a) Water and tapped lugged butterfly valves shall comply with AS 4795.1:2011.

(b) Double-flanged butterfly valves shall comply with AS 4795.2:2011.

(c) The direction of closing shall be clockwise.

(d) For end connections, full face and integral gaskets and O-rings shall comply with WSA 109:2011.

263.3 QUALITY ASSURANCE

(a) Wafer and tapped lugged butterfly valves shall have product certification (ISO Type 5) to AS 4795:1:2011.

(b) Double-flanged butterfly valves shall have product certification (ISO Type 5) to AS 4795.2:2011.

(c) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(d) High build two-pack epoxy coatings shall have Australian Paint Approval Scheme (APAS™) approval to Specifications 2975P or 2977P.

(e) Full face and integral gaskets and O-rings shall have a certificate of compliance to WSA 109:2011.

(f) All products shall be marked in accordance with the conformity assessment body's requirements.

263.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

See Appendix B of AS 4795:1:2011 for wafer and tapped lugged butterfly valves or AS 4795.2:2011 for double-flanged butterfly valves.

NOTE:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

PRODUCT SPECIFICATION

WSA PS – 264 NON-RETURN (REFLUX) VALVES FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

264.1 SCOPE

This specification covers flanged non-return valves[1] of either the swing check or tilting disc type for pressure applications in water supply[2] and sewerage.

264.2 REQUIREMENTS

(a) Valves shall comply with AS 4794:2001.

(b) Pressure class shall be PN 16.

(c) Lifting lugs shall be provided for valves ≥DN 250.

(d) Non-return valves for water supply shall comply with AS/NZS 4020:2005.

(e) Valves that do not comply with AS/NZS 4020:2005 shall be legibly and durably marked with black letters of at least 10 mm high “SEWAGE – DO NOT DRINK” or equivalent.

264.3 QUALITY ASSURANCE

(a) Non-return valves shall have product certification (ISO Type 5) to AS/NZS 4794:2001.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

264.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

See Appendix B of AS 4794:2001.

264.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative Pressure Class PN 35	
Alternative materials as per Appendix C of AS 4794:2001	

NOTES:

1 Non-return valves may also be known as reflux valves or check valves.

2 Includes drinking water and recycled water supply. Colour differentiation is not required.

PRODUCT SPECIFICATION

WSA PS – 265 AIR VALVES FOR PRESSURE APPLICATIONS - WATER SUPPLY

265.1 SCOPE

This specification covers air valves of the following types for pressure applications in water supply[1].

(a) Small orifice valves with nominal inlet size of DN 15, 20 and 25.

(b) Large orifice valves with nominal inlet size of DN 50, 80, 100, 150 and 200.

(c) Combination (double) air valves.

265.2 REQUIREMENTS

(a) Air valves shall comply with AS 4956:2017.

(b) For flanged end connections, full face and integral gaskets and O-rings shall comply with WSA 109:2011.

265.3 QUALITY ASSURANCE

(a) Air valves shall have product certification (ISO Type 5) to AS 4956:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08[2].

(b) Full face and integral gaskets and O-rings shall have a certificate of compliance to WSA 109:2011.

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

265.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

See Appendix B of AS 4956:2017.

NOTE:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

2 Water Services Association of Australia Technical Note (WSA TN-08) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 4956:2017.

PRODUCT SPECIFICATION

WSA PS – 266 KNIFE GATE VALVES FOR PRESSURE APPLICATIONS - WATER SUPPLY AND SEWERAGE

266.1 SCOPE

This specification covers PN 10 flanged or wafered or lugged knife gate valves for use in pressure applications in water supply[1] and sewerage.

266.2 REQUIREMENTS

(a) Knife gate valves shall comply with AS 6401:2003.

(b) For end connections, full face and integral gaskets and O-rings shall comply with WSA 109:2011.

(c) Knife gate valves for water supply shall comply with AS/NZS 4020:2005.

(d) Knife gate valves that do not comply with AS/NZS 4020:2005 shall be legibly and durably marked with black letters of at least 10 mm high “SEWAGE – DO NOT DRINK” or equivalent.

266.3 QUALITY ASSURANCE

(a) Knife gate valves shall have product certification (ISO Type 5) to AS 6401:2003.

(b) Full face and integral gaskets and O-rings shall have a certificate of compliance to WSA 109:2011.

(c) All products shall be marked in accordance with the conformity assessment body’s requirements.

266.4 AGENCY SPECIFIC OR PROJECT REQUIREMENTS

See Appendix B of AS 6401:2003.

266.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative materials as per Appendix D of AS 6401:2003	

NOTE:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

PRODUCT SPECIFICATION

WSA PS – 267 HYDRANTS (SPRING) FOR PRESSURE APPLICATIONS - WATER SUPPLY

267.1 SCOPE

This specification covers PN 16 DN 80 below-ground spring hydrants for pressure applications in water supply when connecting to water mains[1] using a DN 80 or DN 100 flanged tee (hydrant tee).

267.2 REQUIREMENTS

(a) Spring hydrants shall comply with AS 3952:2002.

(b) The outlets to spring hydrants (e.g. claws) for use with recycled water shall be coloured purple[2].

(c) The body thickness of the hydrant seal shall be a minimum of 6 mm.

(d) Flange gaskets shall comply with WSA 109:2011.

267.3 QUALITY ASSURANCE

(a) Spring hydrants shall have product certification (ISO Type 5) to AS 3952:2002.

(b) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

267.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Flange size (DN 80 or DN 100)	

NOTES:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

2 Purple is defined in accordance with RAL[3]DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. It is equivalent to being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac in accordance with AS 2700:2011 (NZS 7702:1989AA).

3 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

PRODUCT SPECIFICATION

WSA PS – 268 AUTOMATIC CONTROL VALVES FOR PRESSURE APPLICATIONS – WATER SUPPLY

268.1 SCOPE

This specification covers PN 16, 21 and 35 hydraulically-operated, diaphragm or piston actuated, globe or piston-style, automatic control valves in size range DN 40 to DN 900 for pressure applications in water supply[1].

268.2 REQUIREMENTS

(a) Valves[2, 3] shall comply with AS 5081:2008.

(b) For flanged joint configurations, gaskets shall comply with WSA 109:2011.

268.3 QUALITY ASSURANCE

(a) Valves shall have product certification (ISO Type 5) to AS 5081:2008.

(b) If applicable, high-build two-pack epoxy coatings shall have Australian Paint Approval Scheme (APAS™) approval to Specifications 2975P or 2977P.

(c) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

268.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

See Appendix B of AS 5081:2008.

NOTES:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

2 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

3 End configurations shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS – 269 EXTENSION SPINDLES FOR VALVES (OTHER THAN GATE VALVES)

269.1 SCOPE

This specification covers extension spindles for use with valves other than metal and resilient seated gate valves.

269.2 REQUIREMENTS

(a) Extension spindles shall comply[1] with AS/NZS 2638.1:2011 Test J and AS/NZS 2638.2:2011 Test M except that the maximum strength test torques specified in the valve product standard shall be used.

(b) Where extension spindles are fabricated using welding, all welding shall be carried out in accordance with AS/NZS 1554:1:2014 Category GP. Cast iron (including grey and ductile iron) components shall not be welded.

(c) Where the materials used are not corrosion resistant to soil and groundwater (e.g. plain carbon or low alloy steels) the extension spindle shall be coated[2] using bitumen paint or synthetic resin based protection systems or thermal bonded polymeric coatings. Bitumen paints shall comply with AS/NZS 3750.4:1994. Synthetic resin base coatings shall comply with AS/NZS 3750.19.2008. Thermal-bonded polymeric coatings shall comply with AS/NZS 4158:2003/Amdt 1:2005.

269.3 QUALITY ASSURANCE

(a) Extension spindles shall have a certificate of compliance to this specification.

269.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size(s) of valves(s) (DN) on which extension spindles are to be used	
Length(s) of extension spindle(s), m	
A specific corrosion protection system i.e. bitumen or synthetic resin based protection systems or thermal bonded polymeric coatings) or a corrosion resistant material[2] (e.g. Grade 316 stainless steel)	

NOTES:

1 Where the maximum strength test torques specified in AS/NZS 2638.1:2011 and AS/NZS 2638.2:2011 are not the same for the same nominal size of valve, the higher value shall be used.

2 In aggressive soils and ground waters, corrosion resistant materials such as grade 316 stainless steel should be specified.

PRODUCT SPECIFICATION

WSA PS – 270 MECHANICAL COUPLINGS, NON-END THRUST RESTRAINT FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

270.1 SCOPE

This specification covers non-end thrust restraint mechanical couplings for use with PVC and ductile iron pipes having "cast iron outside diameters" (CIOD) in pressure applications in water supply[1] and sewerage.

270.2 REQUIREMENTS

(a) Couplings for pipelines other than PE shall comply with AS/NZS 4998:2009.

(b) Couplings for PE pipelines shall comply with AS/NZS 4129:2008/Amdt 1:2013.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Flange adaptor connections shall comply with AS/NZS 4087:2011/Amdt 1:2012.

(e) For flanged adaptor end connections, full face and integral gaskets and O-rings shall comply with WSA 109:2011.

(f) Pressure Class shall be PN 16.

(g) Jointing lubricants shall comply with AS/NZS 4020:2005.

270.3 QUALITY ASSURANCE

(a) Couplings shall have product certification (ISO Type 5) to AS/NZS 4998:2009.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Elastomeric joint seals shall have product certification to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) For flanged adaptor end connections, full face and integral gaskets and O-rings shall have a certificate of compliance to WSA 109:2011.

(e) Jointing lubricants shall have a certificate of compliance to AS/NZS 4020:2005.

(f) All products shall be marked in accordance with the conformity assessment body's requirements.

270.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
Pipe material(s) to be joined	
Coupling length i.e. short series or long series	
Coupling type e.g. straight, stepped, flange adaptor	
For stepped couplings nominate the range of outside diameters to be joined	
For flange adaptors nominate the flange drilling Figure from AS/NZS 4087:2011/Amdt 1:2012 or other nominated flange Standard	
Alternative elastomeric material for joint seals	

270.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative Pressure Class e.g. PN 35	
Alternative bolt head configurations	
Coating requirements	

NOTE:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

PRODUCT SPECIFICATION

WSA PS – 271 DUCTILE IRON WIDE TOLERANCE MECHANICAL COUPLINGS AND FLANGE ADAPTERS, END THRUST RESTRAINT, FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

271.1 SCOPE

This specification covers ductile iron wide tolerance mechanical couplings and flange adapters with end thrust restraint for use with ductile iron, polyethylene (PE), asbestos cement (AC) and steel pipes[1] in pressure applications for water supply[2] and sewerage.

271.2 REQUIREMENTS

(a) Couplings and flange adapters shall comply with EN 14525:2004 *Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, grey iron, steel, PVC-U, PE, fibre-cement.*

(b) Elastomeric joint seals shall be EPDM or NBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Fasteners shall be Grade 316 Stainless Steel with galling prevention compound applied to the threads.

(d) Joint seals, items of restraining systems and jointing lubricant shall comply with AS/NZS 4020:2005.

271.3 QUALITY ASSURANCE

(a) Couplings shall have product certification (ISO Type 5) certification to EN14525:2004.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Components in contact with water shall have a certificate of compliance to AS/NZS 4020:2005.

(d) All products shall be marked in accordance with the conformity assessment body's requirements where applicable.

271.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
Pipe material(s) to be joined	
Coupling length i.e. short series or long series	
Coupling type e.g. straight, stepped, flange adaptor	
Nominate the range of outside diameters to be joined	
For flange adaptors nominate the flange drilling Figure from AS/NZS 4087:2011/Amdt 1:2012 or other nominated flange Standard	
Alternative elastomeric material for joint seals	

271.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Coating requirements	

NOTES:

1 Thrust restraint mechanisms are not recommended for use with PVC or GRP pipes.

2 Includes drinking water and recycled water supply. Colour differentiation is not required.

PRODUCT SPECIFICATION

WSA PS – 273 VACUUM INTERFACE VALVES FOR PRESSURE APPLICATIONS - SEWERAGE

273.1 SCOPE

This specification covers DN 80 piston type vacuum interface valves for pressure applications in sewerage.

273.2 REQUIREMENTS

(a) Vacuum interface valves shall comply with AS 4310:2004.

273.3 QUALITY ASSURANCE

(a) Vacuum interface valves shall have product certification (ISO Type 5) to AS 4310:2004.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

273.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Cycle counters to be fitted	
Air admittance valve or breather bell to be supplied	

273.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative materials as per Appendix D of AS 4310:2004	

PRODUCT SPECIFICATION

WSA PS – 274 BALL VALVES FOR PRESSURE APPLICATIONS – WATER SUPPLY

274.1 SCOPE

This specification covers metal and plastics bodied DN 15 to DN 50 ball valves for pressure applications in water supply[1]. Ball valves covered by this specification are:

(a) Service connection ball valves for tapping into reticulation pipelines.

(b) Service connection termination ball valves located at the property boundary.

(c) Right angle meter assembly ball valves located adjacent to the property service water meter.

Pressure classification is PN 16.

274.2 REQUIREMENTS

(a) Metal bodied and plastics bodied ball valves shall comply with AS 4796:2016.

(b) Valves shall have clockwise direction of closure.

274.3 QUALITY ASSURANCE

Metal bodied and plastics bodied ball valves shall have product certification (ISO Type 5) to AS 4796:2016.

274.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Alternative Pressure Class	PN 20, PN 25
Material Options Body: Ball: Components not in contact with water	 DR copper alloy, stainless steel, plastic Stainless steel, chrome plated DR copper alloy DR copper alloy
Face to face dimensions	Nominate
Body end connections	Threaded, union, compression

274.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative materials e.g. plastics bodied	
Alternative end configurations	

NOTE:

1 Includes drinking water and recycled water supply.

PRODUCT SPECIFICATION

WSA PS – 275 AIR VALVES FOR PRESSURE APPLICATIONS - SEWERAGE

275.1 SCOPE

This specification covers metallic bodied DN 50 to DN 200 air valves[1] for pressure applications in sewerage.

275.2 REQUIREMENTS

(a) Valves shall comply with AS 4883:2017.

275.3 QUALITY ASSURANCE

(a) Valves shall have product certification (ISO Type 5) to AS 4883:2017. The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08[2].

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

275.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

See Appendix B of AS 4883:2017.

NOTES:

1 Includes large orifice air, small orifice, double orifice and anti-slam air valves.

2 Water Services Association of Australia Technical Note (WSA TN-08) sets out additional product conformity assessment requirements that are associated with demonstration of conformity to AS/NZS 4883:2017.

PRODUCT SPECIFICATION

WSA PS - 278 GATE VALVES, RESILIENT SEATED, WITH INTEGRAL POLYETHYLENE (PE) ENDS FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

278.1 SCOPE

This specification covers ductile iron, resilient seated gate valves for use in PE water supply[1] and pressure sewerage applications.

This specification covers resilient seated gate valves[1] with integral polyethylene (PE) ends/ tails for pressure applications in water supply[2] and sewerage.

278.2 REQUIREMENTS

(a) Resilient seated valves shall comply with EN 1074-2:2000.

(b) Valve component materials shall meet the design requirements of Section 3 of AS/NZS 2638.2:2011.

(c) Gate valves shall meet the design requirements of Section 3 of AS/NZS 2638.2:2011.

(d) Valves shall be internally lined and externally coated with a fusion bonded polymer conforming to AS/NZS 4158:2003/Amdt 1:2005.

(e) The direction of rotation of input shaft shall be clockwise to close the valve.

(f) Valves shall be supplied with a spindle cap in accordance with Clause 3.8.2 and Figure 3.4 of AS/NZS 2638.2:2011, which, for water supply applications, shall be coated blue[3] or purple[4] with fusion bonded polymer complying with AS/NZS 4158:2003/Amdt 1:2005.

(g) The integrity of the design and process for making the connection of the PE integral end/tail to the metallic spigot of the valve shall be verified by type testing in accordance with Appendix PS 278.

(h) Valves shall comply with AS/NZS 4020:2005. A scaling factor of 0.01 shall be applied.

278.3 QUALITY ASSURANCE

(a) Resilient seated gate valves shall have product certification (ISO Type 5) to EN 1074-2:2000.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Valves shall have a certificate of compliance to Appendix PS 278.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

278.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[6], PN	
Integral by-pass	
Gearbox depending on the size of the valve and the differential head on the valve	

Opposite direction of closing i.e. clockwise to close the value	
Spindle cap colour	
Extension spindle[7]	
Handwheel in lieu of spindle cap	

NOTES:

1 Resilient seated gate valves are not designed for throttling purposes.

2 Includes drinking water and recycled water supply. Colour differentiation of valve bodies is not required.

3 Blue shall be defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 200 80 25 or 210 80 25 and no lighter than 200 90 10 or 210 90 10, respectively.

4 Purple is defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. It is equivalent to being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac in accordance with AS 2700:2011 (NZS 7702).

5 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

6 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

7 WSA PS–262 covers extension spindles.

APPENDIX PS 278

278 A1 TEST METHOD FOR ASSURING THE CONNECTION OF PE "TAIL" PIPE TO METALLIC VALVE

(Based on VP 600, July 2001, Werkstoffubvergangsverrbinder aus Metall fur Rohre aus PE, Sect.3.6 and3.7)

278 A1.1 Longitudinal sealing

(a) Conduct the test at a temperature of 23±2 °C

(b) Set the metal valve into a tensile testing machine giving an axial tensile stress of magnitude 7.5N/mm^2

(c) Apply the test load within 10 – 15 s.

(d) Maintain the test load constantly for at least 1 h.

NOTE: A constructive related relative movement between the PE pipe and the valve as the test load is applied is not cause for deeming failure, provided that the movement ceases during the test period.

(e) If after the test period there is movement between the PE pipe and the valve, continue the test until the movement stops or the pipe is pulled from the valve (i.e. test fails).

(f) Undertake a leak test to DIN 3230-4 (1977-03) at a test pressure of 1.5 x PN of the valve for at least 10 min. There shall be no evidence of leakage.

278 A1.2 Pull-out resistance

(a) During the test the pipe shall not pull out of the valve or exhibit damage.

(b) Following the longitudinal sealing test, the axial load shall be increased steadily at a rate such that the PE pipe starts to elongate within approximately 5 s.

(c) Release the load.

(d) The pipe/valve connection shall remain intact without evidence of failure (on visual inspection).

PRODUCT SPECIFICATION

WSA PS - 279 EUROPEAN GATE VALVES, RESILIENT SEATED FOR PRESSURE APPLICATIONS – WATER SUPPLY

279.1 SCOPE

This specification covers European resilient seated gate valves[1] for pressure applications in water supply[2 & 3].

279.2 REQUIREMENTS

(a) European resilient seated valves shall comply with EN 1074.1:2000.

(b) Valve component materials shall meet the requirements of Clauses 2.1 and 2.2 of AS/NZS 2638.2:2011.

(c) Gate valves shall meet the design requirements of Section 3 of AS/NZS 2638.2:2011.

(d) Valves shall be internally lined and externally coated with a fusion bonded polymer conforming to AS/NZS 4158:2003/Amdt 1:2005.

(e) The direction of rotation of input shaft shall be clockwise to close the valve.

(f) Valves shall be supplied with a spindle cap in accordance with Clause 3.8.2 and Figure 3.4 of AS/NZS 2638.2:2011, which, for water supply applications, shall be coated blue[4] (or purple[5] for recycled water applications) with fusion bonded polymer complying with AS/NZS 4158:2003/Amdt 1:2005.

(g) For flange joint configurations, flange dimensions shall be in accordance with Figure B5 (for PN 16) or Figure B6 (for PN 25) of AS/NZS 4087:2011/Amdt 1:2012.

(h) For socket joint configurations designed for compatibility with AS/NZS 2280:2014/Amdt 1:2015 pipes, Series 1 or Series 2 PVC pipe, the elastomeric seal joints shall meet the type test requirements of AS/NZS 2280:2014/Amdt 1:2015 Appendix F.

(i) For flange joint configurations, gaskets shall comply with WSA 109:2011.

(j) For socket joint configurations designed for compatibility with EN 545:2010 pipes the elastomeric seal joints shall meet the type test requirements of EN 545:2010[8].

(k) Elastomeric joint seals shall be EPDM.

(l) Spigot ends shall conform to AS/NZS 2280:2014/Amdt 1:2015 or EN 545:2010 to suit the relevant pipeline outside diameter.

(m) The gate valves shall meet the type test requirements of Clause 5.1 of AS/NZS 2638.2:2011.

(n) Where valves have a restrained joint for polyethylene pipe at one or both ends, the joint shall meet the requirements of Clause 245.2 (a) (i) of WSA PS-245 *Ductile Iron Fittings with restrained flexible joints for polyethylene pipe of DN 90 to DN 1000 in pressure applications – water supply and sewerage.*

(o) Valves and joint seals for water supply shall comply with AS/NZS 4020:2005.

279.3 QUALITY ASSURANCE

(a) Resilient seated gate valves shall have product certification (ISO Type 5) to this Specification or alternatively product certification to EN 1074.2:2000 with third party certification to demonstrate compliance with the additional requirements of this Specification.

(b) Polymeric coatings shall have product certification (ISO Type 5) to Section 2 of AS/NZS 4158:2003/Amdt 1:2005. Factory applied coatings shall have third party

certification to demonstrate compliance with Section 3 of AS/NZS 4158:2003/Amdt 1:2005 Section 3.

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Flange gaskets shall have certificates of compliance to WSA 109:2011.

(e) All products shall be marked in accordance with the conformity assessment body's requirements.

279.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class[7], PN	
End configuration[8] (e.g. flange/flange, socket/socket, flange/spigot, socket/spigot)	
Effective length, EN or AS	
Socket compatibility, EN 545 or AS/NZS 2280	
Integral by-pass	
Gearbox depending on the size of the value and the differential head on the valve	
Opposite direction of closing i.e. clockwise to close the value	
Spindle cap colour	
Extension spindle[9]	
Handwheel in lieu of spindle cap	
Alternative elastomeric materials for joint seals	

NOTES:

1 Resilient seated gate valves are not designed for throttling purposes.

2 Includes drinking water and recycled water supply. Colour differentiation of valve bodies is not required.

3 All gate valves to EN 1074.2:2000 are required to comply with AS/NZS 4020:2005.

4 Blue shall be defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 200 80 25 or 210 80 25 and no lighter than 200 90 10 or 210 90 10, respectively.

5 Purple is defined in accordance with RAL[4]DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. It is equivalent to being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac in accordance with AS 2700:2011 (NZS 7702:1989AA).

6 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

7 Pressure Class shall be as specified in the Project Specification or on the Design Drawings.

8 End configurations and extension spindles shall be as specified in the Project Specification or on the Design Drawings.

9 WSA PS–262 covers extension spindles.

PRODUCT SPECIFICATION

WSA PS - 280 REFLUX VALVES - SEWERAGE

280.1 SCOPE

This specification covers plastics-bodied reflux valves[1] manufactured from polyvinylchloride unplasticised (PVC-U) and acrylonitrile butadiene styrene (ABS) that are intended to prevent the reversal of wastewater flow by means of a resilient-seated disc/flap or other mechanism, for use in non-pressure sewerage applications. It covers sizes DN 100 to DN 600.

280.2 REQUIREMENTS

(a) Reflux valves shall comply with WMTS-006:2014.

(b) PVC-U reflux valves shall be marked 'BEP PVC' or the words 'BEST ENVIRONMENTAL PRACTICE PVC'.

(c) Reflux valves shall be stiffness class SN8 or higher.

(d) Joints:

  (i) Elastomeric seals shall be EPDM or CR or SBR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

  (ii) Solvent cement and priming fluid for use with tapered socketed fittings shall be Type N[2] or Type G[3] complying with AS/NZS 3879:2011.

  (iii) Solvent cement for use with parallel socketed fittings shall be Type G[3] complying with AS/NZS 3879:2011.

280.3 QUALITY ASSURANCE

(a) Non-pressure reflux valves shall have product certification to WMTS-006-2014, Appendix A, Clause A3 PRODUCT CERTIFICATION (ISO Type 3 i.e. WaterMark Level 2b – Ref. ISO Guide 67 System 1b).

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Solvent cements shall have product certification (ISO Type 5) to AS/NZS 3879:2011.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

280.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Joint type (elastomeric seal or solvent cement)	
Alternative pipe stiffness Class (e.g. SN16)	
Alternative elastomeric material for joint seals (e.g. NBR)	

NOTES:

1 Reflux valves may also be known as non-return valves or check valves.

2 Type N is used for jointing PVC pipe systems with tapered/interference fit joints which will not be subjected to internal pressure or other applications where high bond strength is not required.

3 Type G is used for joining PVC and ABS pressure or non-pressure pipes where parallel/no or low interference fit joints are used and where a high bond strength and ability to fill small gaps is required.

PRODUCT SPECIFICATION

WSA PS - 290 DUCTILE IRON ACCESS COVERS AND FRAMES FOR WATER SUPPLY AND SEWERAGE TO WSA 132

290.1 SCOPE

This specification covers circular and single and multi-part square or rectangular access (surface) covers and frames conforming to WSA 132:2011[1] for use in:

(a) Water supply e.g. covers for valve or scour chambers.

(b) Sewerage e.g. maintenance holes, maintenance shafts, inspection openings.

290.2 REQUIREMENTS

Access covers and frames shall comply with WSA 132:2011.

290.3 QUALITY ASSURANCE

(a) Access covers and frames shall have ISO Type 5 product certification to WSA 132:2011.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

290.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, mm e.g. 600 mm diameter, 900 x 1200 mm etc	
The style of the cover e.g. round, solid top, infill etc. and its sealability e.g. sealed, unsealed, ventilated	
Minimum clear opening, mm	
Class e.g. B, D, E, F	
Rocking of units in their frames restricted (Refer to Clause 3.2.1.4 of AS 3996:2006)	
Lifting requirements	
Additional marking requirements e.g. CP test point	
Specific requirements for a hinged connection	
Specific packaging, transportation and delivery requirements	
Specific marking requirements	
Alternative coating requirements	
Bolt-down requirements, including bolting material and class	
Alternative materials	

NOTE:

1. WSA PS-291 specifies access covers and frames (manhole tops) conforming to EN 124:1994.

PRODUCT SPECIFICATION

WSA PS – 291 DUCTILE IRON ACCESS COVERS AND FRAMES FOR WATER SUPPLY AND SEWERAGE TO EN 124

291.1 SCOPE

This specification covers circular and single and multi-part square or rectangular access (surface) covers and frames (manhole tops) conforming to EN 124:2015[1] for use in:

(a) Water supply e.g. covers for valve or scour chambers.

(b) Sewerage e.g. maintenance holes, maintenance chambers, maintenance shafts, inspection openings.

291.2 REQUIREMENTS

(a) Covers and frames shall conform to EN 124:2015 with the following variations:

(i) Replace Clause 5 of EN 124:2015 with:

5 LOAD CLASSIFICATIONS FOR PLACE OF INSTALLATION

The appropriate class of manhole top (access cover and frame) to be used depends upon the place of installation. Some places of installation, relative to class are listed below. The selection of the appropriate class is the responsibility of the network designer and where there is doubt the stronger class shall be specified.

Group 2 (minimum Class B 125): Footways, pedestrian areas and property accessible to slow moving / parked vehicles (excluding commercial).

Group 3 (minimum Class C 250): Carriageways of urban roads (speed limit ≤100 km/h) and areas open to commercial vehicles (speed limit ≤100 km/h).

Group 4 (minimum Class D 400): Carriageways of major roads (speed limit >100 km/h).

Group 5 (minimum Class E 600): Areas imposing high wheel loads e.g. docks and aircraft pavements.

(ii) Add new Clause 6.1.5:

6.1.5 Coatings

All solid-top cast iron covers and frames other than recessed parts covers for concrete infill shall be coated. The coating shall comply with AS/NZS 3750.4:1994 or BS 3416:1991.

The coating shall be applied to all non-sealing and non-threaded surfaces of the cover and frame. Coating inadvertently applied to sealing and threaded surfaces shall be removed prior to delivery or supply.

After application and drying (curing) the coating shall be dry to touch (not sticky) and not mark clothing or skin during manual handling.

All fabricated steel covers and frames shall be hot-dip galvanised after fabrication in accordance with AS/NZS 4680:2006.

291.3 QUALITY ASSURANCE

(a) Manhole tops shall have ISO Type 5 product certification to EN 124:2015.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

(c) All products shall be tagged to indicate that they comply with the requirements of this specification.

291.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size mm e.g. 600 mm diameter, 900 x 1200 mm etc	
The style of the cover e.g. round, solid top, infill etc and its sealability e.g. sealed, unsealed, ventilated	
Minimum clear opening, mm	
Class e.g. B, D, E, F	
Lifting requirements	
Additional marking requirements e.g. water, sewer, stormwater etc [See EN 124:2015 Clause 9(e)]	
Specific requirements for a hinged connection	
Specific marking requirements	
Bolt-down requirements, including bolting material and class	
Alternative coating requirements	
Alternative materials	

NOTE:

1 WSA PS-290 specifies covers and frames (manhole tops) conforming to WSA 132:2011.

PRODUCT SPECIFICATION

WSA PS - 292 MACRO-COMPOSITE ACCESS COVERS AND FRAMES FOR WATER SUPPLY AND SEWERAGE TO WSA 133

292.1 SCOPE

This specification covers macro-composite, Class B, solid top, gas-tight and watertight circular and single and multi-part square or rectangular access (surface) covers and macro-composite or ductile iron frames conforming to WSA 133:2013 for use in:

(a) Water supply e.g. covers for valve or scour chambers.

(b) Sewerage e.g. maintenance holes, maintenance shafts, inspection openings.

292.2 REQUIREMENTS

Access covers and frames shall comply with WSA 133:2013.

292.3 QUALITY ASSURANCE

(a) Access covers and frames shall have ISO Type 5 product certification to WSA 133:2013.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

292.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, mm e.g. 600 mm diameter, 900 x 1200 mm etc	
Minimum clear opening, mm	
Lifting requirements	
Additional marking requirements e.g. CP test point	
Specific packaging, transportation and delivery requirements	
Specific marking requirements	
Bolt-down requirements, including bolting material and class	

PRODUCT SPECIFICATION

WSA PS - 293 THERMOPLASTIC ACCESS COVERS AND FRAMES FOR WATER SUPPLY AND SEWERAGE

293.1 SCOPE

This specification covers thermoplastic, solid top, gas-tight and water-tight circular access (surface) covers with ductile iron frames with a clear opening of not less than 600 mm conforming to the requirements listed below for use in:

(a) Water supply e.g. covers for valve or scour chambers.

(b) Sewerage e.g. maintenance holes, maintenance chambers, maintenance shafts and inspection openings.

293.2 REQUIREMENTS

Thermoplastic solid top access covers shall demonstrate considered compliance with EN 124-6:2015 subject to the following variations:

(a) Replace referenced Clause 4.2 of EN 124-1:2015 with:

LOAD CLASSIFICATIONS FOR PLACE OF INSTALLATION

The minimum class of thermoplastic access covers shall be Group 2 (minimum Class B 125): Footways, pedestrian areas and property accessible to slow moving/parked vehicles (excluding commercial)[2].

(b) Access cover/frame assemblies shall show no visible leakage when tested for gas-tightness in accordance with WSA 132:2011, Clause 4.6.

(c) Access cover/frame assemblies shall show no visible leakage when tested for water-tightness in accordance with WSA 132:2011, Clause 4.7.

(d) Additional load testing to simulate a parked car on a hot day (High Temperature Test). Testing load applied for 4 hours after being conditioned for 4 hours @ 50ºC to meet the requirements of WSA 132:2011, Clause 4.10, Table 4.2, load Class B.

293.3 QUALITY ASSURANCE

(a) Access cover tops shall have ISO Type 5 product certification to EN 124-6:2015.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

(c) All products shall be tagged to indicate that they comply with the requirements of this specification.

293.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Lifting requirements	
Additional marking requirements	
Specific packaging, transportation and delivery requirements	

NOTES:

1 The place of installation of thermoplastic access covers is the responsibility of the network designer and where there is doubt a stronger class (product) shall be specified.

PRODUCT SPECIFICATION

WSA PS - 310 TAPPING BANDS – MECHANICAL FOR PRESSURE APPLICATIONS - WATER SUPPLY

310.1 SCOPE

This specification covers mechanical tapping bands for pressure applications in connecting property services to water reticulation mains[1], except for PE mains.

310.2 REQUIREMENTS

(a) Tapping bands shall comply with AS/NZS 4793:2009.

(b) Pressure Class shall be PN 16.

310.3 QUALITY ASSURANCE

(a) Tapping bands shall have product certification (ISO Type 5) to AS/NZS 4793:2009.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

310.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal pipe size (DN) and off-take size (DN)	
With or without electrical insulation[2]	
Series RP or Series RC internal outlet thread[3]	

310.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative Pressure Class, PN	

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

2 Electrical insulation should be specified for tapping bands used on metallic pipes.

3 Where a tapered RC external threaded fitting is to be screwed into a plastics bodied tapping band, a tapered RC internal outlet thread is recommended.

4 WSA PS–327 covers tapping bands for PE pipe.

PRODUCT SPECIFICATION

WSA PS - 312 FLANGE GASKETS AND O-RINGS

312.1 SCOPE

This specification covers flange gaskets and O-rings for pressure applications in water supply[1] and sewerage.

312.2 REQUIREMENTS

(a) Flange gaskets and O-rings shall comply with WSA 109:2011.

312.3 QUALITY ASSURANCE

(a) Flange Gaskets and O-Rings shall have product certification (ISO Type 3) to WSA 109:2011.

(b) Pressure Class shall be PN 16.

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

312.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
O-ring or gasket	
Type (Refer to Table 4.3 of WSA 109:2011)	
Nominal size	
Material	
Hardness classification for elastomers	
Additional requirements as per Appendix B of WSA 109:2011	

312.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative Pressure Class	

NOTE:

1 Includes drinking water and recycled water supply.

PRODUCT SPECIFICATION

WSA PS - 313 REPAIR AND OFF-TAKE CLAMPS FOR PRESSURE APPLICATIONS – WATER SUPPLY

313.1 SCOPE

This specification covers mechanical repair and off-take clamps for pressure applications. The clamps are used for flanged or tapped off-take connections for host pipe sizes up to DN 600 or to repair water mains of all sizes. Clamps are designated as Type R for rigid pipes and Type F for flexible pipes.

This specification does not cover clamps for use on polyethylene pipelines.

313.2 REQUIREMENTS

(a) Mechanical repair and off-take clamps shall comply with AS 4181:2013.

(b) Pressure Class shall be PN 16.

(c) Off-take clamps for water supply[1] shall comply with AS/NZS 4020:2015.

313.3 QUALITY ASSURANCE

(a) Mechanical repair and off-take clamps shall have product certification (ISO Type 5) to AS 4181:2013.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

313.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Type of clamp and application (i.e. Type F repair, Type R flanged off-take, etc.)	
Nominal size, DN	
Off-take size, DN	
Pressure classification, PN	

313.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Pressure Class e.g. Class 35	
Flanges	

NOTE:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

PRODUCT SPECIFICATION

WSA PS – 314 STEPS FOR UNDERGROUND MAN ENTRY CHAMBERS – WATER SUPPLY AND SEWERAGE

314.1 SCOPE

This specification covers steps[1] (step irons) for use in MHs and other underground man entry chambers as a means of access, including steps designed to be:

(a) factory fixed into pre-cast concrete;

(b) fixed into masonry or concrete during construction;

(c) fixed after construction; and

(d) replaced.

314.2 REQUIREMENTS

(a) Steps shall be Type D[2] complying with EN 13101:2002.

(b) Steps shall comply with AS/NZS 4020:2005.

(c) Step material shall be plastic encapsulated steel or austenitic stainless steel.

314.3 QUALITY ASSURANCE

(a) Steps shall have product certification (ISO Type 3 or 5) to EN 13101:2002.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

314.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Single step or double step	
Type[2] (e.g. Type A, B or C to EN 13101:2005)	
Materials (e.g. cast iron or aluminium alloy to EN 13101:2002)	
Corrosion protection (e.g. galvanising to EN 13101:2002)	
Tread reflectors	
Facilities for attaching handrails or safety devices	

NOTES:

1 Some Water Agencies do not permit the use of step irons in MHs.

2 EN 13101:2002 permits four (4) Types of steps:

(a) Type A—Circular tread without patterned surface, without upstand.

(b) Type B—Circular tread without patterned surface, with upstand.

(c) Type C—Any shaped tread with patterned surface, without upstand.

(d) Type D—Any shaped tread with patterned surface, with upstand.

PRODUCT SPECIFICATION

WSA PS - 315 FIXED LADDERS FOR MAN ENTRY STRUCTURES – WATER SUPPLY AND SEWERAGE

315.1 SCOPE

This specification covers ladders for installation in service reservoirs, tanks, MHs and below ground chambers and pits used in water supply and sewerage applications.

315.2 REQUIREMENTS

(a) Fibre reinforced plastic ladders including ladder mounting brackets and fasteners shall comply with EN 14396:2004[1].

(b) Ladders for water supply[2] shall comply with AS/NZS 4020:2005.

(c) Fixed ladders shall comply with AS 1657:2013/Amdt 1:2016.

(d) Ladders that do not comply with AS/NZS 4020:2005 shall be legibly and durably marked with black letters of at least 10 mm high “DO NOT USE FOR WATER SUPPLY”.

(e) Spacing between inside faces of stiles shall be 350±25 mm.

(f) Ladders shall be bright yellow.

(g) Ladder mounting and fastening components shall be stainless steel, Grade 316.

315.3 QUALITY ASSURANCE

(a) Fibre reinforced plastic ladders shall have product certification (ISO Type 3 or 5) to EN 14396:2004.

(b) All products shall be marked in accordance with the conformity assessment body’s requirements.

315.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Type of fixed ladder[3]	
Ladder material[4]	
Top of ladder – distance from stile end to top of first rung, mm	
Bottom of ladder – distance from stile end to bottom of last rung, mm	
Reflectors at the rung/stile interface and colour (if manufacturer’s option)	
Ladder mounting bracket dimension–offset from the MH wall to the inside edge of the rung as measured at the end of the rung (150 minimum), mm	
Spacing of ladder mounting brackets (3000 minimum), mm	
Colour of ladder (other than bright yellow)	

Material for ladder mounting and fastening components (if other than stainless steel, Grade 316)	

NOTES:

1 EN 14396:2004 Fixed ladders for manholes.

2 Includes drinking water and recycled water supply. Colour differentiation is not required.

3 EN 14396:2004 specifies five Types of fixed ladders:

Type	Designation
A	Fixed ladder with movable top extensions
B	Fixed ladder with two stringers and fall arrester
C	Fixed ladder with one stringer and fall arrester
D	Fixed ladder with two stringers
E	Fixed ladder with one stringer

4 EN 14396:2004 permits:

(a) Hot dipped galvanised steel.

(b) Glass reinforced plastics.

(c) Austenitic stainless steel.

(d) Aluminium alloys.

5 Some Water Agencies do not permit the use of ladders in MHs, chambers and pits.

PRODUCT SPECIFICATION

WSA PS - 318 MARKING TAPE, DETECTABLE

318.1 SCOPE

This specification covers detectable marking tape for use in water supply and sewerage.

318.2 REQUIREMENTS

(a) Detectable marking tape shall comply with AS/NZS 2648.1:1995.

(b) Tape width shall be 100 mm minimum.

(c) Tracer wire shall be stainless steel grade 316 or copper alloy designation 122.

(d) Tracer wire shall allow at least 25% elongation of the plastic tape before breakage of the wire.

(e) Height of message letters shall be 40 mm minimum.

318.3 QUALITY ASSURANCE

(a) Detectable marking tape shall have product certification (ISO Type 1) to AS/NZS 2648.1:1995.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

318.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Tape colour (see AS/NZS 2648.1:1995)	
Tape message (see Notes)	
Other tracer wire metal of equivalent corrosion resistance in a buried environment	
Tape colour not in accordance with AS/NZS 2648.1:1995 (e.g. blue for drinking water to match pipe and/or sleeving colour)	

NOTES:

1 The purpose of the tape is to warn excavators of the presence of a service line buried further below in the ground. In addition, "detectable" tape contains a metal wire or strip which enables the route of a non-metallic pipeline to be established by means of detecting equipment, operated from the surface above the pipe.

2 Tape message shall be "CAUTION …….. BURIED BELOW" where ……. is either SEWER, WATER MAIN or RECYCLED WATER MAIN.

PRODUCT SPECIFICATION

WSA PS - 319 MARKING TAPE, NON-DETECTABLE

319.1 SCOPE

This specification covers non-detectable marking tape for use in water supply and sewerage.

319.2 REQUIREMENTS

(a) Non-detectable marking tape shall comply with AS/NZS 2648.1:1995.

(b) Tape width shall be 100 mm minimum.

(c) Height of message letters shall be 40 mm minimum.

319.3 QUALITY ASSURANCE

(a) Non-detectable marking tape shall have product certification (ISO Type 1) to AS/NZS 2648.1:1995.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

319.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Tape colour (see AS/NZS 2648.1:1995)	
Tape message (see Notes)	
Tape colour not in accordance with AS/NZS 2648.1:1995 (e.g. blue for drinking water to match pipe and/or sleeving colour)	

NOTES:

1 The purpose of the tape is to warn excavators of the presence of a service line buried further below in the ground. "Non-detectable" tape does not contain a metal wire or strip and hence is not detectable by means of above-ground detectors.

2 Tape message shall be "CAUTION ..... BURIED BELOW" where ..... is either SEWER, WATER MAIN or RECYCLED WATER MAIN.

PRODUCT SPECIFICATION

WSA PS - 320 SLEEVING, POLYETHYLENE (PE) FOR DUCTILE IRON PIPES AND FITTINGS – WATER SUPPLY AND SEWERAGE

320.1 SCOPE

This specification covers polyethylene sleeving for corrosion protection of ductile iron pipes and fittings used in water supply[1] and sewerage.

320.2 REQUIREMENTS

(a) Polyethylene sleeving shall comply with AS 3680:2008.

(b) Sleeving for pipes and fittings conveying drinking water shall be blue[2].

(c) Sleeving for pipes and fittings conveying recycled water shall be purple[3].

(d) Sleeving for pipes and fittings conveying sewage shall be cream[4].

(e) Sleeving shall be supplied in rolls with protective end flanges and perforated at intervals of 6.1 m.

(f) Sleeving shall be printed with one of the following messages in letters at least 40 mm high corresponding to the sleeving colour and repeated at intervals such that the length of any unmarked pipe shall not exceed 1 m:

  (i) “DRINKING WATER”.

  (ii) “RECYCLED WATER – DO NOT DRINK”.

  (iii) “SEWAGE – DO NOT DRINK”.

320.3 QUALITY ASSURANCE

(a) Polyethylene sleeving shall have product certification (ISO Type 1) to AS 3680:2008.

(b) All products shall be marked in accordance with the conformity assessment body’s requirements.

320.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Not used.

NOTES:

1 Includes drinking water and recycled water supply.

2 Blue shall be defined in accordance with RAL[5] DESIGN colour numbers as being no darker than 240 60 40 and no lighter than 240 70 25.

3 Purple shall be defined in accordance with RAL[5] DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15.

4 Cream shall be defined in accordance with RAL[5] DESIGN colour numbers as being no darker than 075 80 20 and no lighter than 080 90 20.

5 RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)
Siegburger Straße 39
D-53757 Sankt Augustin
http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml

PRODUCT SPECIFICATION

WSA PS - 321 TERMINAL MAINTENANCE SHAFTS (TMS) – POLYVINYLCHLORIDE, UNPLASTICISED (PVC-U) FOR NON-PRESSURE APPLICATIONS – SEWERAGE

321.1 SCOPE

This specification covers terminal maintenance shafts manufactured from unplasticised polyvinylchloride with a moulded and channelled base or spherical base with up to three inlets ≤DN 250 at the base and a nominal riser size DN 225 – DN 425.

321.2 REQUIREMENTS

(a) Maintenance shafts (PVC-U) shall comply with WSA 137:2013.

(b) Elastomeric joint seals shall be EPDM, SBR or CR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) The internal surfaces of the chambers shall be a light colour to permit condition assessment of the TMS by CCTV inspection.

321.3 QUALITY ASSURANCE

(a) Terminal maintenance shafts (PVC-U) shall have product certification (ISO Type 5) to WSA 137:2013.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

321.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal riser size, DN	
Material for risers and cones	
Riser pipe stiffness	
Nominal sizes, DN, of inlet(s) and outlet	
Configuration[2] [e.g. in-line, bend (0 and 45°), junction and terminal]	
Wall construction type (plain wall, ribbed or sandwich)	
Inlet/outlet connections e.g. solvent cement joint socket for PVC-U pipe or elastomeric seal joint socket for PVC-U, PP or VC or PE spigot for electrofusion welding to PE	
Locking type cap/plug or flow relief cap/plug[1]	
Surface cover and frame[3]	

321.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

End connections e.g. adaptors to connect to VC pipes	

NOTES:

1 Requirements for riser caps, lids and joint seals are subject to agreement between the Water Agency and supplier, i.e. not addressed by this Specification.

2 Configurations shall be as specified in the Project Specification or on the Design Drawings.

3 Surface covers and frames shall be supplied in accordance with WSA PS-290 or WSA PS-291.

4 WSA PS-236 covers variable bends for use with maintenance shafts.

PRODUCT SPECIFICATION

WSA PS - 322 TERMINAL MAINTENANCE SHAFTS (TMS) – POLYETHYLENE (PE) FOR NON-PRESSURE APPLICATIONS – SEWERAGE

322.1 SCOPE

This specification covers terminal maintenance shafts manufactured from polyethylene with a moulded and channelled base or spherical base with up to three inlets ≤DN 250 at the base only and a nominal riser size DN 225 – DN 425.

322.2 REQUIREMENTS

(a) PE maintenance shafts shall comply with WSA 137:2013.

322.3 QUALITY ASSURANCE

(a) Terminal maintenance shafts (PE) shall have product certification (ISO Type 5) to WSA 137:2013.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

322.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal riser size, DN	
Material for risers and cones	
Riser pipe stiffness	
Nominal sizes, DN, of inlet(s) and outlet	
Configuration[2] [e.g. in-line, bend (0 and 45°), junction and terminal]	
Wall construction type (plain wall, ribbed or sandwich)	
Inlet / outlet connections e.g. solvent cement joint socket for PVC-U pipe or elastomeric seal joint socket for PVC-U, PP or VC or PE spigot for electrofusion welding to PE	
Locking type cap / plug or flow relief cap / plug[1]	
Surface cover and frame[3]	

NOTES:

1 Requirements for riser caps, lids and joint seals are subject to agreement between the Water Agency and supplier, i.e. not addressed by this Specification.

2 Configurations shall be as specified in the Project Specification or on the Design Drawings.

3 Surface covers and frames shall be supplied in accordance with WSA PS-290 or WSA PS-291.

4 Product Specification WSA PS-236 covers variable bends for use with maintenance shafts.

PRODUCT SPECIFICATION

WSA PS - 323 MAINTENANCE HOLES (MH) – PRE-CAST CONCRETE FOR NON-PRESSURE APPLICATIONS –SEWERAGE

323.1 SCOPE

This specification covers pre-cast concrete maintenance holes[1] for use in gravity sewers of size ≤DN 300.

323.2 REQUIREMENTS

(a) Pre-cast concrete maintenance holes shall comply with AS 4198:1994.

(b) Cement shall be type SR.

(c) The cement content shall not be less than 450 kg per cubic metre of concrete.

(d) Characteristic strength of the concrete shall be 50 MPa.

(e) Aggregate durability shall be in accordance with AS 2758.1:2014, Clause 9 and exposure condition C.

(f) Minimum cover over reinforcement shall be 40 mm internally and 25 mm externally, except at joint ends where cover shall be not less than 20 mm.

(g) Each component shall have two lifting inserts, each having safe-lift rating of at least 1 tonne. The lifting elements shall be corrosion resistant and not affect the corrosion resistance of the reinforcement. The lifting elements shall be fitted such that the pre-cast component will hang horizontally (mating surfaces) when lifted.

(h) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(i) Preformed flexible joint sealants shall be butyl rubber complying with ASTM C990M-09.

323.3 QUALITY ASSURANCE

(a) Maintenance holes shall have product certification (ISO Type 5) to AS 4198:1994 and a certificate of compliance to the requirements of 323.2 (b) to (g) issued by the conformity assessment body that has undertaken product certification.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) Preformed flexible joint sealants shall have product certification (ISO Type 5) to ASTM C990M-09.

(d) All products shall be marked in accordance with the conformity assessment body's requirements.

323.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size, mm	
Configurations[2]	
Step irons, spacing and anchoring or ladder requirements[3]	
Type of jointing i.e. elastomeric joint seal or	

butyl rubber sealant	
Special aggregates e.g. calcareous[4] and additional sacrificial cover over reinforcement	
Special treatments, coatings or linings	
Pre-cast base details	
Maintenance hole configuration at top, e.g. straight back taper, converter slab	

NOTES:

1 Also known as Access Chambers.

2 Configurations shall be as specified in the Project Specification or on the Design Drawings.

3 See WSA PS–314 and WSA PS–315.

4 Calcareous aggregate defined as having an acid solubility greater than 98% when tested in accordance with AWWA B100-09. Calcareous aggregates are not available in all locations.

PRODUCT SPECIFICATION

WSA PS - 324 CASING SPACERS

324.1 SCOPE

This specification covers casing spacers (also known as slippers, centralisers or thinsulators) used to facilitate the insertion of, and to provide protection for carrier pipes when installed inside encasement pipes (casings). Casing spacers are also used for grade control in gravity sewer applications[1,2].

324.2 REQUIREMENTS

(a) Casing spacers shall be manufactured from inert engineering thermoplastics or stainless steel (Grade 304 or 316).

(b) Steel spacers shall not be used on metallic carrier pipes unless the spacer collar is coated or lined to prevent corrosion occurring at the point of contact between spacer and carrier pipe. The coating shall be inert so that it is compatible with metallic carrier pipe coatings.

(c) Casing spacers shall be designed at intervals that allow them to support the weight of the carrier pipe and its contents for the design life of the installation[3].

(d) If used inline in drinking water applications, the casing spacer shall comply with the requirements of AS/NZS 4020:2005.

(e) Spacer runners shall incorporate a wear pad manufactured from abrasion resistant material such as Acetal POM, Nylon, or HDPE.

(f) Casing spacers shall be complete with restraint from movement on the carrier pipe.

(g) The wear pads shall be bevelled to prevent jamming during insertion.

(h) Spacer runners shall be spaced radially around the pipe with a maximum angle between runners as follows:

  (i) Carrier pipe diameter up to DN 150: 90 deg.

  (ii) Carrier pipe diameter between DN 150 and DN 275: 75 deg.

  (iii) Carrier pipe greater than DN 275: not greater than 100 mm between runners at the inner circumference of the casing spacer.

(i) Runner height shall be sufficient to provide at least 10 mm of clearance for the bells or couplings during insertion[4].

324.3 QUALITY ASSURANCE

(a) Casing spacers shall be manufactured under a certified ISO 9001 quality management system.

(b) If applicable, casing spacers shall have a certificate or report from a NATA approved laboratory confirming compliance with the requirements of AS/NZS 4020:2005.

(c) Casing spacers shall be identified with the manufacturer’s name.

324.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

OD of the carrier pipe	
OD of any flanges, bells or couplings on the carrier pipe	
ID of encasement pipe	
Requirement for grouting of the annular space	

NOTES:

1 Cased crossings for gravity sewers need to be grouted and casing spacers should be placed at intervals not exceeding 1 m. This is to ensure that correct grade is maintained.

2 Casing spacers are often used to correct grade and alignment in graded sewer lines. This is more easily achieved if the casing spacer is of a type that allows for different height runners at the top of the spacer versus the bottom of the spacer.

3 If the carrier pipe is being grouted into the casing, this interval may be increased. However, consideration needs to be given to the potential for upward forces on the casing spacer due to flotation of the carrier pipe during the grouting process. Refer to the manufacturer of the casing spacers for technical advice regarding spacing intervals.

4 The OD of the casing spacers should be at least 10 mm less than the smallest ID of the encasement pipe to minimise the potential for jamming. Internal protrusions such as weld beads should also be taken into account.

PRODUCT SPECIFICATION

WSA PS - 325 VENT SHAFTS – EDUCT FOR NON-PRESSURE APPLICATIONS– GRAVITY SEWERAGE

Vent shaft design guidelines and technical requirements vary considerably from utility to utility. A product specification should be developed by the designer for approval by the utility prior to ordering of vent shaft products.

For further information and guidance refer to:

http://www.sydneywater.com.au/SW/plumbing-building-developing/developing/providers/standards_and_specifications/index.htm

and

Drawing SCP-1003 available at https://www.hunterwater.com.au/Building-and-Development/Drawings-Plans-Specifications/Standard-Drawings/

PRODUCT SPECIFICATION

WSA PS - 326 VENT SHAFTS - INDUCT FOR NON-PRESSURE APPLICATIONS– GRAVITY SEWERAGE

Vent shaft design guidelines and technical requirements vary considerably from utility to utility. A product specification should be developed by the designer for approval by the utility prior to ordering of vent shaft products.

For further information and guidance refer to:

http://www.sydneywater.com.au/SW/plumbing-building-developing/developing/providers/standards_and_specifications/index.htm

and

Drawing SCP-1003 available at https://www.hunterwater.com.au/Building-and-Development/Drawings-Plans-Specifications/Standard-Drawings/

PRODUCT SPECIFICATION

WSA PS - 327 TAPPING BANDS, MECHANICAL, FOR USE WITH POLYETHYLENE (PE) MAINS FOR PRESSURE APPLICATIONS – WATER SUPPLY

327.1 SCOPE

This specification covers mechanical tapping bands for pressure applications in connecting property services to PE water reticulation mains[1].

327.2 REQUIREMENTS

(a) Tapping bands shall comply with AS/NZS 4129:2008/Amdt 1:2013.

327.3 QUALITY ASSURANCE

(a) Tapping bands shall have product certification (ISO Type 5) to AS/NZS 4129:2008/Amdt 1:2013.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

327.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal pipe size, DN, and off-take size, mm	
Pressure Class, PN	
Series RP or Series RC internal outlet thread[2]	

327.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative Pressure Class[3]	

NOTES:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

2 Where a tapered RC external threaded fitting is to be screwed into a plastic bodied tapping band, a tapered RC internal outlet thread is recommended.

3 PN 16 is standard.

PRODUCT SPECIFICATION

WSA PS - 329 TAPPING SADDLES, ELECTROFUSION, FOR USE WITH POLYETHYLENE (PE) MAINS FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

329.1 SCOPE

This specification covers electrofusion tapping bands for connecting property services to PE water reticulation mains[1].

329.2 REQUIREMENTS

(a) Tapping bands shall comply with AS/NZS 4129:2008/Amdt 1:2013.

329.3 QUALITY ASSURANCE

(a) Tapping bands shall have product certification (ISO Type 5) to AS/NZS 4129:2008/Amdt 1:2013.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

329.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal pipe size, DN, and off-take size, mm	
Pressure Class, PN	
Series RP or Series RC internal outlet thread[2]	

329.5 HUNTER WATER APPROVED VARIATIONS TO BE SPECIFIED

Alternative Pressure Class[3]	

NOTES:

1 Includes drinking water, recycled water supply and pressure sewerage. Colour differentiation is not required.

2 Where a tapered RC external threaded fitting is to be screwed into a plastic bodied tapping band, a tapered RC internal outlet thread is recommended.

3 PN 16 is standard.

PRODUCT SPECIFICATION

WSA PS - 331 MAINTENANCE CHAMBERS (MC) - PRE-CAST CONCRETE FOR NON-PRESSURE APPLICATIONS –SEWERAGE

331.1 SCOPE

This specification covers pre-cast concrete maintenance chambers with formed channels or a conical base with up to three inlets ≤DN 300 at the base and a riser shaft of nominal shaft size DN 600 – DN 800.

331.2 REQUIREMENTS

(a) All components shall conform to Clauses 2.3 and 6 of AS 4198:1994.

(b) Cement shall be type SR.

(c) The cement content shall not be less than 450 kg per cubic metre of concrete.

(d) Characteristic strength of the concrete shall be 50 MPa.

(e) Aggregate durability shall be in accordance with Clause 9 and exposure condition C of AS 2758.1:2014.

(f) Minimum cover over reinforcement shall be 40 mm internally and 25 mm externally, except at joint ends where cover shall be not less than 20 mm.

(g) Each component shall have two lifting inserts, each having safe-lift rating of at least 1 tonne. The lifting elements shall be corrosion resistant and not affect the corrosion resistance of the reinforcement. The lifting elements shall be fitted such that the pre-cast component will hang horizontally (mating surfaces) when lifted.

(h) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(i) Preformed flexible joint sealants shall be butyl rubber complying with ASTM C990M-09.

(j) A maximum of three inlets may be provided, one of which shall be “straight-through”. The change of direction of upstream flow from any inlet shall not exceed 90 degrees relative to the outlet.

(k) Hydraulic performance of a conical base shall be verified as follows for pre-cast concrete bases with DN 150 [(i) and (ii)] inlets and outlet and one or more DN 225 inlets and a DN 225 outlet [(iii) and (iv)]:

  (i) For an MC with three DN 150 inlets (one straight through) and a DN 150 outlet, all at 0.55% grade and with two inlets positioned at right angles to the straight through inlet, a combined incoming flow (equally split between the inlets) of 3.0 L/s shall transit the base without any observed “back-up” of flow; and

  (ii) For the same arrangement, but with the straight through inlet blocked and the inlets and outlet grades at 3.0%, a combined flow of 26.5 L/s (equally split between the opposed inlets) shall transit the base, with the outflow level not greater than the obvert of the outlet.

  (iii) For an MC with three DN 225 inlets (one straight through) and a DN 225 outlet, all at 0.40% grade and with two inlets positioned at right angles to the straight through inlet, a combined incoming flow (equally split between the

inlets) of 6.0 L/s shall transit the base without any observed "back-up" of flow; and

(iv) For the same arrangement, but with the straight through inlet blocked and the inlets and outlet grades at 1.6%, a combined flow of 61 L/s (equally split between the opposed inlets) shall transit the base, with the outflow level not greater than the obvert of the outlet.

331.3 QUALITY ASSURANCE

(a) Maintenance chambers shall have product certification (ISO Type 3 or 5) to Clause 2.3 and Clause 6 of AS 4198:1994 as amended by this specification except for Clause 331.2(k).

(b) The supplier shall provide objective evidence of conformance to Clause 331.2(k).

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Preformed flexible joint sealants shall have product certification (ISO Type 5) to ASTM C990M-09.

(e) All products shall be marked in accordance with the conformity assessment body's requirements.

331.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal shaft size, DN	
Inlet and outlet sizes and configuration	
Type of chamber top (e.g. shaft cap with removable lid)[1]	
Surface cover and frame[2]	

NOTES:

1 Requirements for shaft caps, lids and joint seals are subject to agreement between the Water Agency and supplier, i.e. not addressed by this specification.

2 Surface covers and frames shall be supplied in accordance with WSA PS-290 or WSA PS-291.

PRODUCT SPECIFICATION

WSA PS - 333 PRE-CAST CONCRETE CONICAL BASES FOR CONCRETE MAINTENANCE HOLES (MH) FOR NON-PRESSURE APPLICATIONS – SEWERAGE

333.1 SCOPE

This specification covers pre-cast concrete conical bases, with up to three inlets ≤DN 225, for use with pre-cast concrete maintenance holes conforming to WSA PS-323 (for which the conical base and all other components of the pre-cast maintenance hole system are sourced from the same shall manufacturer).

333.2 REQUIREMENTS

(a) All components shall conform to Clauses 2.3 and 6 of AS 4198:1994.

(b) Cement shall be type SR.

(c) The cement content shall not be less than 450 kg per cubic metre of concrete.

(d) Characteristic strength of the concrete shall be 50 MPa.

(e) Aggregate durability shall be in accordance with Clause 9 and exposure condition C of AS 2758.1:1998.

(f) Minimum cover over reinforcement shall be 40 mm internally and 25 mm externally, except at joint ends where cover shall be not less than 20 mm.

(g) Each component shall have two lifting inserts, each having safe-lift rating of at least 1 tonne. The lifting elements shall be corrosion resistant and not affect the corrosion resistance of the reinforcement. The lifting elements shall be fitted such that the pre-cast component will hang horizontally (mating surfaces) when lifted.

(h) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(i) Preformed flexible joint sealants shall be butyl rubber complying with ASTM C990M-09.

(j) A maximum of three inlets may be provided, one of which shall be “straight-through”. The change of direction of upstream flow from any inlet shall not exceed 90 degrees relative to the outlet.

(k) Hydraulic performance of a conical base shall be verified as follows for pre-cast concrete bases with DN 150 [(i) and (ii)] inlets and outlet and one or more DN 225 inlets and a DN 225 outlet [(iii) and (iv)]:

  (i) For a conical MH base with three DN 150 inlets (one straight through) and a DN 150 outlet, all at 0.55% grade and with two inlets positioned at right angles to the straight through inlet, a combined incoming flow (equally split between the inlets) of 3.0 L/s shall transit the base without any observed “back-up” of flow; and

  (ii) For the same arrangement, but with the straight through inlet blocked and the inlets and outlet grades at 3.0%, a combined flow of 26.5 L/s (equally split between the opposed inlets) shall transit the base, with the outflow level not greater than the obvert of the outlet.

(iii) For a conical MH base with three DN 225 inlets (one straight through) and a DN 225 outlet, all at 0.40% grade and with two inlets positioned at right angles to the straight through inlet, a combined incoming flow (equally split between the inlets) of 6.0 L/s shall transit the base without any observed "back-up" of flow; and

(iv) For the same arrangement, but with the straight through inlet blocked and the inlets and outlet grades at 1.6%, a combined flow of 61 L/s (equally split between the opposed inlets) shall transit the base, with the outflow level not greater than the obvert of the outlet.

333.3 QUALITY ASSURANCE

(a) Pre-cast concrete conical bases shall have product certification (ISO Type 3 or 5) to Clause 2.3 and Clause 6 of AS 4198:1994 as amended by this specification except for Clause 333.2(k).

(b) The supplier shall provide objective evidence of conformance to Clause 333.2(k).

(c) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Preformed flexible joint sealants shall have product certification (ISO Type 5) to ASTM C990M-09.

(e) All products shall be marked in accordance with the conformity assessment body's requirements.

333.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal shaft size, DN	
Inlet and outlet sizes and configuration	

PRODUCT SPECIFICATION

WSA PS - 334 VITRIFIED CLAY (VC) MAINTENANCE HOLES (MH), MAINTENANCE CHAMBERS (MC) AND TERMINAL MAINTENANCE SHAFTS (TMS) FOR NON-PRESSURE APPLICATIONS – SEWERAGE

334.1 SCOPE

This specification covers vitrified clay (VC) maintenance holes (MH) of nominal shaft size DN 900 – DN 1200, chambers (MC) of nominal shaft size DN 600 – DN 800 and riser (TMS) of nominal size DN 225 – DN 425 for use with sewers having grades/hydraulic design of connected sewers conforming to Part 1 of the Gravity Sewerage Code of Australia.

Chamber and shaft products includes a shaft cap with removable lid, joint seals[1] and a surface cover with frame[2].

Maintenance holes, chambers and shafts are intended for installation to a maximum depth of 6 m from ground level to the invert of the sewer.

334.2 REQUIREMENTS

(a) Maintenance holes, chambers and shafts shall comply with EN 295-6:1995.

(b) Sealing rings shall be EPDM, SBR or CR complying with EN 681-1:1996.

(c) Maintenance chambers and shafts shall comply with AS/NZS 4999:2006 regarding tool and camera access.

334.3 QUALITY ASSURANCE

(a) Maintenance holes, chambers and shafts shall have product certification (ISO Type 3 or 5) to EN 295-6:1995.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to EN 681-1:1996.

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

334.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal shaft size, DN	
Inlet and outlet sizes and configuration	
Type of chamber or shaft top (e.g. shaft cap with removable lid)[1]	
Surface cover and frame[2]	

NOTES:

1 Requirements for shaft caps, lids and joint seals are subject to agreement between the Water Agency and supplier, i.e. not addressed by this specification.

2 Surface covers and frames shall be supplied in accordance with WSA PS- 290 or WSA PS-291.

PRODUCT SPECIFICATION

WSA PS - 335 PIPELINE COLD-APPLIED LIQUID ADHESIVES AND PREFABRICATED TAPES

335.1 SCOPE

This specification covers cold-applied liquid adhesives and prefabricated tapes[1].

Tapes may be field or shop applied.

335.2 REQUIREMENTS

(a) Heat-shrinkable, cross-linked polyolefin coatings shall comply with ANSI/AWWA C209-06.

335.3 QUALITY ASSURANCE

(a) Heat-shrinkable, cross-linked polyolefin coatings shall have product certification (ISO Type 3 or 5) to ANSI/AWWA C209-06.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

335.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Tape type[2]	
Tape form[3]	

NOTES:

1 It is expected that adhesives and prefabricated tapes will be applied by appropriately trained and experienced constructors of pipeline systems.

2 Type I tape consists of a laminate composed of a plastic film backing and a homogeneous bituminous-sealant layer. Type II tape consists of a laminate composed of a plastic film backing and a homogeneous elastomeric-sealant layer.

3 The prefabricated tape may be supplied in sheets, pads, or rolls wound on hollow cores.

PRODUCT SPECIFICATION

WSA PS - 336 PIPELINE HEAT-SHRINKABLE, CROSS-LINKED POLYOLEFIN COATINGS

336.1 SCOPE

This specification covers heat-shrinkable, cross-linked polyolefin coatings[1] that consist of a cross-linked polyolefin backing that has been coated with an adhesive.

Heat-shrinkable, cross-linked polyolefin coatings may be field or shop applied.

336.2 REQUIREMENTS

(a) Heat-shrinkable, cross-linked polyolefin coatings shall comply with ANSI/AWWA C216-07.

336.3 QUALITY ASSURANCE

(a) Heat-shrinkable, cross-linked polyolefin coatings shall have product certification (ISO Type 3 or 5) to ANSI/AWWA C216-07.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

336.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Prefabricated heat-shrinkable polyolefin coating type[2]	
Coating width if non-standard, mm	

NOTES:

1 It is expected that heat-shrinkable coatings will be applied by appropriately trained and experienced constructors of pipeline systems.

2 Type I coatings are provided in sleeves of predetermined diameters to fit the steel pipe. Type II coatings are supplied in individually pre-cut sizes or in roll form. Type III coatings are provided in roll form. Type IV coatings are provided as pre-cut patches or in roll form.

PRODUCT SPECIFICATION

WSA PS - 337 MAINTENANCE CHAMBERS (MC) – POLYPROPYLENE (PP) FOR NON-PRESSURE APPLICATIONS – SEWERAGE

337.1 SCOPE

This specification covers maintenance chambers manufactured from polypropylene (PP) or polypropylene with mineral modifier (PP-MD) incorporating a moulded and channeled base or spherical base with up to three inlets ≤DN 300 at the base and a nominal riser size DN 600 – DN 800.

337.2 REQUIREMENTS

(a) Maintenance chambers (PP or PP-MD) shall comply with WSA 137:2013.

(b) Elastomeric joint seals shall be EPDM, SBR or CR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) The internal surfaces of the chambers shall be a light colour to permit condition assessment of the tank by CCTV inspection.

337.3 QUALITY ASSURANCE

(a) Maintenance chambers (PP or PP-MD) shall have product certification (ISO Type 3 or 5) to WSA 137:2013.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

337.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal riser size, DN	
Material for risers and cones	
Riser pipe stiffness	
Nominal sizes, DN, of inlet(s) and outlet	
Configuration[2] [e.g. in-line, bend (0 and 45°), junction and terminal)	
Wall construction type (plain wall, ribbed or sandwich	
Inlet/outlet connections e.g. solvent cement joint socket for PVC-U pipe or elastomeric seal joint socket for PVC-U, PP or VC or PE spigot for electofusion welding to PE	
Locking type cap/plug or flow relief cap/plug[1]	
Surface cover and frame[3]	

NOTES: See over

1 Requirements for riser caps, lids and joint seals are subject to agreement between the Water Agency and supplier, i.e. not addressed by this Specification.

2 Configurations shall be as specified in the Project Specification or on the Design Drawings.

3 Surface covers and frames shall be supplied in accordance with WSA PS-290 or WSA PS-291.

4 WSA PS-236 covers variable bends for use with maintenance shafts.

PRODUCT SPECIFICATION

WSA PS - 338 MAINTENANCE CHAMBERS (MC) – POLYETHYLENE (PE) FOR NON-PRESSURE APPLICATIONS – SEWERAGE

338.1 SCOPE

This specification covers maintenance chambers manufactured from polyethylene incorporating a moulded and channeled base or spherical base with up to three inlets ≤DN 300 at the base and a nominal riser size DN 600 – DN 800.

338.2 REQUIREMENTS

(a) Maintenance chambers (PE) shall comply with WSA 137:2013.

(b) Elastomeric joint seals shall be EPDM, SBR or CR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) The internal surfaces of the chambers shall be a light colour to permit condition assessment of the tank by CCTV inspection.

338.3 QUALITY ASSURANCE

(a) Maintenance chambers (PE) shall have product certification (ISO Type 5) to WSA 137:2013.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

337.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal riser size, DN	
Material for risers and cones	
Riser pipe stiffness	
Nominal sizes, DN, of inlet(s) and outlet	
Configuration[2] [e.g. in-line, bend (0 and 45°), junction and terminal)	
Wall construction type (plain wall, ribbed or sandwich	
Inlet/outlet connections e.g. solvent cement joint socket for PVC-U pipe or elastomeric seal joint socket for PVC-U, PP or VC or PE spigot for electofusion welding to PE	
Locking type cap/plug or flow relief cap/plug[1]	
Surface cover and frame[3]	

NOTES:

1 Requirements for riser caps, lids and joint seals are subject to agreement between the Water Agency and supplier, i.e. not addressed by this Specification.

2 Configurations shall be as specified in the Project Specification or on the Design Drawings.

3 Surface covers and frames shall be supplied in accordance with WSA PS-290 or WSA PS-291.

4 WSA PS-236 covers variable bends for use with maintenance shafts.

PRODUCT SPECIFICATION

WSA PS - 341 TERMINAL MAINTENANCE SHAFTS (TMS) – POLYPROPYLENE (PP) FOR NON-PRESSURE APPLICATIONS – SEWERAGE

341.1 SCOPE

This specification covers terminal maintenance shafts manufactured from polypropylene (PP) or polypropylene with mineral modifier (PP-MD) incorporating a moulded and channeled base or spherical base with up to three inlets ≤DN 225 and a nominal riser size DN 225 – DN 425.

341.2 REQUIREMENTS

(a) Maintenance chambers (PP or PP-MD) shall comply with WSA 137:2013.

(b) Elastomeric joint seals shall be EPDM, SBR or CR complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) The internal surfaces of the chambers shall be a light colour to permit condition assessment of the tank by CCTV inspection.

341.3 QUALITY ASSURANCE

(a) Terminal maintenance shafts (PP or PP-MD) shall have product certification (ISO Type 5) to WSA 137:2013.

(b) Elastomeric joint seals shall have product certification (ISO Type 5) to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(c) All products shall be marked in accordance with the conformity assessment body's requirements.

341.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal riser size, DN	
Material for risers and cones	
Riser pipe stiffness	
Nominal sizes, DN, of inlet(s) and outlet	
Configuration[2] [e.g. in-line, bend (0 and 45°), junction and terminal)	
Wall construction type (plain wall, ribbed or sandwich	
Inlet/outlet connections e.g. solvent cement joint socket for PVC-U pipe or elastomeric seal joint socket for PVC-U, PP or VC or PE spigot for electofusion welding to PE	
Locking type cap/plug or flow relief cap/plug[1]	
Surface cover and frame[3]	

NOTES:

1 Requirements for riser caps, lids and joint seals are subject to agreement between the Water Agency and supplier, i.e. not addressed by this Specification.

2 Configurations shall be as specified in the Project Specification or on the Design Drawings.

3 Surface covers and frames shall be supplied in accordance with WSA PS-290 or WSA PS-291.

4 WSA PS-236 covers variable bends for use with maintenance shafts.

PRODUCT SPECIFICATION

WSA PS - 343 TRACER WIRE, DETECTABLE

343.1 SCOPE

This specification covers detectable tracer wire[2,3] for use in water supply[1] and sewerage using open cut, HDD and pipe bursting installation methods.

343.2 REQUIREMENTS

(a) The tracer wire shall be:

(i) Stainless steel grade 316; or

(ii) Copper alloy designation 122 or UNS-C10200 to ASTM B-170; or

(iii) Annealed copper-clad steel wire complying with ASTM B910/B910M-07;

(A) Steel designation is high carbon 1055 grade steel.

(B) Copper designation is UNS-C10200 to ASTM B-170.

(b) For buried applications, tracer wire complying with Clauses 343.2(a) (ii) and (iii) shall be externally coated with a fusion bonded high-density polyethylene complying with ASTM D1248-12.

(c) Tracer wire shall allow at least 15% elongation before breakage of the wire.

(d) The colour of the PE coating for tracer wire shall comply with AS/NZS 2648.1:1995 (e.g. blue for drinking water to match pipe and/or sleeving colour).

343.3 QUALITY ASSURANCE

Tracer wire shall be manufactured and supplied under the cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Manufacture and supply of detectable tracer wire to the relevant ASTM standards shall have product certification (ISO Type 1) to ASTM standards" or similar.

343.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Other tracer wire metal of equivalent corrosion resistance in a buried environment	
Tracer wire gauge	
Break load (tensile strength)	
PE coating thickness	
Elongation	
Copper thickness	
Electrical resistivity	
Polyethylene insulating jacket colour not in accordance with AS/NZS 2648.1:1995 (e.g. blue for drinking water to match pipe and/or sleeving colour)	

NOTES:

1 Includes drinking water and recycled water supply.

2 The purpose of the reinforced tracer wire is to accurately locate buried metallic or non-metallic assets by means of detecting equipment operated from the surface above the pipe.

3 The reinforced tracer wire is used in conjunction with appropriate connectors, test stations and anodes.

PRODUCT SPECIFICATION

WSA PS - 350 COMPACTION SAND FOR PIPE EMBEDMENT

350.1 SCOPE

This specification nominates requirements for naturally occurring compaction sand used for pipe embedment.

This specification does not cover recycled, reuse or waste products.

350.2 REQUIREMENTS

Compaction sand shall:

(a) Consist of hard durable inert grains of washed river, marine or dune sand or hard rock sand or a blend of these naturally occurring sand types.

(b) Compaction sand grading shall comply with Table 350.1

(c) The resistivity shall be greater than 1500 Ohm.cm[1] when tested in accordance with AS 1289.4.4.1:1997.

(d) The pH shall be in the range 5 - 9 when determined in accordance with AS 1289.4.3.1:1997.

(e) The sand shall be free from noxious weeds as proclaimed by the relevant regulators.

(f) The sand shall be free from dangerous chemicals as proclaimed by the relevant regulators.

TABLE 350.1

COMPACTION SAND GRADING

Sieve Size mm	Mass of sample passing, percent	
	Grade A	Grade B[2]
6.7	100	
4.75	95-100	100
2.36	85-95	100-90
1.18	65-80	85-100
0.6	50-70	70-100
0.3	30-50	50-100
0.15	5-12	0-40
0.075	3-8	0-5

NOTE

Table taken from Table G3 of AS/NZS 2566.2:2002/Amdt 1:2013.

350.3 QUALITY ASSURANCE

Sand shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Quarrying, processing, cleaning and grading of sands” (or similar).

350.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Grade (e.g. A or B)	

NOTES:

1 Soil resistivity requirements are incorporated to provide optimum corrosion protection of ductile cast iron pipe and fittings when used in conjunction with loose polyethylene sleeving.

2 The grading requirements of this sand may not be readily available in all locations.

PRODUCT SPECIFICATION

WSA PS - 351 PROCESSED AGGREGATES FOR PIPE EMBEDMENT

(Replaces Section 2.4 of WITS Specification 95-007.1 for single size crushed rock 10 and 20 mm)

351.1 SCOPE

This specification nominates requirements for graded and single size coarse processed naturally occurring aggregates used for pipe embedment.

This specification does not cover recycled, reuse or waste products.

351.2 REQUIREMENTS

(a) Aggregates shall have grading conforming to Table 351.1.

(b) Aggregates shall be free from noxious weeds as proclaimed by the relevant regulators.

(c) Aggregates shall be free from dangerous chemicals as proclaimed by the relevant regulators.

(d) Wet strength shall be not less than 80 kN when determined in accordance with AS 1141.22:2008/Amdt 1:2016.

(e) Wet strength/dry strength variation shall not exceed 35% when determined in accordance with AS 1141.22:2008/Amdt 1:2016.

(f) Weak particles shall not exceed 0.5% when determined in accordance with AS 1141.32:2008/Amdt 1:2016.

351.3 QUALITY ASSURANCE

Aggregates shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Quarrying, processing, cleaning and grading of aggregates" (or similar).

351.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Aggregate type (e.g. graded or single size)	
Nominal size of aggregate, mm	

TABLE 351.1*

PROCESSED AGGREGATES - ACCEPTABLE FOR EMBEDMENT MATERIALS

Sieve size mm	Mass of sample passing, percent						
	Nominal size of graded aggregate** mm		Nominal size of single-size aggregates mm				
	20	14	20	14	10	7	5
75.0	–	–	–	–	–	–	–
53.0	–	–	–	–	–	–	–
37.5	–	–	–	–	–	–	–
26.5	100	–	100	–	–	–	–
19.0	85– 100	100	85–100	100	–	–	–
13.2	–	85– 100		85–100	100	–	–
9.50	25 – 55	–	0 – 20	–	85– 100	100	–
6.70	–	25 – 55	–	0 – 20	–	85 –100	100
4.75	0 – 10	–	0 – 5	–	0 – 20	–	85–100
2.36	0 – 5	0 – 10	–	0 – 5	0 – 5	0 – 20	0 – 40
0.075***	0 – 2	0 – 2	0 – 2	0 – 2	0 – 2	0 – 2	0 – 2

* Table taken from Table G2 of AS/NZS 2566.2:2002/Amdt 1:2013.

** Single-size aggregate should always be specified where strict control of grading is considered essential. Graded aggregates are considered more susceptible to segregation in transport and handling.

*** See Clause 8.2 of AS 2758.1:2014. In addition, where coarse aggregates contain more than about 1% of material passing the 0.075 mm sieve, particular care should be taken to remix or wash this material to minimize the effect of segregation.

PRODUCT SPECIFICATION

WSA PS - 352 CONTROLLED LOW STRENGTH MATERIALS (CLSM) FOR PIPE EMBEDMENT

352.1 SCOPE

This specification nominates requirements for Controlled Low Strength Materials (CLSM) used for pipe embedment.

This specification does not cover recycled, reuse or waste products for use as embedment material for cement stabilisation.

352.2 REQUIREMENTS

(a) Embedment material shall be naturally occurring materials having gradings conforming to Table 352.1.

TABLE 352.1[1]

EMBEDMENT MATERIAL - ACCEPTABLE FOR CEMENT STABILISATION

Sieve size mm	Mass of sample passing, percent	
	20 mm	10 mm
26.5	100	—
19.0	85-100	—
13.2	—	100
9.5	58-80	90-100
6.7	55-72	—
4.75	44-65	60-80
2.36	32-54	40-65
1.18	24-45	30-50
0.60	18-36	20-38
0.30	15-30	15-30
0.15	8-24	5-24
0.075	5-20	2-20
Liquid limit	35	25
Plasticity index	15	6

NOTES:

1 Table taken from Table G4 of AS/NZS 2566.2:2002/Amdt 1:2013.

2 These gravel/s and gradings meet the requirements of Table K1 of AS/NZS 2566.2:2002/Amdt 1:2013 for cement stabilised embedment material.

3 Tolerances on aggregates generally ±10% for sieve sizes above 2.36 mm – see AS 2758.1:2014 for details.

(b) CLSM mix proportions shall conform to Table 352.2.

TABLE 352.2[1]

CLSM MIX PROPORTIONS

Material	% by mass	Standard
GP cement	2-6	AS 3972
Fly ash	0-20	AS 3582.1
Granular material	60-80	Table 352.1

NOTES:

1 Table taken from Table K1 of AS/NZS 2566.2:2002/Amdt 1:2013.

2 Slump shall be in the range 150 – 200.

3 Trial mixes should be prepared to confirm the strength characteristics and setting times of the selected mix, and to confirm mix suitability for the installation. It is important that the surrounding trench walls or embankment have a density and stiffness not less than that of the CLSM fill.

4 Mix strengths at the lower end of the range can usually be excavated with a backhoe.

5 Alternative mixes to this specification may be preferred to suit a specific situation. Refer to AS/NZS 2566.2:2002/Amdt 1:2013, Appendix L for guidance.

6 The mix proportions detailed above should achieve a 28 day compressive strength of 0.6 to 3 MPa.

7 CLSMs are normally transported to site in ready-mixed form, with care being taken to minimise segregation during transportation.

352.3 QUALITY ASSURANCE

Aggregates shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Quarrying, processing, cleaning and grading of aggregates" (or similar).

352.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Embedment material size for stabilisation (e.g. 10 or 20 mm)	
28 day compressive strength required, MPa	

NOTE:

1 The grading requirements of these aggregates may not be readily available in all locations.

PRODUCT SPECIFICATION

WSA PS - 353 ROCK, FINE CRUSHED FOR ROADBASE

353.1 SCOPE

This specification nominates requirements for fine crushed rock used as an unbound and modified base and sub-base material ("roadbase") for the reinstatement of pipe trench road pavements.

This specification does not cover recycled, reuse or waste products.

353.2 REQUIREMENTS

(a) Fine crushed rock or "roadbase" shall comply with relevant state or territory Road Owner's specifications.

353.3 QUALITY ASSURANCE

Roadbases shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Quarrying, processing, cleaning and grading of aggregates" (or similar).

353.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

The purchaser shall specify requirements as nominated by the Road Owner.

PRODUCT SPECIFICATION

WSA PS - 354 ROCK, COARSE CRUSHED FOR ROADBASE

354.1 SCOPE

This specification nominates requirements for coarse crushed rock used for roadbase in the reinstatement of pipe trench road surfaces.

This specification does not cover recycled, reuse or waste products.

354.2 REQUIREMENTS

(a) Coarse crushed rock or “roadbase” shall comply with relevant state or territory Road Owner’s specifications.

354.3 QUALITY ASSURANCE

Roadbases shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Quarrying, processing, cleaning and grading of aggregates” (or similar).

354.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

The purchaser shall specify requirements as nominated by the Road Owner.

PRODUCT SPECIFICATION

WSA PS - 355 GEOTEXTILE FILTER FABRIC

355.1 SCOPE

This specification covers geotextile filter fabric used for the encapsulation[1] of pipe embedment and foundations or separation of embedment from backfill in water supply and sewerage systems so as to control soil particle migration into and within the embedment zone.

355.2 REQUIREMENTS

(a) Geotextile shall be a non woven fabric made from filaments of synthetic fibres which meets the requirements of Appendix J of AS/NZS 2566.2:2002/Amdt 1:2013.

(b) Geotextile shall be unaffected by bacteria and fungi and be suitable for burial.

(c) Marking on outside wrapping of geotextile rolls and on inside core of rolls shall be in accordance with AS 3705:2012.

355.3 QUALITY ASSURANCE

Geotextile filter fabric shall be manufactured and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Manufacture of geotextile filter fabric" (or similar).

355.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Width of the geotextile (e.g. 2, 3, 4, 6 m)	
Material preference, if required (e.g. polyester, polypropylene, etc)	

NOTE:

1 Encapsulation should be achieved with a single width.

PRODUCT SPECIFICATION

WSA PS - 356 PILES

356.1 SCOPE

This default specification covers piles used to provide support for water supply and sewerage pipelines and other structures in non-supportive ground.

356.2 REQUIREMENTS

(a) Piles shall comply with AS 2159:2009/Amdt 1:2010.

(b) Piles shall be either treated hardwood conforming to AS 1604.1:2012 (Hazard Class[1] H5 or H6) or concrete.

356.3 QUALITY ASSURANCE

Piles shall be manufactured and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Preservation of round timber” (or similar).

356.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Dimensions[2]	
Material[2] (e.g. treated hardwood or concrete and Hazard Class for timber piles (e.g. H5 or H6) or concrete specification and grade)	
Alternative materials for piles (e.g. steel, composite steel concrete)	

NOTES:

1 Refer to Table D1 of AS 1604.1:2012.

2 Dimensions and concrete requirements shall be as specified in the Project Specification or on the Design Drawings.

PRODUCT SPECIFICATION

WSA PS - 357 CONCRETE, PRE-MIXED, NORMAL CLASS

357.1 SCOPE

This product specification covers Normal Class pre-mixed concrete[1].

357.2 REQUIREMENTS

(a) Normal Class concrete shall comply with AS 1379:2007/Amdt 2:2015.

(b) Nominated slump shall be not less than 80 mm.

357.3 QUALITY ASSURANCE

Concrete shall be manufactured and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Manufacture and supply of pre-mixed concrete to AS 1379” (or similar).

357.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Strength Class[2]	
Slump[3]	

NOTES:

1 This concrete is for use in such applications as anchor blocks and concrete encasement of pipe in water supply and sewerage systems (in non-aggressive environments).

2 The Strength Class shall be as specified in the Project Specification or on the Design Drawings.

3 Slump shall be as specified in the Project Specification or on the Design Drawings. Slump shall be appropriate to the project and method of concrete placement. If slump is not nominated in the project specification, the supplier’s and/or other specialist advice shall be obtained.

PRODUCT SPECIFICATION

WSA PS - 358 CONCRETE, PRE-MIXED, SPECIAL CLASS

358.1 SCOPE

This specification covers Special Class pre-mixed concrete for use in such applications as cast in-situ (sewerage) maintenance holes and for concrete placed in an aggressive environment. This class of concrete may not be appropriate for water retaining structures. Seek Water Agency advice for such structures.

358.2 REQUIREMENTS

(a) Special Class concrete shall conform to WSA 114:2002.

358.3 QUALITY ASSURANCE

Concrete shall be manufactured and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Manufacture and supply of pre-mixed concrete to AS 1379” (or similar).

358.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Strength Class[1]	
Slump[2]	
Calcareous aggregates[3, 4]	

NOTES:

1 The Strength Class of concrete ordered shall be as specified in the Project Specification or on the Design Drawings.

2 Slump shall be as specified in the Project Specification or on the Design Drawings. Slump shall be appropriate to the project and method of concrete placement. If slump is not nominated in the project specification, the supplier’s and/or other specialist advice shall be obtained.

3 Calcareous aggregate is defined as having an acid solubility greater than 98% when tested in accordance with AWWA B 100-09.

4 Calcareous aggregates are not available in all locations.

PRODUCT SPECIFICATION

WSA PS - 359 7 MM PROCESSED AGGREGATE FOR PIPE EMBEDMENT

359.1 SCOPE

This specification nominates requirements for 7 mm processed aggregate used as pipe embedment.

This specification does not cover recycled, reuse or waste products.

359.2 REQUIREMENTS

(a) 7 mm processed aggregate shall have grading conforming to Table 359.1.

(b) Processed aggregate shall be free from noxious weeds as proclaimed by the relevant regulators.

(c) Processed aggregate shall be free from dangerous chemicals as proclaimed by the relevant regulators.

(d) Wet strength shall be not less than 80 kN when determined in accordance with AS 1141.22:2008/Amdt 1:2016.

(e) Wet strength/dry strength variation shall not exceed 35% when determined in accordance with AS 1141.22:2008/Amdt 1:2016.

(f) Weak particles shall not exceed 0.5% when determined in accordance with AS 1141.32:2008/Amdt 1:2016.

TABLE 359.1*

7 MM PROCESSED AGGREGATE GRADING

Sieve size mm	Mass of sample passing percent
26.5	–
19.0	–
13.2	–
9.5	100
6.7	85–100
4.75	–
2.36	0–20
1.18	–
0.60	–
0.30	–
0.15	–
0.075	0–2

NOTES:

1 Table taken from Table G3 of AS/NZS 2566.2:2002/Amdt 1:2013.

2 Tolerances on aggregates generally ± 10% for sieve sizes above 2.36 mm – see AS 2758.1:2014 details.

359.3 QUALITY ASSURANCE

Processed aggregate shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Quarrying, processing, cleaning and grading of aggregates" (or similar).

359.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Not used.

PRODUCT SPECIFICATION

WSA PS - 360 EMBEDMENT/CONCRETE SAND

(Replaces Section 2.1 of WITS Specification 95-007.1

360.1 SCOPE

This specification nominates requirements for naturally occurring sand used for pipe embedment and for mixing of concrete and CLSM material on-site.

This specification does not cover recycled, reuse or waste products.

360.2 DEFINITION

A processed, washed naturally occurring sand of particle size less than 5 mm and produced in a controlled manner to close tolerances of grading, allowing the sand to have filtering properties.

360.3 REQUIREMENTS

Embedment/concrete sand shall consist of hard durable inert grains of washed river, marine or dune sand or hard rock sand or a blend of these sand types.

Embedment/concrete sand shall:

(a) comply with requirements of Table 360.1.

(b) have a grading[1] complying with Table 360.2.

(c) have a resistivity[2] greater than 15 Ohm.m when tested in accordance with AS 1289.4.4.1:1997.

(d) have a pH in the range of 5 – 9 when determined in accordance with AS 1289.4.3.1:1997.

(e) be free from noxious weeds as proclaimed by relevant regulators.

(f) be free from dangerous chemicals as proclaimed by relevant regulators.

Embedment sand shall have gradings complying with Table 360.2.

TABLE 360.1

GENERAL PROPERTIES OF EMBEDMENT/CONCRETE SAND

Property	Property Value
Particle Density	(min)2100Kg/m^3
Water Absorption	(max) 3%
Material Finer than 0.075 nun	(max) 10%
Material Finer than 0.002 nun	(max) 1%
Friable/Weak/Light Particles	(max) 1%

TABLE 360.2

EMBEDMENT/CONCRETE SAND GRADING

Sieve Size Mm	Mass of sample passing %
9.50	100
4.75	90-100
2.36	60-100
1.18	30-100
0.6	15-100
0.3	5-50
0.15	0-15
0.075	0-5

360.4 MOISTURE CONTENT

The moisture content shall not exceed 10% by mass at delivery.

360.5 QUALITY ASSURANCE

Sand shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Quarrying, processing, cleaning and grading of sands” (or similar).

360.6 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Not used.

NOTES:

1 The grading requirements of this sand may not be readily available in all locations.

2 Soil resistivity requirements are incorporated to provide optimum corrosion protection of ductile cast iron pipe and fittings when used in conjunction with loose polyethylene sleeving.

PRODUCT SPECIFICATION

WSA PS - 361 EMBEDMENT / 5 MM MINUS FINE CRUSHED ROCK

(Replaces Section 2.2 of WITS Specification 95-007.1)

361.1 SCOPE

This specification nominates requirements for fine crushed rock used as pipe embedment.

This specification does not cover recycled, reuse or waste products.

361.2 DEFINITION

Fine crushed rock is a manufactured product produced from the crushing and screening of non-sedimentary quarried rock (including scoria[1]). It has a particle size less than 7 mm and varies with the type of rock quarried for production.

361.3 REQUIREMENTS

Embedment fine crushed rock shall consist of hard durable particles free from dust, clay and other deleterious material, produced in a controlled manner to close tolerances of grading, allowing the product to have filtering properties.

Embedment fine crushed rock shall:

(a) comply with requirements of Table 361.1.

(b) have a grading[2] complying with Table 361.2.

(c) have a resistivity[3] greater than 15 Ohm.m when tested in accordance with AS 1289.4.4.1:1997.

(d) have a pH in the range of 5 – 9 when determined in accordance with AS 1289.4.3.1:1997.

(e) be free from noxious weeds as proclaimed by relevant regulators.

(f) be free from dangerous chemicals as proclaimed by relevant regulators.

TABLE 361.1

GENERAL PROPERTIES OF EMBEDMENT/5 MM MINUS FINE CRUSHED ROCK

Property	Property Value
Particle Density	(min) 1900Kg/m^3
Plasticity Index	(max) 10
Degradation Factor – Fines	(min) 50

TABLE 361.2

EMBEDMENT/5 MM MINUS SAND GRADING

Sieve Size Mm	Mass of sample passing %
6.70	100
4.75	90-100
2.36	60-100
1.18	30-80
0.6	15-60
0.3	5-40
0.15	0-20
0.075	0-10

361.4 QUALITY ASSURANCE

Fine crushed rock shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Quarrying, processing, cleaning and grading of crushed rock products" (or similar).

361.5 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Maximum moisture content at delivery, %	

NOTES:

1 Use of fine crushed scoria in water reticulation works may be restricted by Water Agencies due potential corrosive action of scoria on copper alloy items.

2 The grading requirements of this product may not be readily available in all locations.

3 Soil resistivity requirements are incorporated to provide optimum corrosion protection of ductile cast iron pipes and fittings when used in conjunction with loose polyethylene sleeving.

PRODUCT SPECIFICATION

WSA PS - 362 WELL GRADED CRUSHED ROCK FOR PIPE EMBEDMENT

(Replaces Section 2.3 of WITS Specification 95-007.1)

362.1 SCOPE

This specification nominates requirements for well graded crushed rock[1] used as pipe embedment.

This specification does not cover recycled, reuse or waste products.

362.2 REQUIREMENTS

(a) Well graded crushed rock shall be produced from igneous or metamorphic source rock by crushing clean spalls.

(b) Well graded crushed rock shall have grading conforming to Table 362.1.

(c) Well graded crushed rock shall be free from noxious weeds as proclaimed by relevant regulators.

(d) Well graded crushed rock shall be free from dangerous chemicals as proclaimed by relevant regulators.

TABLE 362.1[1]

WELL GRADED CRUSHED ROCK - ACCEPTABLE FOR EMBEDMENT MATERIAL

Sieve size mm	Mass of sample passing, percent	
	20 mm	10 mm
26.5	100	–
19.0	85-100	–
13.2	–	100
9.5	60-80	90-100[2]
6.7	55-72	
4.75	42-62	60-80[2]
2.36	30-48	40-65
1.18	22-36	25-50
0.60	16-28	16-38
0.30	10-20	9-30
0.15	6-15	5-24
0.075	4-12	2-20
Liquid limit	25	25
Plasticity index	4	6

NOTES:

1 Table taken from Table G3 of AS/NZS 2566.2:2002/Amdt 1:2013.

2 Tolerances on aggregates generally ±10% for sieve sizes above 2.36 mm – see AS 2758.1:2014 details.

362.3 QUALITY ASSURANCE

Well graded crushed rock shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Quarrying, processing, cleaning and grading of aggregates" (or similar).

362.4 AGENCY SPECIFIC REQUIREMENTS

Not used.

NOTE:

1 The grading requirements of well graded crushed rock may not be readily available in all locations.

PRODUCT SPECIFICATION

WSA PS - 363 TRENCH FILL MATERIALS

(Replaces Section 3 of WITS Specification 95-007.1)

363.1 SCOPE

This specification nominates requirements for materials used for trench fill below paved and unpaved surfaces.

Due to varying environmental regulations Water Agency approval to supply crushed concrete to this Specification is required. This specification does not cover other recycled, reuse or waste products.

363.2 DEFINITION

The material used to fill the trench from the top of the embedment zone to the level below the paved or unpaved surface.

363.3 REQUIREMENTS FOR TRENCH FILL MATERIALS UNDER PAVED SURFACES

363.3.1 Crushed rock

Crushed Rock, excepting scoria, shall be of 20 mm nominal size, Class 4 or higher grade and shall comply with VicRoads Standard Specification Section 812.

363.3.2 Crushed scoria

Crushed scoria shall be of 20 mm nominal size and shall comply with VicRoads Standard Specification Section 818.

363.3.3 Crushed concrete

Crushed concrete shall be of 20 mm nominal size and shall comply with VicRoads Standard Specification Section 820.

363.4 REQUIREMENTS FOR TRENCH FILL MATERIALS UNDER UNPAVED SURFACES

Selected excavated and imported material shall:

(a) be free of hard, sharp objects and organic material;

(b) have a particle size not exceeding 75 mm; and

(c) be capable of being compacted without excessive effort to a mean value of density ratio (R_D) of not less than 90%.

363.5 QUALITY ASSURANCE

(a) Crushed rock and scoria shall be quarried, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Quarrying, processing, cleaning and grading of aggregates” (or similar).

(b) Crushed concrete shall be recycled material processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall

include “Recycling, processing, cleaning and grading of recycled concrete” (or similar).

363.6 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Not used.

PRODUCT SPECIFICATION

WSA PS – 364 GRADED RECYCLED MATERIALS FOR PIPE EMBEDMENT

364.1 SCOPE

This specification nominates requirements for graded processed recycled materials used for pipe embedment, predominantly comprising crushed concrete, brick and reclaimed asphalt blends but excluding granulated slag.

Due to varying environmental regulations Water Agency approval to adopt this specification is required.

364.2 REQUIREMENTS

(a) Recycled materials[1] shall be Class D20 or Class D10 complying with IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[2].

(b) Recycled materials shall be free from noxious weeds as proclaimed by relevant regulators.

(c) Recycled materials shall be free from dangerous chemicals as proclaimed by relevant regulators.

364.3 QUALITY ASSURANCE

(a) Recycled materials shall be collected, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Collecting, processing, cleaning and grading of recycled building materials” (or similar).

(b) Sampling and testing shall be in accordance with Section 5 of IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[2].

364.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Material Class (e.g. D20 or D10)	
Maximum moisture content at delivery, %	
Amended supply requirements (see Annexure 4 of IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[2]	

NOTES:

1 These recycled materials may not be readily available in all locations.

2 Available from the IPWEA Website.

PRODUCT SPECIFICATION

WSA PS – 365 RECYCLED MATERIALS FOR TRENCH FILL

365.1 SCOPE

This specification nominates requirements for graded recycled materials used for trench fill, predominantly comprising crushed concrete, brick and reclaimed asphalt blends but excluding granulated slag.

Due to varying environmental regulations Water Agency approval to adopt this specification is required.

365.2 REQUIREMENTS

(a) Recycled materials[1] shall comply with IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[2].

(b) Recycled materials shall be free from noxious weeds as proclaimed by relevant regulators.

(c) Recycled materials shall be free from dangerous chemicals as proclaimed by relevant regulators.

365.3 QUALITY ASSURANCE

(a) Recycled materials shall be collected, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Collecting, processing, cleaning and grading of recycled building materials" (or similar).

(b) Sampling and testing shall be in accordance with Section 5 of IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2008[2].

365.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Material Class (e.g. D75 or D20 or D10)	
Maximum moisture content at delivery, %	
Amended supply requirements (see Annexure 4 of IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[2]	

NOTES:

1 These recycled materials may not be readily available in all locations.

2 Available from the IPWEA Website.

PRODUCT SPECIFICATION

WSA PS – 366 GRADED AND SINGLE SIZED RECYCLED MATERIALS FOR PIPE EMBEDMENT

366.1 SCOPE

This specification nominates requirements for graded and single size recycled materials used for pipe embedment, predominantly comprising crushed concrete, brick and reclaimed asphalt blends but excluding granulated slag. This specification may be used as an alternative to WSA PS-351 with Water Agency approval[1].

366.2 REQUIREMENTS

(a) Recycled materials[2] shall comply with IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[3] except that recycled materials shall have gradings conforming to Table 366.1[4].

(b) Recycled materials shall be free from noxious weeds as proclaimed by relevant regulators.

(c) Recycled materials shall be free from dangerous chemicals as proclaimed by relevant regulators.

TABLE 366.1[4]

RECYCLED MATERIALS FOR PIPE EMBEDMENT

Sieve size mm	Mass of sample passing, percent					
	Nominal size of recycled materials mm					
	20	16	14	10	7	5
26.5	100	–	–	–	–	–
19.0	95–100	100	–	–	–	–
16.0	35–65	95–100	100	–	–	–
13.2	0–10	40–70	90–100	100	–	–
9.50	0–2	0–10	0–15	85–100	100	–
6.70		0–2	0–2	0-15	80–100	100
4.75	–	–	–	0–3	0–20	80–100
2.36	–	–	–	–	0–5	0–10
1.18	0–1	0–1	0–1	0–1	0–1	0–1

366.3 QUALITY ASSURANCE

Recycled materials shall be collected, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Collecting, processing, cleaning and grading of recycled building materials" (or similar).

Sampling and testing shall be in accordance with Section 5 of IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[3].

366.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Nominal size of aggregate, mm	
Maximum moisture content at delivery, %	

Amended supply requirements (see Annexure 4 of IPWEA Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage:2010[2]	

NOTES:

1 This use of these recycled materials may require Water Agency specific environmental certifications and/or controls.

2 These recycled materials may not be readily available in all locations.

3 Available from the IPWEA Website.

4 Adopted from Transport South Australia specification.

PRODUCT SPECIFICATION

WSA PS – 367 STEEL REINFORCING MATERIALS FOR CONCRETE

367.1 SCOPE

This specification covers steel reinforcing materials for the reinforcement of concrete in the form of:

(a) deformed or plain bars and coils;

(b) machine-welded mesh: and

(c) continuously threaded bars.

This specification does not apply to prestressing steels, stainless steel reinforcement, polymer coated steels and galvanised steels.

367.2 REQUIREMENTS

(a) Steel reinforcing materials shall comply with AS/NZS 4671:2001/Amdt 1:2003.

367.3 QUALITY ASSURANCE

(a) Steel reinforcing materials shall have product certification (ISO Type 5) to AS/NZS 4671:2001/Amdt 1:2003.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

367.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Product (e.g. deformed bar, plain bar, coil, rectangular mesh etc.)	
Designation (e.g. D500N16, RL1218 etc.)	
As appropriate to the product form, mass and/or dimensions of steel e.g. bar length, m, coil diameter, mm and coil mass, kg	

PRODUCT SPECIFICATION

WSA PS – 368 RECYCLED GLASS SAND FOR PIPE EMBEDMENT

368.1 SCOPE

This specification nominates requirements for recycled glass sand[1] used for pipe embedment.

Due to varying environmental regulations Water Agency approval to adopt this Specification is required.

368.2 REQUIREMENTS

Processed crushed recycled glass sand shall:

(a) be recovered and processed from the collection of domestic and/or commercial commingled recycled waste;

(b) not include glass recovered from the sorting or processing of mixed municipal, commercial, and industrial waste, construction and demolition waste, cathode ray tubes, fluorescent and incandescent lights, or other glass recovered from electrical equipment;

(c) be crushed and/or sieved to meet the particle size distribution specified in the Table 368.1;

(d) have resistivity greater than 1500 Ω.cm when tested in accordance with AS 1289.4.4.1:1997;

(e) have a pH between 5 and 9 when determined in accordance with AS 1289.4.3.1:1997;

(f) have a wet strength of less than 80 kN when determined in accordance with AS 1141.22:2008;

(g) has a wet strength/dry strength variation of not exceeding 20%, and weak particles of not exceeding 0.1%, when determined in accordance with AS 1141.22:2008; and

(h) have a current exemption or licence for recovery of resources from waste issued by the relevant state or territory environmental authority.

TABLE 368.1

RECYCLED GLASS SAND GRADING

Sieve Size mm	Mass of sample passing %
3.35	85 – 100
1.18	65 – 80
0.6	50 – 70
0.3	30 – 50
0.15	5 – 12
0.075	3 – 8

368.3 QUALITY ASSURANCE

(a) Processed crushed recycled glass sand shall be collected, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include "Collecting, processing, cleaning and grading of domestic and/or commercial commingled recycled materials" (or similar).

368.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Maximum moisture content at delivery, %	

NOTE:

1. Processed crushed recycled glass sand may not be readily available in all locations.

PRODUCT SPECIFICATION

WSA PS – 369 BOTTOM ASH SAND FOR PIPE EMBEDMENT

369.1 SCOPE

This specification nominates requirements for bottom ash sand[1] from black coal-fired power stations used for pipe embedment.

Due to varying environmental regulations Water Agency approval to adopt this Specification is required.

369.2 REQUIREMENTS

Bottom ash sand shall:

(a) be recovered and processed from furnace bottom ash resulting from the burning of black coal in coal-fired power stations;

(b) not include brine conditioned or treated ash or salts;

(c) crushed and/or sieved to meet the particle size distribution specified in the Table 369.1;

(d) have resistivity greater than 1500 Ω.cm when tested in accordance with AS 1289.4.4.1:1997;

(e) have pH between 5 and 9 when determined in accordance with AS 1289.4.3.1:1997; and

(f) have a current exemption or licence for recovery of resources from waste issued by the relevant state environmental authority.

TABLE 369.1

BOTTOM ASH SAND GRADING

Sieve Size mm	Mass of sample passing %
19.0	100
2.36	50 – 100
0.6	20 – 90
0.3	10 – 60
0.15	0 – 25
0.075	0 – 10

NOTE: Table taken from Table G3 of AS/NZS 2566.2:2002/Amdt 1:2013

369.3 QUALITY ASSURANCE

(a) Bottom ash sand shall be collected, processed and supplied under cover of a certified ISO 9001:2016 management system. The scope of the certification shall include “Collecting, processing, cleaning and grading of recycled industrial materials” (or similar).

369.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Maximum moisture content at delivery, %	

NOTE:

1. Bottom ash sand may not be readily available in all locations.

PRODUCT SPECIFICATION

WSA PS – 400 SUBMERSIBLE ELECTRIC PUMPS FOR SEWAGE PUMPING STATIONS

400.1 SCOPE

This specification covers submersible electric pumps for sewage pumping stations.

400.2 REQUIREMENTS

(a) Submersible electric pumps shall comply with WSA 101:2008.

400.3 QUALITY ASSURANCE

(a) Submersible electric pumps shall have product certification (ISO Type 3 or 5) to WSA 101:2008.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

400.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Purchasing requirements as per Annexure 1	
Nominal size, DN x DN	
Pump testing (e.g. type test certificates and/or works acceptance tests)	
Alternative material requirements	

ANNEXURE 1 DATA SHEET PERFORMANCE SCHEDULE

(Copied from Appendix D of WSA 101:2008)

	Guarantee Point		Secondary Duty Point Nr 1		Secondary Duty Point Nr 2		Secondary Duty Point Nr 3		Maximum Achievable Rate of Flow	
	Required	Offered	Required	Offered	Required	Offered	Required	Offered	Required	Offered
Flow, L/s										
Head, m										
NPSHR, m										
Efficiency (Pump), %										
Power factor	≥0.80		≥0.80		≥0.80		≥0.80		≥0.80	
Efficiency (Motor), %	≥85		≥85		≥85		≥85		≥85	
kWh/1000 L										
Speed, rpm										

NOTE: *Clause numbers refer to WSA 101*

Section 1 General		
1.1	Manufacturer's name	
1.2	Manufacturer's address	
1.3	Agent's name	
1.4	Agent's address	
1.5	Model number	
1.6	Years in production	

Section 2 Pump Hydraulic and Dynamic Design			
		Required	Offered
2.1	Motor shaft speed	Clauses 3.7.7.1(a)	
2.2	First critical speed	Clause 3.7.5(a)	
2.3	Maximum speed on flow reversal	Clause 3.4	
2.4	Suction eye area		
2.5	Impeller type	Clause 3.7.2	
2.6	Impeller free passage	Clause 3.7.1	
2.7	Impeller diameter		
2.7.1	Fitted		
2.7.2	Maximum		
2.7.3	Minimum		
2.8	Minimum submergence	Clause 4.3	

Section 3 Pump Mechanical Design			
		Required	Offered
3.1	Casing		
3.1.1	Design	Clause 3.7.3	
3.1.2	Volute type (single/double)		
3.1.3	Suction port diameter		
3.1.4	Discharge port diameter		
3.1.5	Discharge connection type	Clause 3.7.3	
3.1.6	Discharge connection resilient seal (for pedestal connections only)		
3.1.7	Material	Table 2.1	
3.2	Casing fasteners		
3.2.1	Bolts/studs material	Table 2.1	
3.2.2	Nuts material	Table 2.1	
3.2.3	Anti-galling compound Application method/material	Clause 3.7.8.4	

Section 3 Pump Mechanical Design			
		Required	Offered
3.3	Impeller		
3.3.1	Type		
3.3.2	Non-clogging performance	Clauses 3.7.1 and 3.7.2	
3.3.3	Material	Table 2.1	
3.3.4	Attachment method		
3.3.5	Retention method		
3.3.6	Locknut material	Table 2.1	
3.4	Impeller sealing ring		
3.4.1	Material	Table 2.1	
3.4.2	Surface hardness	Clause 3.7.4	
3.4.3	Fixing method/material		
3.5	Casing wear ring		
3.5.1	Material	Table 2.1	
3.5.2	Surface hardness	Clause 3.7.4	
3.5.3	Dissimilar material to sealing ring	Clause 3.7.4	
3.5.4	Fixing method/material		
3.6	Shaft		
3.6.1	Design	Clause 3.7.5	
3.6.2	Finish	Clause 3.7.5	
3.6.3	Maximum lateral deflection	Clause 3.7.5	
3.6.4	Material	Table 2.1	
3.6.5	Diameter at impeller		
3.6.6	Diameter in seal chamber		
3.6.7	Diameter maximum		
3.7	Shaft mechanical seal		
3.7.1	Type/Design	Clause 3.7.6	
3.7.2	Arrangement		
3.7.3	Manufacturer		
3.7.4	Model number		
3.7.5	Rotating face material	Table 2.1	
3.7.6	Stationary face material	Table 2.1	
3.7.7	Spring material (s)	Table 2.1	
3.7.8	Elastomer material	Table 2.1	
3.7.9	Estimated design life		
3.7.10	Leakage detection	Clause 3.7.6	
3.8	Seal chamber		
3.8.1	Material	Table 2.1	
3.8.2	Oil filling point incorporated?		
3.8.3	Drain point incorporated?		
3.8.4	Recommended oil		

Section 3 Pump Mechanical Design			
		Required	Offered
3.9	Leakage detection device	Clause 3.7.6	
3.9.1	Manufacturer		
3.9.2	Type		
3.9.3	Model		

Section 4 Motor Electrical Design			
		Required	Offered
4.1	Power supply	Clause 3.7.7.1(a)	
4.2	Insulation	Clause 3.7.7.5	
4.3	Protection	Clause 3.7.7.4	
4.3.1	PTC		
4.3.2	RTD		
4.3.3	Moisture protection		
4.4	Rating, kW		
4.5	Nr poles	Clause 3.7.7.1(a)	
4.6	Efficiency, %		
4.6.1	Full load		
4.6.2	¾ load	Clause 3.7.7.1(c)	
4.6.3	½ load		
4.7	Power factors		
4.7.1	Full load		
4.7.2	¾ load	Clause 3.7.7.1(b)	
4.7.3	½ load		
4.8	Locked rotor	Clause 3.7.7.1(h)	
4.8.1	Torque, Nm		
4.8.2	Current, A		
4.9	Full load		
4.9.1	Speed, rpm		
4.9.2	Torque, Nm		
4.9.3	Current, A		
4.10	Motor cables		
4.10.1	Type	Clause 3.7.7.6	
4.10.2	Additional cores	Clause 3.7.7.6	
4.10.3	Demountable flange	Clause 3.7.7.6	
4.10.4	Length	Clause 3.7.7.6	

Section 5 Motor Mechanical Design			
		Required	Offered
5.1	Temperature	≥Class 155	
5.2	Temperature rise at full load	Class C	
5.3	Rotor characteristics	AS 1359	
5.4	Bearings	Clause 3.7.7.7	
5.4.1	Manufacturer		
5.4.2	Type		
5.4.3	Series number–DE		
5.4.4	Series number–NDE		
5.4.5	Rating fatigue life, L_{10}	40,000 h	
5.5	Motor housing	Clause 3.7.7.2	
5.5.1	Material	Table 2.1	
5.5.2	Coating	Clause 2.4	
5.5.3	Watertightness at 20 m head	Leaktight	
5.5.4	Cable entry glands	Clause 3.7.7.6	
5.5.5	Hangs vertically plumb	Clause 3.7.7.2(b)	
5.6	Motor cooling	Clause 3.7.7.3	
	Convectional air cooling		
	Jacketed housing		

Section 6 Ancillary Equipment			
		Required	Offered
6.1	Pump pedestal and discharge connection (if applicable)	Clause 3.8	
6.1.1	Design	Clause 3.8.3	
6.1.2	Dimensions	Clause 3.8.4	
6.1.3	Material	Table 2.1	
6.1.4	Coating	Clause 2.4	
6.1.5	Discharge flange rating	AS/NZS 4087:2011/ Amdt 1:2012 Figure B2	
6.2	Guide rails	Clause 3.9.1	
6.2.1	Type		
6.2.2	Material	Table 2.1	
6.2.3	Size		
6.2.4	Bracket spacing, m		
6.2.5	Bracket deflection, mm	Clause 3.9.1	
6.2.6	Bracket material	Table 2.1	
6.3	Lifting chains		

Section 6 Ancillary Equipment			
		Required	Offered
6.3.1	Type	Clause 3.9.2	
6.3.2	Rectangular links at 3 m intervals	Clause 3.9.2	
6.3.3	Shackle	Clause 3.9.2	
6.3.4	Material	Table 2.1	
6.3.5	WLL, kg	Clause 3.9.2	
6.3.6	Tagged	Clause 3.9.2	
6.3.7	Pumpset mass, kg		
6.4	Bolts, screws and dowels		
6.4.1	Type	Clause 3.9.3	
6.4.2	Flange bolting	Clause 3.9.3	
6.4.3	Material	Table 2.1	
6.4.4	Anti-galling compound Application method/material	Clause 3.9.3	
6.5	Seals	Clause 3.9.4	
6.5.1	Material	Table 2.1	
6.5.2	Seal reinforcement		
6.5.3	Seal hardness, IRHD		
6.6	Flange gaskets and O-rings	Clause 3.9.5	
6.6.1	Type		
6.6.2	Material	Table 2.1	
6.6.3	Hardness, IRHD		

Section 7 Other			
		Required	Offered
7.1	Spare parts list	Clause 6.4	
7.1.1	Where listed?		
7.2	Special tools	Clause 6.4	
7.2.1	List		
7.2.1	Availability		
7.3	Manuals and technical data sheets	Clause 6.5	
7.2.1	Documentation list		
7.2.1	Availability		

PRODUCT SPECIFICATION

WSA PS – 401 GRINDER PUMPS AND RELATED COMPONENTS FOR PRESSURE SEWERAGE

401.1 SCOPE

This specification covers grinder pumps and associated collection tanks (pump basins), including check and air or vacuum release valves included in the grinder pump package used for pumping sewage as part of a pressure sewerage scheme.

401.2 REQUIREMENTS

(a) Grinder pumps and associated collection tanks (pump basins), including check and air or vacuum release valves included in the grinder pump package shall comply with NSF/ANSI 46:2010.

401.3 QUALITY ASSURANCE

(a) Grinder pumps and associated collection tanks (pump basins), including check and air or vacuum release valves included in the grinder pump package shall have product certification (ISO Type 3 or 5) to NSF/ANSI 46:2010.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

401.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Grinder pump capacity, L/s	
Grinder pump testing (e.g. type test certificates and/or works acceptance tests)	

PRODUCT SPECIFICATION

WSA PS – 402 COLLECTION TANKS FOR PRESSURE AND VACUUM SEWERAGE

402.1 SCOPE

This specification covers collection tanks (also known as pump basins, collection pits etc.) used to collect and store sewage in pressure and vacuum sewer systems. Where a collection tank is supplied as an integral component of collection/pump unit, the product specification for the unit should be used.

402.2 REQUIREMENTS

(a) Collection tanks shall comply with WSA 129:2011.

402.3 QUALITY ASSURANCE

(a) Collection tanks shall have product certification (ISO Type 3 or 5) to WSA 129:2011.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

402.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Tank dimensions, mm	
Positions and dimensions of access cover, connector fittings for pipework and electrical/control conduits and any brackets, supports or other elements	
Tank and cover material	
Class of tank access cover	

PRODUCT SPECIFICATION

WSA PS – 403 ISO END SUCTION CENTRIFUGAL PUMPS FOR WATER SUPPLY BOOSTER PUMPING STATIONS

403.1 SCOPE

This specification covers ISO end suction centrifugal pumps for water supply booster pumping stations.

403.2 REQUIREMENTS

(a) Pumps shall comply with WSA 130:2010.

403.3 QUALITY ASSURANCE

(a) Pumps shall have product certification (ISO Type 3 or 5) to WSA 130:2010.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

403.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Refer to Table C.1 Schedule of Project Technical Requirements of WSA 130:2010.

PRODUCT SPECIFICATION

WSA PS – 404 ISO END SUCTION CENTRIFUGAL MOTOR PUMPS FOR WATER SUPPLY BOOSTER PUMPING STATIONS

404.1 SCOPE

This specification covers ISO end suction centrifugal pumps for water supply booster pumping stations.

404.2 REQUIREMENTS

(a) Pumps shall comply with WSA 131:2010.

404.3 QUALITY ASSURANCE

(a) Pumps shall have product certification (ISO Type 3 or 5) to WSA 131:2010.

(b) All products shall be marked in accordance with the conformity assessment body's requirements.

404.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Refer to Table D.1 Schedule of Project Technical Requirements of WSA 131:2010.