Australian Plastic Profiles

PRODUCT APPRAISAL REPORT PA 1522 Issue 2

PVC-U DWV PIPES AND FITTINGS

AS/NZS 1260:2009 – PVC-U pipes and fittings for drain, waste and vent applications
WMTS-006:2014 –Reflux Valves-Sewerage

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Document History

The following information indicates the changes made to this document.

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Peer Reviewers

Name/Title	Organisation	Date
Product Appraisal Technical Advisory Group	WSAA	2 September 2016
WSAA Expert Panel	WSAA	26 August 2016
Carl Radford, Product Appraisal Manager	WSAA	12 August 2016
Peter Pittard, WSAA Consultant	WSAA	18 April 2018
Carl Radford, Product Appraisal Manager	WSAA	20 April 2018

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Overview of WSAA

The Water Services Association of Australia (WSAA) is the peak industry body representing the urban water industry. Our members provide water and sewerage services to over 20 million customers in Australia and New Zealand and many of Australia's largest industrial and commercial enterprises.

Based around our vision of 'customer driven, enriching life', WSAA facilitates collaboration, knowledge sharing, networking and cooperation within the urban water industry. We are proud of the collegiate attitude of our members which has led to industry-wide approaches to national water issues.

WSAA can demonstrate success in the standardisation of industry performance monitoring and benchmarking, as well as many research outcomes of national significance. The WSAA Executive retains strong links with policy makers and legislative bodies and their influencers, to monitor emerging issues of importance to the urban water industry.

WSAA was formed in 1995 as a non-profit organisation to foster the exchange of information between industry, government and the community, and to promote sustainable water resource management.

The urban water industry is committed to anchoring its services to customers' values, and to enrich communities where water services have broad economic, environmental and social values. In line with this our main activities focus on four areas:

1. influencing national and state policies on the provision of urban water services and sustainable water resource management
2. promoting debate on environmentally sustainable development and management of water resources and the community health requirements of public water supplies
3. improving industry performance and establishing benchmarks and industry leading practices for water service processes; and
4. fostering the exchange of information on education, training, research, water and wastewater management and treatment and other matters of common interest.

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1 EXECUTIVE SUMMARY

Australian Plastic Profiles Pty Ltd (AAP) manufactures the PIPE KING™ AS/NZS 1260:2009 compliant range of sandwich construction polyvinylchloride, unplasticised (PVC-U), pipes for drain, waste and vent (DWV) applications, injection moulded PVC-U plain wall solvent cement joint fittings to complement PVC-U DWV pipe range and an injection moulded DN 100 PVC-U reflux valve in compliance with WMTS-006:2014.

This Issue 2 is to address a Future Work item that required an update to the WaterMark certificate for the DN 100 Reflux Valve. QA certification has also been updated.

This appraisal is limited to APP's PIPE KING™ DWV PVC-U pipes and fittings that exceed a minimum stiffness class as specified in WSA PS-230. The range of PIPE KING™ pipes and fittings typically used by the Australian Urban Water Utilities for DWV purposes in deeper gravity sewerage application are identified in Tables 1.1, 1.2 and 1.3.

The APP appraised products include:

- Sandwich construction AS/NZS 1260-2009 *PVC-U pipes and fittings for drain, waste and vent application* compliant PVC-U DWV pipe called "PIPE KING™" in sizes DN 100, 150 and 225. This pipe is available in classes SN10 (DN 100) and SN8 (DN 150 and DN 225) as single socketed with tapered sockets for solvent weld jointing (SCJ) and single socketed for rubber ring jointing (RRJ) in 3 metre or 6 metre lengths.
- A range of PIPE KING™ AS/NZS 1260-2006 compliant PVC-U injection moulded plain wall fittings for solvent cement jointing to complement the PIPE KING™ PVC-U DWV pipeline system. The PIPE KING™ injection moulded plain wall fittings are rated SN6 and are considered suitable for use in systems using up to SN16 pipe.
- The PIPE KING™ injection moulded DN 100 PVC-U Reflux Valve is also included in this appraisal. This reflux valve is manufactured in Australia and is compliant with WaterMark Technical Specification WMTS-006:2014 - *Reflux Valves-Sewerage*. The PIPE KING™ PVC-U 100 mm Reflux Valve Brochure and Installation Guide is shown in Appendix 'E'.

Australian Plastic Profiles products are manufactured under a Quality Management System certified as fulfilling the requirements of ISO 9001.

Australian Plastic Profiles PIPE KING™ PVC-U DWV pipe and fittings are StandardsMark and WaterMark certified for compliance with AS/NZS 1260:2009 and the DN 100 PIPE KING™ Reflux Valve is WaterMark Level 2 certified for compliance with WMTS-006:2014.

Appraisal criteria is determined by the WSAA Infrastructure Products and Materials Network and regularly reviewed to ensure that the criterion reflects the requirements of WSAA members. The Product Specifications that are relevant to this application are:

- WSA PS - 230 *Polyvinylchloride, Unplasticised (PVC-U) Pipes and Fittings for Non-Pressure Applications – Sewerage and Drainage*.
- WSA PS - 280 *Reflux valves – Sewerage*

Copies of these specifications can be found in Appendix B.

The Australian Plastic Profiles range of PVC-U pipes and fittings are designed on the basis of 50-year extrapolated material test data. For correctly manufactured and installed systems, the actual life cannot be predicted, but can reasonably be expected to be in excess of 100 years before major rehabilitation is required. Pipe life expectancy can vary with the quality of installation workmanship, system operating conditions, operating environment and other site-specific factors.

1.1 Recommendations

It is recommended that WSAA members, subject to any specific requirements of the member, accept or authorise the PIPE KING™ PVC-U DWV pipes and fittings and the

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PIPE KING Reflux Valve as detailed in this report for use in gravity sewerage networks provided pipeline design, installation acceptance testing and commissioning are in accordance with relevant WSAA Codes, WSAA Member Integrated Codes and the manufacturer's requirements.

2 THE APPLICANT

Established in 1972, Australian Plastic Profiles Pty Ltd (APP), trading as 'PIPE KING' is a 100% Australian owned and operated company which manufactures and distributes plastic injection mouldings and extruded products from polymers for the plumbing, electrical and building industries, using state-of-the-art manufacturing equipment.

APP is a leading independent manufacturer in Australia of PVC Pipes and Fittings with manufacturing facilities in both Sydney and Adelaide and sales offices and warehouses throughout Australia. APP is a Quality Endorsed company to ISO 9001 with national coverage and local service outlets present in all major capital cities throughout Australia.

3 THE PRODUCT

The APP appraised products include:

- Sandwich construction AS/NZS 1260-2009 compliant PVC-U DWV pipe called "PIPE KING™" in sizes DN 100, 150 and 225. This pipe is available in classes SN10 (DN 100) and SN8 (DN 150 and DN 225) as single socketed with tapered sockets for solvent weld jointing (SCJ) and single socketed for rubber ring jointing (RRJ) in 3 metre or 6 metre lengths.
- A range of PIPE KING™ AS/NZS 1260-2009 compliant PVC-U injection moulded plain wall fittings for solvent cement jointing to complement the PIPE KING™ PVC-U DWV pipeline system. The PIPE KING™ injection moulded plain wall fittings are rated SN6 and are considered suitable for use in systems using up to SN16 pipe.
- APP PIPE KING™ injection moulded PVC-U DWV DN 100 mm Reflux Valve is also included in this appraisal. This reflux valve is manufactured in Australia to WaterMark Technical Specification WMTS-006:2014 with Level 2 WaterMark Certification.

This appraisal is limited to APP's PIPE KING™ DWV PVC-U pipes and fittings that exceed a minimum stiffness class as specified in WSA PS - 230. The range of PIPE KING™ pipes and fittings typically used by the Australian Urban Water Utilities for DWV purposes in deeper gravity sewerage application are identified in Tables 1.1, 1.2 and 1.3.

Australian Plastic Profiles Pty Ltd PIPE KING™ PVC-U DWV pipes do not contain any compounds based on lead, cadmium or mercury. The recycled PVC-U material used in the core of the sandwich construction pipe has no traces of the above-mentioned elements.

4 SCOPE OF THE APPRAISAL

Refer to Section 3 above and Tables 1.1, 1.2 and 1.3 below which specify the appraised products as included in the StandardsMark and WaterMark Schedules for the APP complete range of DWV PVC-U pipe and injection moulded fittings.

Note: SCJ – Solvent Weld Joint; RRJ – Rubber Ring Joint; SN – Stiffness Rating Number

TABLE 1.1

DRAIN, WASTE AND VENT PIPE – RUBBER RING JOINT

Product code	DN Nominal Size (mm)	Stiffness Rating	Effective Length (m)	Joint Type	Type
DWV150SN8RJJ3M	150	SN8	3	RRJ	Sandwich Pipe
DWV225SN8RJJ3M	225	SN8	3	RRJ	Sandwich Pipe

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TABLE 1.2

DRAIN, WASTE AND VENT PIPE – SOLVENT WELD

Product code	DN Nominal Size (mm)	Stiffness Rating	Effective Length (m)	Joint Type	Type
DWV100SN10SC	100	SN10	6	SCJ	Sandwich Pipe
DWV150SN8SC3M	150	SN8	3	SCJ	Sandwich Pipe
DWV225SCSJ	225	SN8	6	SCJ	Sandwich Pipe
DWV225SN8SC3M	225	SN8	3	SCJ	Sandwich Pipe

TABLE 1.3

DRAIN, WASTE AND VENT FITTINGS – SOLVENT WELD

Product code	Product Description	Product Type	Stiffness Rating	Joint Type	Nominal Size (DN)
BFF10005	100mm x 5° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	100
BFF10015	100mm x 15° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	100
BFF10030	100mm x 30° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	100
BFF10045	100mm x 45° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	100
BFF10060	100mm x 60° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	100
BFF10088	100mm x 88° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	100
BFF15088	150mm x 45° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	150
BFF15088	150mm x 88° Plain Bend F + F	PLAIN BENDS F+F	SN6	SCJ	150
BIOFF10088	100mm x 88° Inspection Opening Bend F+F	INSPECTION OPENING BENDS	SN6	SCJ	100
BMF10005	100mm x 5° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	100
BMF10015	100mm x 15° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	100
BMF10030	100mm x 30° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	100
BMF10045	100mm x 45° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	100
BMF10060	100mm x 60° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	100
BMF10088	100mm x 88° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	100
BMF15045	150mm x 45° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	150
BMF15088	150mm x 88° Plain Bend M + F	PLAIN BENDS M+F	SN6	SCJ	150
DC100	100mm Dust Cap	CAPS	SN6	SCJ	100

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Product code	Product Description	Product Type	Stiffness Rating	Joint Type	Nominal Size (DN)
JFF10045	100mm x 45° Plain Junction F + F	PLAIN JUNCTIONS F+F	SN6	SCJ	100
JFF10088	100mm x 88° Plain Junction F + F	PLAIN JUNCTIONS F+F	SN6	SCJ	100
LIT150100	150mm x 100mm Level Invert Taper	LEVEL INVERT TAPERS	SN6	SCJ	150
POC100	100mm Push On Cap	CAPS	SN6	SCJ	100
SC100	100mm Straight Coupling Threaded	STRAIGHT COUPLINGS	SN6	SCJ	100
SC150	150mm Straight Coupling	STRAIGHT COUPLINGS	SN6	SCJ	150
SR150100	150mm x 100mm Socket Reducer	SOCKET REDUCERS	SN6	SCJ	150
TAC100	100mm Threaded Access Cap	CAPS	SN6	SCJ	100

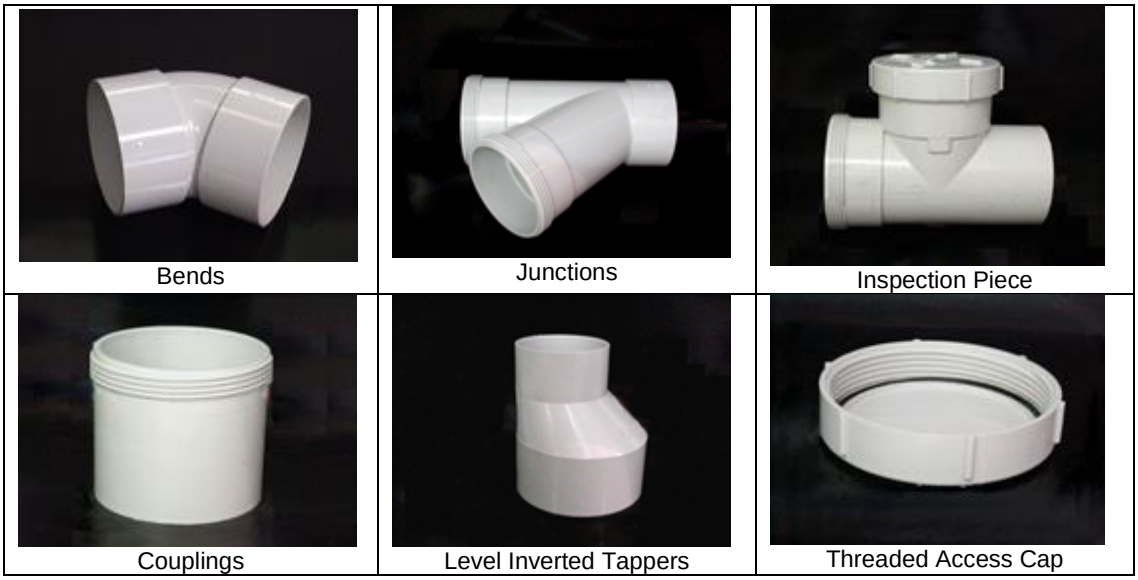

FIGURE 1 RANGE OF APP PIPE KING™ FITTINGS TYPICALLY USED IN GRAVITY SEWERAGE SYSTEMS

Note: Injection-moulded plain wall Class SN6 fittings are suitable for use in systems using up to Class SN16 pipe.

The PIPE KING™ PVC-U DN 100 Reflux Valve Brochure and Installation Guide is shown in Appendix ‘E’.

5 APPRAISAL CRITERIA

5.1 Quality Assurance Requirements

The WSAA Product Appraisal Technical Advisory Group accepts the pipes and fittings manufactured in compliance with AS/NZS 1260:2009 and duly certified by means of an ISO Type 5 product certification scheme undertaken by a JAS-ANZ accredited Conformity Assessment Body (CAB) or by an international accreditation system recognised by JAS-ANZ.

The WSAA Product Appraisal Technical Advisory Group accepts reflux valves manufactured in compliance with WMTS-006:2014 and duly certified by means of an ISO Type 3 product certification scheme undertaken by a JAS-ANZ accredited Conformity

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Assessment Body (CAB) or by an international accreditation system recognised by JAS-ANZ.

The manufacturer is generally expected to have a production management and control system that has been duly accredited in accordance with AS/NZS ISO 9001 as a prerequisite to undergoing a product certification audit.

5.2 Performance Requirements

The PIPE KING™ range of PVC-U DWV pipes and fittings has been appraised for compliance with AS/NZS 1260:2009.

The PIPE KING™ injection moulded PVC-U DN 100 Reflux Valve has been appraised for compliance with WaterMark Technical Specification WMTS-006-2014.

Appraisal criteria are also determined by the WSAA Product Appraisal Technical Advisory Group and regularly reviewed to ensure that the criteria reflect the requirements of WSAA members.

The following Product Specifications are also relevant to this application:

WSA PS - 230 *Polyvinylchloride, Unplasticised (PVC-U) Pipes and Fittings for Non-Pressure Applications – Sewerage and Drainage.*

WSA PS – 280 *Reflux Valves – Sewerage*

Copies of the above Product Specifications can be found in Appendix B or downloaded from the WSAA website.

6 COMPLIANCE WITH APPRAISAL CRITERIA

6.1 Compliance with Quality Assurance Requirements

Australian Plastic Profiles Pty Ltd products are manufactured under a Quality Management System certified as fulfilling the requirements of ISO 9001, Certificate Registration Number QEC0597, issued in Australia by SAI Global.

Australian Plastic Profiles has been issued with StandardsMark Licence No SMKP02157 by SAI Global for pipes and fittings complying with AS/NZS 1260:2009 - *“PVC-U pipes and fittings for drain, waste and vent application”.* The Schedule to this Licence includes the pipes and fittings shown in Tables 1.1, 1.2 and 1.3 above.

Australian Plastic Profiles has been issued with WaterMark Certificate of Conformity – Level 1 Certificate No WMKA02157 by SAI Global for PVC-U pipes and fittings complying with AS/NZS 1260:2009 - *“PVC-U pipes and fittings for drain, waste and vent application”.* The Schedule to this Licence is similar to the StandardsMark Licence.

Australian Plastic Profiles has been issued with WaterMark Certificate of Conformity – Level 2 Certificate No 23090 by Australian Certification Services for PIPE KING™ DN100 PVC-U Bodied Reflux Valve (Model Number RV-100) complying with WaterMark Technical Specification WMTS-006:2014 *Reflux Valves-Sewerage.*

Australian Plastic Profiles source elastomeric seals from Gulf Rubber Australia. These seals are StandardsMark product certified by SAI Global Certificate No. SMKP20133 for compliance with AS 1646:2007 *Elastomeric seals for waterworks purposes.*

Australian Plastic Profiles provide Thomas Grozier & Son BK lubricant for elastomeric seal jointing of pipe. BK lubricant is Level 1 WaterMark certified for compliance with WMTS - 014:2016 *Jointing materials.*

6.2 Compliance with Performance Requirements

The PIPE KING™ PVC-U DWV pipes and fittings are manufactured to meet the requirements of AS/NZS 1260:2009 *PVC-U pipes and fittings for drain, waste and vent applications* and are both StandardsMark and WaterMark product certified by SAI Global to

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provide some confidence that the products meet the performance requirements of this standard. Refer Appendix A.

The pipe and fittings range as described by this appraisal report meets the requirements of WSA PS-230 *Polyvinylchloride, Unplasticised (PVC-U) Pipes and Fittings for Non-Pressure Applications – Sewerage and Drainage.*

The PIPE KING™ RV100 Reflux Valve is manufactured to meet the requirements of *WaterMark Technical Specification* WMTS-006:2014 *Reflux Valves – Sewerage* and is WaterMark– Level 2 Certified to provide some confidence that the product meets the performance requirements of this specification. Refer Appendix A.

6.3 General Compliance

6.3.1 Elastomeric Seals

Ref: AS/NZS 1260 Clause 2.5.

Australian Plastic Profiles purchase elastomeric seals from Gulf Rubber Australia Pty Ltd / Thong Nhat Rubber Company. These elastomeric seals are product certified for compliance with AS 1646:2007 - *Elastomeric seals for waterworks purposes.* Certification provides some confidence that the products meet the performance requirements of this standard.

6.3.2 Solvent Cement

Ref: AS/NZS 1260 Clause 2.6.

Australian Plastic Profiles PVC-U pipe and fittings with tapered sockets for solvent cement jointing are intended for use with priming fluid and solvent cement complying with AS/NZS 3879.

These products are <u>not</u> provided by Australian Plastic Profiles.

6.4 Tests on pipe

6.4.1 Pipe impact characteristics

Ref: AS/NZS 1260 Clause 3.2.1.

Australian Plastic Profiles has provided two ‘batch release test’ charts for production in February 2016. The two charts provided the following information:

Chart 1: DWV 100 SN6 pipe demonstrating 36 individual tests over 7 days. The column for impact testing nominated AS/NZS 1462.3 with 2.75 kg mass and a drop of 2m. Each line on the chart indicates three samples and three total impacts (AS/NZS 1260:2009 Table 3.1 nominates six impacts per specimen for DN 100 pipe). The P/F column states P (Pass) for each test group.

Chart 2: DWV 150 SN4 pipe demonstrating 32 individual tests on 7 February 2016. The column for impact testing nominated AS/NZS 1462.3 with 3.5 kg mass and a drop of 2m. Each line on the chart indicates two samples and 12 total impacts (AS/NZS 1260:2009 Table 3.1 nominates eight impacts per specimen for DN 150 pipe). The P/F column states P (Pass) for each test group.

Note 1: The above test reports should be taken as indicative and do not represent the SN values of the appraised products.

6.4.2 Pipe Stiffness/Pipe Dimensions

Ref: AS/NZS 1260 Clauses 3.2.4 and 4.2

Australian Plastic Profiles has provided CSIRO Reports describing testing conducted on DN 100, SN6 and DN 150 SN4 foam core PVC pipe to establish compliance with AS/NZS 1260 Clauses 3.2.4 – ‘pipe stiffness’ and 4.2 – ‘diameter and wall thickness’.

The DN 100 SN6 pipe report is dated 27/06/05 and describes the tests and provides dimensions and results from four sets of three specimens (12 test items). The report

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'Conclusion' states: *Pipe samples A,B,C & D were found to meet the requirements of AS/NZS 1260 sections 3.2.4 and 4.2 for DWV100 SN6 sandwich construction pipe.*

The DN 150 SN4 pipe report is dated 04/02/04 and describes the tests and provides dimensions and results from one set of three specimens (3 test items). The report 'Conclusion' states: *Pipe sample C was found to meet the requirements of AS/NZS 1260 sections 3.2.4 and 4.2 for DWV150 SN4 sandwich construction pipe.*

Note 2: The test reports should be taken as indicative and do not represent the SN values of the appraised products.

Note 3: AS/NZS 1260 Table A1 states these tests are required to be repeated with any new formulation or new design. APP has advised that there have been no changes.

6.4.3 Ring flexibility test

Ref: AS/NZS 1260 Clause 3.2.5

Australian Plastic Profiles has provided two 'batch release test' charts for production in February 2016. The two charts provided the following information:

Chart 1: DWV 100 SN6 pipe demonstrating 36 individual tests over 7 days. The column for ring flexibility testing nominates AS/NZS 1462.22, a test temperature of 20ºC and > 6000 N/m/m stiffness. Each line on the chart indicates a single stiffness test and all tests in the column state individual results exceeded the minimum stiffness requirement.

Chart 2: DWV 150 SN4 pipe demonstrating 32 individual tests on 7 February 2016. The column for ring flexibility testing nominates AS/NZS 1462.22, a test temperature of 20ºC and > 4000 N/m/m stiffness. Each line on the chart indicates a single stiffness test and all tests in the column state individual results exceeded the minimum stiffness requirement.

Note 4: The above test reports should be taken as indicative and do not represent the SN values of the appraised products.

6.4.4 Softening temperature (Vicat test)

Ref: AS/NZS 1260 Clause 3.2.6

Australian Plastic Profiles has stated that this testing is not required for foam core pipe.

6.5 Tests on moulded fittings

6.5.1 High temperature stress relief test

Ref: AS/NZS 1260 Clause 3.3.4

Australian Plastic Profiles has provided a 'Quality Compliance Record' dated 03/02/16. The 'Record' provides arbitrary data for 16 hourly test regimes with the following information including that specified in AS/NZS 1260 Clause 3.3.4:

- Product Code – S/BFF 150 88
- 2 Cavities (mould)
- Gauge – GO/NO GO and wall thickness
- Test requirements to AAS/NZS 1462.11
- Listed High Temperature Stress Relief test requirements – Blisters, Inclusions, Voids Present – Opening of weld line – Surface Delamination, Wall delamination.
- Hydrostatic Pressure Test – Weeping Cracking or Leakage, other failure of specimen.

The 'Record' is signed and indicates a 'Pass' for all requirements.

6.5.2 Softening temperature (Vicat test)

Ref: AS/NZS 1260 Clause 3.3.5

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Australian Plastic Profiles has provided NATA Accredited Vipac Plumbing Products Laboratory Test Report No. 30P-16-0066-TRP-399057-1 demonstrating tests on three samples of a 100 mm X 88 DWV PVC fitting.

The tests were conducted as per AS/NZS 1462.5 – Vicat Softening Temperature and all samples exceeded the required minimum of 74ºC.

6.6 Tests on elastomeric seal joints

6.6.1 Hydrostatic & Infiltration tests

Ref: AS/NZS 1260 Clause 3.4.2 & 3.4.3

Australian Plastic Profiles has provided NATA Accredited Vipac Plumbing Products Laboratory Test Report No. 30P-09-0080-TRP-442311-1 demonstrating compliance with the following clauses of AS/NZS 1477:2006:

- Clause 3.3.1 – Long term hydrostatic pressure test
- Clause 3.5.1 - Joint hydrostatic test
- Clause 3.5.2 – Joint Infiltration test.

The Report indicates ‘Conformed’ for all tests.

6.6.2 Contact width and pressure

Ref: AS/NZS 1260 Clause 3.4.4

These seals are standard Gulf Rubber Product Certified product and this data has not been pursued.

7 REFLUX VALVE COMPLIANCE

Ref: WMTS-006 :2014

7.1 PVC-U Body Requirements

Ref: WMTS-006:2014

Refer to Section 6.5 above as typical for this fitting.

7.2 Resilient seat Requirements

Ref: WMTS.006-2014 – Clause 5.3

The elastomeric seal for the Flap Valve shown in Figure 2 is manufactured in compliance with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

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FIGURE 2 FLAP VALVE AND SEAL

7.3 Other Material Requirements

Ref: WMTS-006:2014 – Clause 5.3

The Flap Valve hinge pin is Grade 316 stainless steel.

8 REFLUX VALVE DESIGN

Ref: WMTS-006:2014 – Section 8

8.1 Dimensions, Waterway, Reflux Action and Access Cover

Ref: WMTS-006:2014 – Clauses 8.1, 8.2, 8.3 & 8.4.

The Pipe King DN100 Reflux Valve Brochure and Installation Guide shown in Appendix 'E' describes the unit with cut away photos and description. The Pipe King DN 100 Reflux Valve is for buried installation with Soc/Soc solvent cement jointing. The basic assembly is provided with a standard TAC150 screw on 'Cap' used with the fitting, installed either on the fitting or if installed below surface then 'Cap' can be used at ground level.

The Flap Valve mounts in the base on a removable forked bracket that locates above the waterway allowing the whole assembly to be removed through the DN 150 socketed riser for cleaning or maintenance.

For deeper burial a DN 150 PVC-U DWV riser pipe, cut to the required length can be solvent cemented into the short riser section of the base and capped with a special BTS 150 cap (refer to Australian Plastic Profiles). To extract the Flap Valve assembly a section of 20 or 25 mm (optional) PN 12 PVC pressure pipe is solvent welded to the bracket and cut to length for easy reach at surface level. The top of the 20 or 25 mm pipe remains open. When the riser cap is removed there is access to remove the flap.

WMTS-006 specifies the waterway must allow free passage for a ball of 0.9 times the maximum bore of the pipe and there be no protrusions into the waterway. A test report was not provided and product certification is accepted to demonstrate compliance.

The Flap Valve reflux action is provided using a Grade 316 stainless steel hinge pin pivot located on the forked bracket.

9 REFLUX VALVE PERFORMANCE REQUIREMENTS AND TESTING

9.1 Seating Test

Ref: WMTS-006:2014 – Clause 9.1

Australian Plastic Profiles has provided a Queensland Testing Laboratory Pty Ltd Test Report No. 1121952731 detailing the Seating Test.

The test sample was listed as DN 100 PVC Bodied Reflux Valve and stated as 'compliant'.

9.2 Moulded Body Tests (Hydrostatic Pressure Test)

Ref: WMTS-006:2014 – Clause 9.2

Australian Plastic Profiles has provided a Queensland Testing Laboratory Pty Ltd Test Report No. 1121952731 detailing the Hydrostatic Pressure Test.

The test sample was listed as DN100 PVC Bodied Reflux Valve and stated as 'compliant'.

9.3 Elastomeric Seal Joint Tests

Ref: WMTS-006:2014 – Clause 9.3

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Not required. The Soc/Soc Reflux Valve is connected to DN 100 pipe using solvent cement jointing and the DN 150 riser extension is also solvent cement jointed.

10 FITTING INSTRUCTIONS, TRAINING AND INSTALLATION

PVC-U DWV pipe has been a commonly used product in the urban water industry for many years and pipe layer training is readily available. Installation, repair and maintenance procedures for PVC pipes are specified in WSA 02 Gravity Sewerage Code of Australia and additional information is available on the WSAA web site http://www.wsaa.asn.au including:

- Product Specifications
- Product and Material Information and Guidance
- Water Industry Product Standards
- Technical Notes
- Product Appraisal reports

The following standards and guideline also provide information:

- AS/NZS 2032 Installation of PVC–U Pipe Systems
- AS/NZS 2566.1 Buried flexible pipelines Part 1: Structural Design
- AS/NZS 2566.2 Buried flexible pipelines Part 2: Installation
- POP102 Solvent Cement Jointing of PVC Pipe downloadable from http://www.pipa.com.au/images/pdf/POP102.pdf

As for any specialised products there is a requirement for the installers and repairers to be trained in the installation/repair of PVC pipe systems. APP do not provide any specific training for pipe layers, however there are a number of Registered Training Organisations (RTOs) who conduct suitable training courses based on AS/NZS 2032 and AS/NZS 2566.2.

The PIPE KING™ Reflux Valve Installation Guide is located in Appendix ‘E’.

11 PRODUCT MARKING

All PIPE KING™ PVC-U DWV pipe, fittings and Reflux valve are marked in accordance with the requirements of the appropriate standards, e.g. PVC-U DWV pipes are marked in accordance with AS/NZS 1260:2009 as per the following:

Pipe & Fittings

- Manufacturers name or registered trademark or both
- Nominal size
- The letters PVCU
- The letters DWV
- The letters SC (Structured Wall pipes of Sandwich Construction)
- Class e.g. SN8
- Date of manufacture using the ISO system: e.g.110401 (i.e. 1st April 2011)
- Identification of manufacture site
- The standard number: AS/NZS 1260
- Standards Mark symbol – I>>>>>I)
- Licence Number: SMKP02157
- WaterMark symbol: W

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Reflux Valve is marked in accordance with WMTS.006:2014 as follows:

- Manufacturers Name: PIPE KING
- WaterMark
- Licence Number: 23090
- Nominal Size: 100mm RV100
- Direction of flow
- Batch identification
- Material: DWV PVC
- The number of the Technical Standard: WMTS.006

12 PACKAGING AND TRANSPORTATION

Australian Plastic Profiles has provided a typical crating diagram describing the three timber frames, placement, strapping with 16mm plastic straps and pipe layout within the frames.

Australian Plastic Profiles has individual procedures prepared for pipes and fittings packaging to ensure safety from damage of the products. There is a planned approach for loading the trucks - e.g. B_Double_Template.doc provided. This template is used to ensure the loads on the truck are set in a way preventing damage to the products.

The PIPE KING™ Reflux Valve is packaged individually in clear plastic bags as shown above and suitably boxed to prevent damage whilst in transit.

13 PRODUCT WARRANTY

The products are covered by the normal commercial and legal requirements of the *Competition and Consumer Act 2010 (Cth)*, which covers manufacture to the relevant standard, and details of Australian Plastic Profiles warranty is included in their terms and conditions of sale.

14 WATER AGENCY EXPERIENCE WITH THE PRODUCT OR FIELD TESTING REPORT

WSAA Product Appraisal Trial report prepared by Yarra Valley Water is shown in Appendix ‘F’.

15 DISCUSSION

This appraisal updates previously published WSAA Product Appraisal report PA 1002 and since then no negative reports have been received by WSAA for PIPE KING™ Products. This appraisal provides a more extended review of available QA and Test documentation providing additional confidence in the PIPE KING Products.

The appraisal concludes that:

- The PIPE KING™ PVC-U DWV pipes and fittings are ‘fit for purpose’ and suitable for use in water agency gravity sewerage systems.
- The ISO Type 5 StandardsMark Licence for the PIPE KING™ PVC-U DWV pipes and fittings has been addressed to the satisfaction of WSAA Product Appraisal Technical Advisory Group.
- WaterMark Certificate of Conformity – Level 2 for the PIPE KING Reflux valve has been addressed to the satisfaction of WSAA Product Appraisal Technical Advisory Group.

16 OUTCOMES OF EXPERT PANEL PRODUCT REVIEW

There are no issues to address.

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17 LIFE EXPECTANCY

The Australian Plastic Profiles range of PVC-U DWV pipes and fittings are designed on the basis of 50-year extrapolated material test data. For correctly manufactured and installed systems, the actual life cannot be predicted, but can reasonably be expected to be in excess of 100 years before major rehabilitation is required. Pipe life expectancy can vary with the quality of installation workmanship, system operating conditions, operating environment and other site-specific factors.

18 FUTURE WORKS

There are no future works.

19 DISCLAIMER

This Product Appraisal Report (Report) is issued by the Water Services Association of Australia Limited on the understanding that:

This Report applies to the product(s) as submitted. Any changes to the product(s) either minor or major shall void this Report.

To maintain the recommendations of this Report any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the Report and appropriate action. Appraisals and their recommendations will be the subject of continuous review dependent upon the satisfactory performance of products.

WSAA reserves the right to undertake random audits of product manufacture and installation. Where products fail to maintain appraised performance requirements the appraisal and its recommendations may be modified and reissued. Appraisal reports will be reviewed and reissued at regular intervals not exceeding five (5) years.

The following information explains a number of very important limits on your ability to rely on the information in this Report. Please read it carefully and take it into account when considering the contents of this Report.

Any enquiries regarding this report should be directed to the Program Manager, Carl Radford, Phone: 03 8605 7601 email carl.radford@wsaa.asn.au.

19.1 Issue of Report

This Report has been published and/or prepared by the Water Services Association of Australia Limited and nominated Project Manager and peer group of technical specialists (the Publishers).

The Report has been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Report (the Recipients).

By accepting this Report, the Recipient acknowledges and represents to the Publisher(s) and to each person involved in the preparation of the Report that the Recipient has understood and accepted the terms of this Disclaimer.

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This Report does not contain all information that a person might require for the purposes of assessing any product discussed or appraised within it. The product appraisal criteria used in preparing this Report may not address all relevant aspects of the Product.

Recipients should seek independent evidence of any matter which is material to their decisions in connection with an assessment of the Product and consult their own advisers for any technical information required. Any decision to use the Product should take into account the reliability of that independent evidence obtained by the Recipient regarding the Product.

Recipients should also independently verify and assess the appropriateness of any recommendation in the Report, especially given that any recommendation will not take into account a Recipient’s particular needs or circumstances.

WSAA has not evaluated the extent of the product liability and professional indemnify insurance that the provider of the product maintains. Recipients should ensure that they evaluate the allocation of liability for product defects and any professional advice obtained in relation to the product or its specification including the requirements for product liability and professional indemnity insurance.

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Neither the Publisher(s) nor any person involved in the preparation of this Report [has] [have] any obligation to notify you of any change in the information contained in this Report or of any new information concerning the Publisher(s) or the Product or any other matter.

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The Publisher(s) do[es] not, in any way, warrant that steps have been taken to verify or audit the accuracy or completeness of the information in this Report, or the accuracy, completeness or reasonableness of any recommendation in this Report.

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APPENDIX A - QUALITY CERTIFICATIONS

Copies of the following Quality Certification Certificates are available for downloading from the WSAA members website.

TABLE A1 – AUSTRALIAN PLASTIC PROFILES - MANAGEMENT SYSTEMS

12 Cawarra Road Caringbah NSW 2229	
Quality Systems Standard	ISO 9001:2008
Certification licence no.	QEC0597
Certifying agency	SAI GLOBAL
First date of certification	13 July 1995
Current date of certification	19 March 2013
Expiry date of certification	14 September 2018

TABLE A2 - AUSTRALIAN PLASTIC PROFILES – PRODUCT CERTIFICATION

12 Cawarra Road Caringbah NSW 2229	
Quality Systems Standard	AS/NZS 1260:2009
Certification licence no.	SMKP02157
Certifying agency	SAI GLOBAL
First date of certification	9 March 2010
Current date of certification	9 December 2014
Expiry date of certification	8 March 2020

TABLE A3 - AUSTRALIAN PLASTIC PROFILES
WATERMARK CERTIFICATE OF CONFORMITY LEVEL 1

12 Cawarra Road Caringbah NSW 2229	
Standard	AS/NZS 1260:2009
Certificate No.	WMKA02157
Certifying agency	SAI GLOBAL
First date of certification	9 April 1999
Current date of certification	13 March 2014
Expiry date of certification	8 April 2019

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TABLE A4 - AUSTRALIAN PLASTIC PROFILES
WATERMARK CERTIFICATE OF CONFORMITY LEVEL 2

12 Cawarra Road Caringbah NSW 2229 Trading as PIPE KING	
Australian Technical Specification	WMTS-006:2014
Certificate No.	23090
Certifying agency	Australian Certification Services
First date of certification	10 August 2011
Current date of certification	6 July 2017
Expiry date of certification	9 August 2020

TABLE A4 – GULF RUBBER AUSTRALIA/THONG NHAT RUBBER COMPANY RUTHIMEX – PRODUCT CERTIFICATION

12-13 Green Street, Revesby NSW 2212	
Quality Systems Standard	AS 1646:2007
Certification licence no.	SMKP20133
Certifying agency	SAI GLOBAL
First date of certification	10 December 2003
Current date of certification	15 December 2014
Issued date	15 December 2014
Expiry date of certification	9 December 2018

TABLE A5 – THOMAS GROZIER & SON
WATERMARK CERTIFICATE OF CONFORMITY LEVEL 1

Unit 2, 8 Prince William Drive, Seven Hills, NSW 2147	
Australian Technical Specification	WMTS-014:2016
Certificate No..	WMKA00103
Certifying agency	SAI GLOBAL
First date of certification	1 June 1993
Current date of certification	5 February 2018
Expiry date of certification	30 May 2019

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CERTIFICATE OF REGISTRATION

This is to certify that:

Australian Plastic Profiles Pty Ltd

12 Cawarra Road Caringbah NSW 2229 AUSTRALIA

operates a

QUALITY MANAGEMENT SYSTEM

which complies with the requirements of

ISO 9001:2008

for the following scope

The manufacture and distribution of plastic injection mouldings and extruded product from polymers; and the assembly of custom profile work. Products include items for the building industry - electrical conduits electrical trunking rectangular hydroponic troughs fittings and expanded foam profiles; UPVC soil waste and vent pipes and fittings for the plumbing industry.

Certificate No: QEC0597

Issued: 6 June 2016
Expires: 14/09/2018

Originally Certified: 13 July 1995
Current Certification: 6 June 2016

Heather Mahon
Acting Head of Policy, Risk and Certification

Certified System ISO 9001

JAS-ANZ
WWW.JAS-ANZ.ORG/REGISTER

Registered by:
SAI Global Certification Services Pty Ltd (ACN 108 716 669) 680 George Street Sydney NSW 2000 Australia with SAI Global Limited 680 George Street Sydney NSW 2000 Australia ("SAI Global") and subject to the SAI Global Terms and Conditions for Certification. While all due care and skill was exercised in carrying out this assessment, SAI Global accepts responsibility only for proven negligence. This certificate remains the property of SAI Global and must be returned to SAI Global upon its request. To verify that this certificate is current please refer to SAI Global On-Line Certification register at http://www.saiglobal.com

SAI GLOBAL
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STANDARDSMARK LICENCE

SAI Global hereby grants:

Australian Plastic Profiles Pty Ltd

12 Cawarra Road, Caringbah, NSW 2229, Australia

StandardsMark Licence

Manufactured to:

AS/NZS 1260:2009 - PVC-U pipes and fittings for drain, waste and vent application

"the StandardsMark Licensee" the right to use the STANDARDSMARK as shown below only in respect of the goods described and detailed in the Schedule which are produced by the Licensee or on behalf of the Licensee* and which comply with the appropriate Standard referred to above as from time to time amended. The Licence is granted subject to the rules governing the use of the STANDARDSMARK and the Terms and Conditions for certification and licence. The Licensee covenants to comply with all the Rules and Terms and Conditions.

Certificate No:SMKP02157

Issued: 9 December 2014
Expires: 8 March 2020

Originally Certified: 9 March 2010
Current Certification: 9 December 2014

Samer Chaouk
Head of Policy, Risk and Certification

Certified Product™ Australian Standard

JAS-ANZ

WWW.JAS-ANZ.ORG/REGISTER

*** For details of manufacture, refer to the licensee**

The STANDARDSMARK is a registered certification trademark of SAI Global Limited (A.C.N. 050 644 642) and is issued under licence by SAI Global Certification Services Pty Limited (ACN 108 716 669) ("SAI Global") 680 George Street, Sydney NSW 2000, GPO Box 5420 Sydney NSW 2001. This certificate remains the property of SAI Global and must be returned to SAI Global upon its request. Refer to www.saiglobal.com, for the list of product models.

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CERTIFICATE OF CONFORMITY

SAI Global hereby grants:

Australian Plastic Profiles Pty Ltd

12 Cawarra Road, Caringbah, NSW 2229, Australia

Watermark Certificate of Conformity - Level 1

Evaluated to:

AS/NZS 1260:2009 - PVC-U pipes and fittings for drain, waste and vent application

"the WaterMark Licensee" the right to use or arrange the use of the WATERMARK as shown below only in respect of the goods described and detailed on the product schedule identified on www.saiglobal.com which are produced by the WaterMark Licensee or on behalf of the WaterMark Licensee* and which comply with the appropriate Standard referred to above as from time to time amended. The Licence is granted subject to the rules governing the use of the WATERMARK and the Terms and Conditions for certification. The WaterMark Licensee covenants to comply with all the Rules and Terms and Conditions

Certificate No:WMKA02157

Issued: 13 March 2014
Expires: 8 April 2019

Originally Certified: 9 April 1999
Current Certification: 13 March 2014

Samer Chaouk
Head of Policy, Risk and Certification

WaterMark

JAS-ANZ

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*** For details of manufacture, refer to the licensee**

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WaterMark™

Level 2

Certificate of Conformity

Australian Certification Services Pty Ltd grants to the WaterMark User:

Pipe King Pty Ltd

Trading as PIPE KING

the right to use the WaterMark as shown above in conjunction with the Certificate No. on product/s as identified in the WaterMark Schedule and as listed on the WaterMark database www.abcb.gov.au/Product-Certification/WaterMark-Certification-Scheme which have been shown to comply with the relevant Standard/s and level of certification referred to below. The WaterMark User is granted a licence to use the WaterMark subject to the rules governing the use of the WaterMark.

Product Type:	Reflux Valve
Brand:	PIPE KING
Evaluated to:	WMTS-006:2014 Reflux valves-Sewerage

Issue Date	6th July 2017
Initial Issue Date:	10th August 2011
Expiry Date:	9th August 2020

Paul Greig
General Manager

Certificate No.: 23090

This certificate remains the property of Australian Certification Services Pty Ltd

WaterMark Level 2 certification is a conformity assessment scheme based on ISO Guide 67 (system 1b)

AUSTRALIAN CERTIFICATION SERVICES

Australian Certification Services Pty Ltd ABN 37 121 022 366
PO Box 627 Jannali, NSW 2226 AUSTRALIA
Phone:+61 2 8521 0726 Email:admin@certificationservices.com.au
www.certificationservices.com.au

JAS-ANZ
www.jas-anz.org/register

Certificate Number: 23090
Issue Date: 6th July 2017
Issue: 03 Revision: 00

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WaterMark Certification Schedule

The WaterMark User	Pipe King Pty Ltd ABN:54 082 877 610 30 Cawarra Road Caringbah NSW 2229 AUSTRALIA Website: www.pipeking.com.au
Certificate Number	23090
Level of Certification	WaterMark Level 2
Certification Standards:	WMTS-006:2014 Reflux valves-Sewerage

Product Listing

Model Identification	Brand Name	Product Description
RV-100	PIPE KING	DN 100 PVC-U Bodied Reflux Valve Solvent Weld Socket Ends

AUSTRALIAN CERTIFICATION SERVICES

Australian Certification Services Pty Ltd ABN 37 121 022 366
PO Box 627 Jannali, NSW 2226 AUSTRALIA
Phone:+61 2 8521 0726 Email:admin@certificationservices.com.au
www.certificationservices.com.au

JAS-ANZ
www.jas-anz.org/register

Certificate Number: 23090
Issue Date: 6th July 2017
Issue: 03 Revision: 00

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STANDARDSMARK LICENCE

SAI Global hereby grants:

Gulf Rubber Australia Pty Ltd

ABN 13118010263

Thong Nhat Rubber Company Ruthimex

12-13 Green Street, Revesby, NSW 2212, Australia

StandardsMark Licence

Manufactured to:

AS 1646-2007 - Elastomeric seals for waterworks purposes

"the StandardsMark Licensee" the right to use the STANDARDSMARK as shown below only in respect of the goods described and detailed in the Schedule which are produced by the Licensee or on behalf of the Licensee" and which comply with the appropriate Standard referred to above as from time to time amended. The Licence is granted subject to the rules governing the use of the STANDARDSMARK and the Terms and Conditions for certification and licence. The Licensee covenants to comply with all the Rules and Terms and Conditions.

Certificate No:SMKP20133

Issued: 15 December 2014 **Originally Certified: 10 December 2003**

Expires: 9 December 2018 **Current Certification: 15 December 2014**

Samer Chaouk
Head of Policy, Risk and Certification

Certified Product™ Australian Standard

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*** For details of manufacture, refer to the licensee**

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CERTIFICATE OF CONFORMITY

SAI Global hereby grants:

Thomas Grozier & Son Pty Ltd

ABN 71 087 973 466

Unit 2, 8 Prince William Drive, Seven Hills, NSW 2147, Australia

Watermark Certificate of Conformity - Level 1

Evaluated to:

WMTS 014:2016 - Jointing materials

"the WaterMark Licensee" the right to use or arrange the use of the WATERMARK as shown below only in respect of the goods described and detailed on the product schedule identified on www.saiglobal.com which are produced by the WaterMark Licensee or on behalf of the WaterMark Licensee* and which comply with the appropriate Standard referred to above as from time to time amended. The Licence is granted subject to the rules governing the use of the WATERMARK and the Terms and Conditions for certification. The WaterMark Licensee covenants to comply with all the Rules and Terms and Conditions

Certificate No:WMKA00103

Issued: 5 February 2018
Expires: 30 May 2019

Originally Certified: 1 June 1993
Current Certification: 5 February 2018

Nicole Grantham
General Manager SAI Global Certification Services

WaterMark™

JAS-ANZ
WWW.JAS-ANZ.ORG/REGISTER

*** For details of manufacture, refer to the licensee**

The WATERMARK is a registered certification trademark of Australian Building Codes Board ABN 74 599 608 295 and is issued under licence by SAI Global Certification Services Pty Limited (ACN 108 716 669) ("SAI Global") 680 George Street, Sydney NSW 2000, GPO Box 5420 Sydney NSW 2001. This certificate remains the property of SAI Global and must be returned to SAI Global upon its request. Refer to www.saiglobal.com for the list of product models.

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SCHEDULE TO

CERTIFICATE OF CONFORMITY

SAI Global hereby grants:

Thomas Grozier & Son Pty Ltd

Unit 2, 8 Prince William Drive, Seven Hills, NSW 2147, Australia

Watermark Certificate of Conformity - Level 1

Evaluated to:

WMTS 014:2016 - Jointing materials

Model identification of the goods on which the WATERMARK may be used:

Model Identification	Model Name	Brand Name	Product Description	Date Endorsed
W103-001	BK	N/A	Lubricant	1 Feb 2008
W103-002	BK – Standard *	N/A	Lubricant	1 Feb 2008

End of Record

Certificate No: WMKA00103 Issued Date: 5 February 2018

This schedule supersedes all previously issued schedules

*** For details of manufacture, refer to the licensee**

The WATERMARK is a registered certification trademark of Australian Building Codes Board ABN 74 599 608 295 and is issued under licence by SAI Global Certification Services Pty Limited (ACN 108 716 669) ("SAI Global") 680 George Street, Sydney NSW 2000, GPO Box 5420 Sydney NSW 2001. This certificate remains the property of SAI Global and must be returned to SAI Global upon its request. Refer to www.saiglobal.com for the list of product models.

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APPENDIX B - WSA PRODUCT SPECIFICATION

WATER SERVICES ASSOCIATION of Australia

PRODUCT SPECIFICATION

WSA PS - 230 POLYVINYLCHLORIDE, UNPLASTICISED (PVC-U) PIPES AND FITTINGS FOR NON-PRESSURE APPLICATIONS – SEWERAGE AND DRAINAGE

230.1 SCOPE

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

230.2 REQUIREMENTS

(a) PVC-U pipes 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 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 requirements.[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	

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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.

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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.

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APPENDIX C - SUPPLIER CONTACTS

SYDNEY - NSW
30 CAWARRA RD, CARINGBAH, 2229
Phone: (02) 9527 8888
Fax: (02) 9527 8899
Email: sydsales@pipeking.com.au

NEWCASTLE - NSW
40 SANDRINGHAM AVE, THORNTON, 2322
Phone: (02) 4966 0477
Fax: (02) 4966 0488
Email: newsales@pipeking.com.au

CANBERRA - A.C.T.
20 FAUNCE ST, QUEANBEYAN, 2620
Phone: (02) 6299 0833
Fax: (02) 6299 0877
Email: cansales@pipeking.com.au

BRISBANE - QLD
32 CLINKER ST, DARRA, 4076
Phone: (07) 3715 8844
Fax: (07) 3715 8855

MELBOURNE - VIC
110 Colemans Rd
Carrum Downs VIC 3201
Phone: (03) 8773 8200
Fax: (03) 8773 8299
Email: melsales@pipeking.com.au

ADELAIDE - S.A.
Southlink Industrial Park
Bldg. C / 1 Sherriffs Rd
West Lonsdale SA 5160
Phone: (08) 8186 8300
Fax:(08) 8186 8399
Email:adesales@pipeking.com.au

PERTH - W.A.
396 VICTORIA RD, MALAGA, 6090
Phone: (08) 9248 4315 (08) 9248 4315
Fax: (08) 9248 4316
Email: brisales@pipeking.com.au

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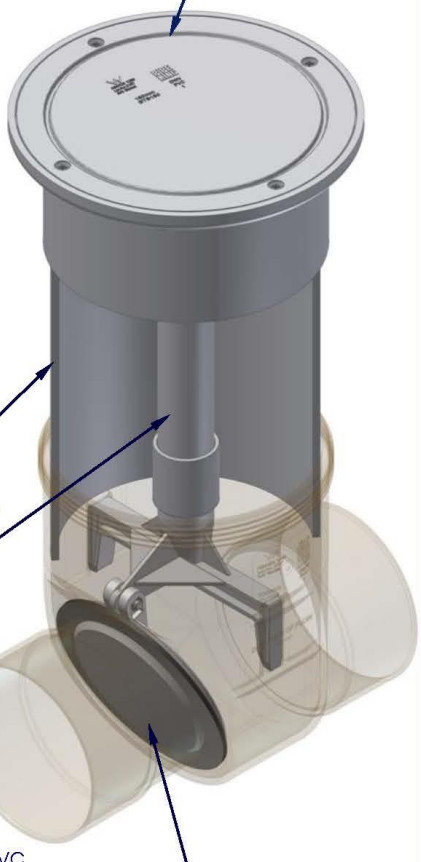
APPENDIX E – PIPE KING REFLUX VALVE BROCHURE

"SIMPLY THE BEST"

PIPE KING
HEAD OFFICE
30 Cawarra Rd,
Caringbah NSW 2229
www.pipeking.com.au
sydsales@pipeking.com.au

WaterMark
Lic No23090
ATS5200.006



PIPEKING Revolutionary 100mm Reflux Valve

- Robust construction
- Compact design=reduced installation time
- Fitting can be installed underground using PIPEKING 150mm PVC pipe
- When installed underground the sealing valve can be easily accessed using appropriate length of 20 or 25mm Pressure Pipe
- Fewer parts means less time when accessing sealing valve
- Hinge Pin on sealing valve made from stainless steel
- Manufactured to Australian Technical Specifications ATS5200.006-2005

100mm Reflux Valve Installation guide

- Product must be installed by Licenced Plumber in accordance to AS/NZS3500
- Install valve with a gradient of no more than 3° gradient in direction of flow, as indicated on side of fitting.
- Cut a Length of 150mm PVC Pipe to the a predetermined length from Reflux Valve to surface.
- Cut a predetermined length of 20 or 25mm PN12 PVC Pressure pipe. This pipe is used to access flap valve for cleaning purposes and must have clearance of 10mm to the lid.
- Solvent cement 150mm pipe to reflux valve and 20 or 25mm PN12 PVC Pressure pipe to flap valve insert making sure can be easily removed.

www.pipeking.com.au

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APPENDIX F – WSAA PA FIELD TRIAL

WSAA PRODUCT APPRAISAL FIELD TRIAL REPORTING *Australian Plastic Profiles Pty Ltd - Pipe King DWV PVC-U Sewer Pipe & Fittings*

1. WSAA Product Appraisal Report
   - PA 10/02
   - Published 13th September 2010
   - Specified need to undertake field trial with 6 months of product appraisal
2. Project Field Trial Details -
   - the Estate Stage name - Renaissance Rise, Stage 16, Mernda
   - the design consultant - Cardno Grogon Richards
   - the sewer contractor - Crowley Excavations
   - the project involves
     - 463m of DN150, SN8, Pipe King, DWV PVC-U pipe
     - 12m of DN225, SN8, Pipe King, DWV PVC-U pipe
     - 48 property service connections
     - 7 manholes
     - 2 maintenance shafts
     - 3 inspection shafts
     - Refer to the design plan within Appendix 1
3. Date(s) of installation.
   - 18th March, 2011
4. Condition of product at delivery with photos showing packaging, support timbers, strapping with photo(s)
   - Product delivered to site by local plumbing supplier (Reece Civil).
   - All pipe delivered within designate pack.
   - No evidence of any damage or distortion of any pipe or fittings was evident
5. Photograph any surface damage.
   - None encountered.
6. Product marking details.
   - Product markings observed as defined with the product appraisal report
7. Describe jointing type or seal.
   - Pipe & fittings are soc-sp solvent cement jointed
8. The complete installation details such as length of pipe installed for the trial.
   - Project trial installation included supply & installation of pipe and fittings necessary for the sewer retic network (refer Item 2 above) to service the above Estate.
9. The type of ground and trench conditions.

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- Clay (heavy) – refer attached photo within Appendix 2

10. Installation design; - grades, fittings, bedding and embedment materials and compaction method.
    - Size & range of pipe & fittings define within Item 2
    - Pipe grades ranging generally 1 in 150

      Bedding & Embedding material – 7mm Fine CR

      Compaction – in accordance with MRWA Backfill Spec
11. The range of covers or depths - deepest to shallowest and average.
    - Depth of installation ranging b/w 1.9m and 4.2m, average depth – 3.3m.
12. If applicable, the relative water table or cover to invert - deepest to shallowest and average.
    - No water evident within the trench
13. Report on pressure testing program

    Low pressure air testing successfully completed in accordance with MRWA Edition of the WSAA Sewerage Code
    - Maintenance Structure vacuum testing successfully completed in accordance with MRWA Edition of the WSAA Sewerage Code.
14. Report on ovality testing and CCTV inspection.
    - Ovality testing successfully completed in accordance with MRWA Edition of the WSAA Sewerage Code.

      No CCTV inspection required
15. Were there any signs of failure or concern for the installation?
    - No signs of any product failure evident throughout the project.
16. What was learned about the product that could make it better or worse than other brands?

    No new learnings evident during the installation of this product
    - Installation occurred without incident and as expected.
17. Summary and any other comments.

    The APP Pipe King, DWV PVC-U pipe & fittings appears to be equivalent to other DWV PVC-U pipe & fittings
    - No issues were encountered with installing this product as a trial installation

      The contractor involved, Crowley excavations was more the happy with the performance of the product during the trial installation and indicated they would be happy to use this product on future projects

Trail report prepared by

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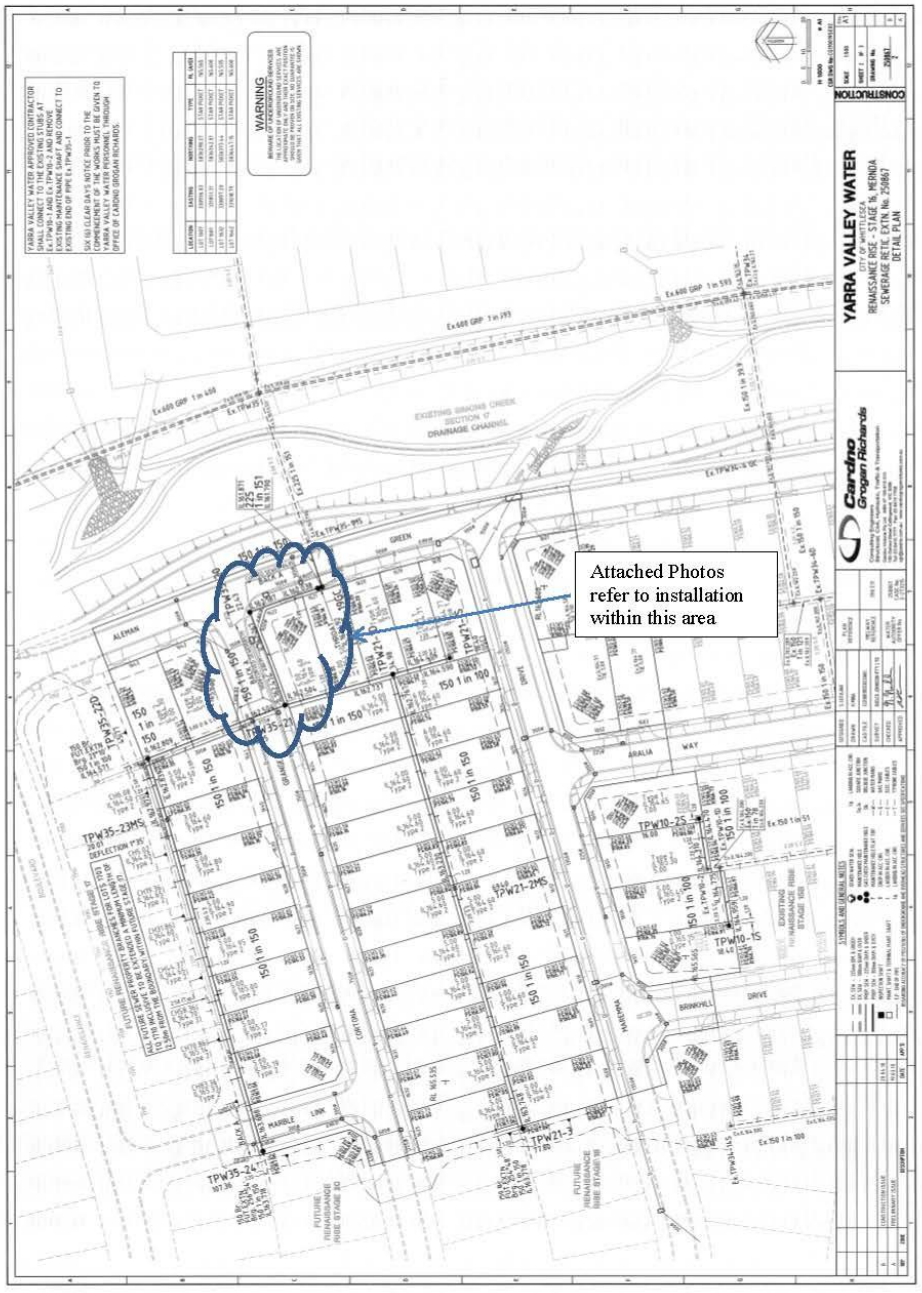
Appendix 1 – Design Plan



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Appendix 2 – Sample Delivered Pipe Photos

Sample DN150 Pipe

Pipe Soc / Sp Ends

Pipe Installation

Property Service Connections

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Manhole Connection Fittings

Typical Ground Conditions – Heavy Clay

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