

# Iplex Pipelines Australia Pty Ltd

## PRODUCT APPRAISAL REPORT No 0901 Issue 4

EZIpit<sup>®</sup> Polypropylene (PP) Inspection and Maintenance Chambers and Shafts

### **WSA 137—2013 Industry Standard for Maintenance Chambers and shafts for Sewerage**

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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

Iplex Pipelines Australia Pty Ltd (Iplex) is a leading manufacturer and supplier of plastic pipeline systems in Australasia. Iplex has a long-term technology supply arrangement with WAVIN® Overseas. Iplex maintains close associations with other industry leaders around the world to ensure the latest innovations are available to customers and also undertakes its own product and technological development, aimed at meeting the specific requirements of local conditions and projects in Australia and New Zealand.

This fourth issue revises the Appraisal Report to include a new DN 425 x dn150 PP four way Riser Coupling. Elastomeric sealed joints formed between the coupling and riser shaft has been assessed for compliance with WSA 137-2013, Clause 3.7.4 Water Tightness between riser and accompanying components.

The material characteristics of the EZIpit® DN 425 x dn 150 4-way riser coupling has also been appraised for performance compliance with WSA 137-2013 Appendix B Table B2 .i.e. Density, OIT and MFR.

The coupling is designed for property branch inflows via the EZIpit® 425 maintenance shaft (MS) riser. This fitting allows up to 4 inflows at 90° apart and is lighter than current Iplex PVC coupling version.

In Issue 3 of this Appraisal Report amendments were incorporated to include enhanced design features in the products and closes out original Future Work items that required seal effectiveness and liquid infiltration tests to be completed and a field trial to be carried out. The requirement for a field trial has been withdrawn because the products have been approved and installed by a large number of water agencies since publication of the original Appraisal. QA certificates have also been updated for currency.

This appraisal covers the Iplex EZIpit® 600 maintenance chamber (MC) and EZIpit® 425 (MS). Both of the structures comprise of a base, corrugated riser, riser coupling and cover arrangement suitable for vehicular and non-vehicular loading.

The EZIpit® 600 MC and 425 MS are intended for installation in buried non-pressure drainage and sewerage applications with a maximum depth from invert to the finished surface level of 6m and an operating temperature less than 25°C.

The EZIpit® 600 MC and 425 MS, designed as non-man entry maintenance structures, permit maintenance from the surface of connected sewers by operators using common maintenance and condition assessment inspection techniques and equipment.

The EZIpit® 600 MC and 425 MS components and cover arrangements are manufactured to comply with:

- BS EN 13598-2:2009 *Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticised Poly (vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) – Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations.*
- ISO13272:2011 *Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticised poly (vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Specifications for manholes and inspection chambers in traffic areas and underground installations*
- WSA 137:2013 *Maintenance chambers and shafts for sewerage and sanitary drainage*
- AS/NZS 5065:2005 *Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications*

- AS 1646:2007 *Elastomeric seals for waterworks purposes* and
- AS 3996:2006 *Access covers and grates*

Examination of the submitted documented material provides an expectation that the products described herein and distributed by Iplex are 'fit for purpose' in gravity sewer pipeline networks.

### **1.1 Recommendation**

It is recommended that WSAA members and associates accept/authorise the EZIpit® 600 Maintenance Chamber and EZIpit® 425 Maintenance Shaft for gravity sewer applications subject to the following:

- (a) The design, installation, testing and commissioning is carried out in accordance with:
  - (i) AS/NZS 2566.1 Buried flexible pipelines part 1: Structural design
  - (ii) AS/NZS 2566.2 Buried flexible pipelines Part 2: Installation
  - (iii) Iplex Pipelines EZIpit® Technical Guide, 'Polypropylene maintenance shafts and chambers for gravity sewer applications'
  - (iv) WSAA Codes and any specific requirements of the member or associate.

## **2 THE APPLICANT**

Iplex is part of the Building Products division of Fletcher Building Pty Ltd.

Iplex is a leading manufacturer and supplier of plastic pipeline systems in Australasia for a diverse range of applications including: water supply, sewerage, plumbing, gas, stormwater, irrigation, telecommunications, electrical, mining and industrial. Iplex operates manufacturing facilities located in every Australian State and New Zealand.

Iplex has a long-term technology supply arrangement with WAVIN® as well as maintaining close associations with other industry leaders around the world to ensure the latest innovations are available to customers. Iplex also undertakes its own product and technological development, aimed at meeting the specific requirements of local conditions and projects in Australia and New Zealand.

Iplex manufacturing sites are ISO 9001 quality endorsed and have product certification for a range of products used by the water industry.

Products are sold under Iplex and Gatic® brands.

### **2.1 The Manufacturer**

The EZIpit® polypropylene components are manufactured in Europe by WAVIN®, except for the DN 600 corrugated riser which is manufactured by Iplex in Brisbane. The ductile iron cover arrangements and concrete components are supplied by Gatic® in Australia.

WAVIN® is the largest supplier of plastic pipe systems in Europe. The company is located in Zwolle, The Netherlands, where the world's first manufacturing facility was established in 1955 for the manufacture of PVC pressure water pipes.

WAVIN® offers a wide range of plastic pipe systems for building and civil infrastructure market sectors including solutions for water supply, sewerage and drainage systems.

WAVIN® is highly focused on quality and reliability of the products they offer. All WAVIN® products comply with the required standards and norms and have the necessary certificates and approvals. WAVIN® have implemented and certified quality management systems complying with ISO 9001. The systems cover all aspects of design, construction, manufacture, sales, distribution, and post sales service.

The EZIpit®425 x dn150 Riser (PP) Coupling F&F is manufactured by Kiel industries Morwell, Victoria using a rotational moulding process. Kiel industries are a member of the Association of Rotational Moulders Australasia and operate under an ISO 9001 quality management system, certified by DQS Certification AUSNZ P/L.

### 3 THE PRODUCT

The EZIpit® 600 maintenance chamber (MC) is a non-entry sewer inspection and maintenance chamber with a nominal inside diameter of 600mm.

The EZIpit® 425 maintenance shaft (MS) is a non-entry sewer inspection and maintenance shaft with a nominal inside diameter of 425 mm.

Both structures are suitable for installation depths up to 6m and consist of a polypropylene base and corrugated riser with a Class B (non-trafficable) or Class D (trafficable) cover arrangement.

The EZIpit® 600 MC and EZIpit® 425 MS provides flexibility in design and installation by allowing compact design in sewer networks. The EZIpit® provides increased access for cleaning and inspection equipment and is available with a range of bases and flow channels to accommodate side inflows and changes in direction. The EZIpit® 600 MC and 425 MS consists of the following components:

- DN 600 and DN 425 polypropylene bases. The bases are available with 30°, 60°, 90° 180° 'T' and '4 Way' flow channels and DN100, DN150, DN225, DN300 and DN375 adjustable rubber ring joint sockets. The sockets are suitable for use with smooth wall DWV PVC-U pipes manufactured to AS/NZS 1260
- DN 600 and DN 425 polypropylene single wall corrugated risers. The EZIpit® risers are available in a range of lengths to accommodate various depths. The DN 600 riser is light grey in colour whilst the DN 425 riser is orange-brown in colour.
- DN 600 and DN 425 SBR seals for the base to riser elastomeric joint
- DN 425 x dn150 PP (four way) riser coupling
- DN 600 and DN 425 cover arrangements for both non-trafficable conditions (Class B) and trafficable conditions (Class D).
- SBR seals for the base to pipe connection.

The EZIpit® 600 cover arrangements can accommodate both flat and sloped surfaces and are comprised of different types depending on the site conditions. The following gives a brief description of each type.

The conventional Class B and Class D cover arrangement comprises of a cap and lid, to seal the top of the riser and a frame and cover, located above the cap and lid, to accommodate Class B and Class D loads in AS 3996. See Figures 1 and 2.

The EZIpit® 600 'Top Hat' Cover is comprised of a Class B (non-trafficable) or Class D (trafficable) frame and cover. The Top Hat covers sit directly over the riser and are sealed with an EZIpit600 elastomeric ring. The covers accommodate the external loads. See Figures 3 and 4

For sloped surfaces (>1 in 10 or steeper) an EZIpit600 cap and lid is assembled on the corrugated riser with the EZIpit600 elastomeric ring seal. An 800mm PE shroud is installed around the cap which allows the installer to adjust the height and slope as required. A Gatic® (concrete encased) DN600 frame and cover is then assembled on top of the PE shroud to accommodate external load. See Figure 5



The EZIpit® 425 cover arrangement is comprised of a 425 'Top Hat' frame and cover to accommodate external loads described in AS 3996. See Figures 6 and 8

For sloped surfaces (>1 in 10) an EZIpit425 cap and lid is assembled on the corrugated riser and sealed with the EZIpit425 elastomeric ring seal. A 560mm PE shroud is then placed around the cap and lid which allows the installer to adjust the height and slope as required. A Gatic® (concrete encased) DN 600 frame and cover is then assembled on top of the PE shroud to accommodate the external load. See Figure 7.

#### 4 SCOPE OF THE APPRAISAL

The scope of this Appraisal includes the EZIpit® 600 maintenance chamber (MC) and 425 maintenance shaft (MS). The components include polypropylene bases and risers, riser couplings, plain couplings, cover arrangements and elastomeric ring seals

##### 4.1 EZIpit® Base (Tegra® 600 and Tegra® 425)

The EZIpit® base is available with six different flow profiles. 30°, 60°, 90°, straight through (180°), Tee, and double Tee sweep.

The bases are manufactured from block co-polymer polypropylene (PP-R) with RRJ adjustable connections suitable for use with smooth wall DWV PVC pipes manufactured to AS/NZS 1260:2009 *PVC-U pipes and fittings for drain, waste and vent application*.

The bases are manufactured by WAVIN® Metalplast – Buk Sp.zo.o, Poland in accordance with EN 13598-2. Refer to Tables 1 and 2 below and Appendix A.

**TABLE 1 EZIPIT® 425 MS FLOW PROFILES (TEGRA® 425)**

Product Code	Description	Material
TGB425100	DN 425 x 100 base x 180° channel RRJ	Polypropylene
TGB425150	DN 425 x 150 base x 180° channel RRJ	Polypropylene
TGB425225	DN 425 x 225 base x 180° channel RRJ	Polypropylene
TGB425300	DN 425 x 300 base x 180° channel RRJ	Polypropylene
TGB42515090	DN 425 x 150 base x 90° channel RRJ	Polypropylene
TGB425150120	DN 425 x 150 base x 60° channel RRJ	Polypropylene
TGB425150150	DN 425 x 150 base x 30° channel RRJ	Polypropylene
TGB425T150	DN 425 x 150 base x Tee channel RRJ	Polypropylene
TGB425X100	DN 425 x 100 base x Double Tee channel RRJ	Polypropylene
TGB425X150	DN 425 x 150 base x Double Tee channel RRJ	Polypropylene

**TABLE 2 EZIPIT® 600 MC FLOW PROFILES (TEGRA® 600)**

Product Code	Description	Material
TGB600150	DN 600 x 150 base x 180° channel RRJ	Polypropylene
TGB600225	DN 600 x 225 base x 180° channel RRJ	Polypropylene
TGB600300	DN 600 x 300 base x 180° channel RRJ	Polypropylene
TGB600375	DN 600 x 375 base x 180° channel RRJ	Polypropylene
TGB60015090	DN 600 x 150 base x 90° channel RRJ	Polypropylene
TGB60022590	DN 600 x 225 base x 90° channel RRJ	Polypropylene
TGB60030090	DN 600 x 300 base x 90° channel RRJ	Polypropylene
TGB600150120	DN 600 x 150 base x 60° channel RRJ	Polypropylene
TGB600225120	DN 600 x 225 base x 60° channel RRJ	Polypropylene
TGB600300120	DN 600 x 300 base x 60° channel RRJ	Polypropylene
TGB600150150	DN 600 x 150 base x 30° channel RRJ	Polypropylene
TGB600225150	DN 600 x 225 base x 30° channel RRJ	Polypropylene
TGB600300150	DN 600 x 300 base x 30° channel RRJ	Polypropylene
TGB600T150	DN 600 x 150 base x Tee channel RRJ	Polypropylene
TGB600T225	DN 600 x 225 base x Tee channel RRJ	Polypropylene
TGB600T300	DN 600 x 300 base x Tee channel RRJ	Polypropylene
TGB600X150	DN 600 x 150 base x Double Tee channel RRJ	Polypropylene
TGB600X225	DN 600 x 225 base x Double Tee channel RRJ	Polypropylene
TGB600X300	DN 600 x 300 base x Double Tee channel RRJ	Polypropylene
TGB600	DN 600 Empty base	Polypropylene

#### 4.2 EZIpit® MC Riser (DN 600) and MS Riser (DN 425)

The EZIpit® 600 Riser is manufactured as a single wall corrugated polypropylene pipe (DN 600 SewerMAX® pipe without the smooth inner wall) with spigot plain ends

The EZIpit® 600 riser is manufactured by Iplex in Strathpine, Queensland in accordance with the relevant clauses in AS/NZS 5065 *Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications*.

The EZIpit® 600 riser is manufactured in a light grey colour in standard nominal lengths, which can also be cut in the field to adjust the height. See Table 3.

The riser is manufactured with a minimum ring stiffness of 8000 N/m/m.

The EZIpit® 425 Riser is manufactured as a single wall corrugated polypropylene pipe with spigot plain ends.

The EZIpit® 425 riser is manufactured by Nordisk WAVIN A/S Wavinvej 1 DK-8450 Hammel Denmark, in accordance with the BS EN 13598-2, EN 14982, EN 14830 and EN 14802.

The EZIpit® 425 riser is manufactured in an orange/brown colour in standard nominal lengths, which can be cut in the field to adjust the height. See Table 3.

The EZIpit® 425 riser is manufactured with a minimum pipe stiffness of 4000 N/m/m.

**TABLE 3 EZIPIT® MC RISER (DN 600) AND MS RISER (DN 425)**

Product Code	Description	Colour	Material
TGPP425B	DN 425 x 2000 mm EZIpit® Riser	Orange/Brown	Polypropylene
TGPP425C	DN 425 x 3000 mm EZIpit® Riser	Orange/Brown	Polypropylene
TGPP425F	DN 425 x 6000 mm EZIpit® Riser	Orange/Brown	Polypropylene
TGPP600A	DN 600 x 1000 mm EZIpit® Riser	Light Grey	Polypropylene
TGPP600AV	DN 600 x 1500 mm EZIpit® Riser	Light Grey	Polypropylene
TGPP600B	DN 600 x 2000 mm EZIpit® Riser	Light Grey	Polypropylene
TGPP600C	DN 600 x 3000 mm EZIpit® Riser	Light Grey	Polypropylene
TGPP600D	DN 600 x 4000 mm EZIpit® Riser	Light Grey	Polypropylene
TGPP600DV	DN 600 x 4500 mm EZIpit® Riser	Light Grey	Polypropylene
TGPP600F	DN 600 x 6000 mm EZIpit® Riser	Light Grey	Polypropylene

### 4.3 EZIpit® Jointing Options

#### 4.3.1 Base to pipe connection

The EZIpit® bases include adjustable pipe sockets with encapsulated SBR elastomeric ring seals. The RRJ sockets are compatible with smooth wall PVC DWV sewer pipes complying with AS/NZS 1260:2009 '*PVC-U pipes and fittings for drain, waste and vent application* in sizes DN 150, DN 225, DN 300 and DN 375.

All of the adjustable pipe socket connections, except for DN375, allow an additional angular deflection up to 7.5° in any direction.

#### 4.3.2 Base to the riser connection

The EZIpit® 600 MC utilises a DN600 SewerMAX® SBR elastomeric ring to form a seal between the base and riser. The same elastomeric ring is also used between the EZIpit® riser and the EZIpit® ductile iron cover at the surface. See Tables 4 and A8 and Figures A8.

The EZIpit® 425 MS utilises a DN425 SBR elastomeric ring to form a seal between the base and the riser. The same elastomeric ring is also used between the EZIpit® riser and the EZIpit® ductile iron cover at the surface. Refer to Figure A8 and Tables 4 and A8 in Appendix A.

**TABLE 4 EZIPIT™ 600 AND 425 ELASTOMERIC RISER SEALS**

Product Code	Description	Material
GERSEW425	EZIpit®425 Seal	SBR
GERSEW600	EZIpit®600 Seal	SBR

The EZIpit® 425 and 600 elastomeric ring seals comply with AS 1646 *Elastomeric seals for waterworks purposes* and EN 681 *Elastomeric seals*.

SBR compounds exhibit chemical resistance to mineral acids, alkalis, oils and organic solvents and have shown to be immune to microbiological attack that occurs with NR when the sacrificial antioxidants have been consumed.

#### **4.3.3 Riser to (4 way) Riser Coupling**

The EZIpit® 425 MS utilises the DN425 SBR elastomeric ring to form a seal between the riser and coupling. The same elastomeric ring is also used between the EZIpit® base and riser. Refer to Table 4.

The DN 150 PP spigots off-takes are compatible with Standards DWV PVC elastomeric seal ring joint fittings manufactured to AS/NZS 1260.

#### **4.3.4 EZIpit® Cover Arrangements**

For flat surfaces the EZIpit® cover arrangement is comprised of a 'Top Hat' Frame with a circular cover (solid top or concrete infill). The frame is assembled on the corrugated riser and sealed with an EZIpit® elastomeric ring. The 'Top Hat' frame allows the installer to adjust the height and surface grade in the field. I.e. the frame can be tilted (typically up to 1:40) to match the slope of the pavement. The EZIpit 'Top Hat' frame is manufactured with a 300mm clear opening to reduce risks associated with falling from heights. The Top Hat frame and cover is available in Class B or Class D to AS3996 *Access covers and grates*. See Figures 3,4,6 and 8

For sloped surfaces greater than 1 in 10 the EZIpit® Top Hat is not suitable and a different arrangement is used. A cap and lid is assembled on the corrugated riser and sealed with an EZIpit® elastomeric ring. A PE shroud is then placed around the cap and lid and a (concrete encased) frame and cover is then assembled above the cap and lid. The PE shroud keeps the cap and lid clean and allows height and slope adjustment in the field. See Figures 5 and 7.

The Caps include a 300mm clear opening to minimise the risk of falling from heights. The cap is sealed with the lid using Gatic® sealing compound. See Figures 1, 2, 5 and 7.

In some jurisdictions, the caps are omitted. Refer to Drawings No's 3816 and 3817 in Appendix A.

#### **4.3.5 EZIpit® frame and access cover arrangement**

Gatic® Pty Ltd supplies all of the components of the access covers, frames and reinforced concrete surrounds for the EZIpit® 600 MC and 425 MS.

The EZIpit® 600 and 425 frames and access covers comply with AS 3996:2006 *Access covers and grates* and the additional requirements in WSA PS-290.

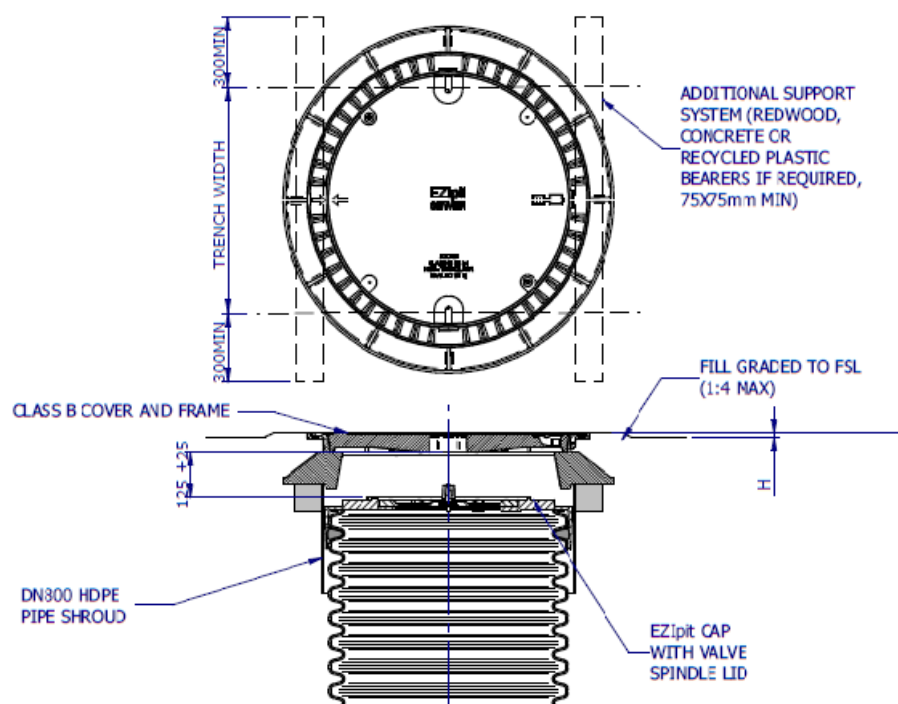
The EZIpit® covers have provision for a bolt down security.

The EZIpit® cover arrangements and manufacturers installation instructions are designed to transfer any loads into the compacted embedment material.

#### 4.3.5.1 EZIpit™ 600 MC frame and access cover (Class B) - conventional type.

For non-trafficable areas Iplex can supply a Class B cast ductile iron circular solid top access cover and frame (GME300S6B2) with 610 mm diameter clear opening.

To prevent movement of the frame and access cover, it may be necessary to provide additional support, expanding the trench width as shown in Figure 1. The supports may be timber, concrete house stumps, recycled plastic bearers or angle iron depending on the designer's requirements. The riser should also be surrounded with a compacted crushed rock or other compacted material to further support the structure up to the removable lid and cover. A section of standard DN 800 HDPE pipe is used as a shroud to stop fill from falling into the void between the underside of the cover and frame and the cap and lid on the riser (Refer to WSA 02 Sewerage Code of Australia)

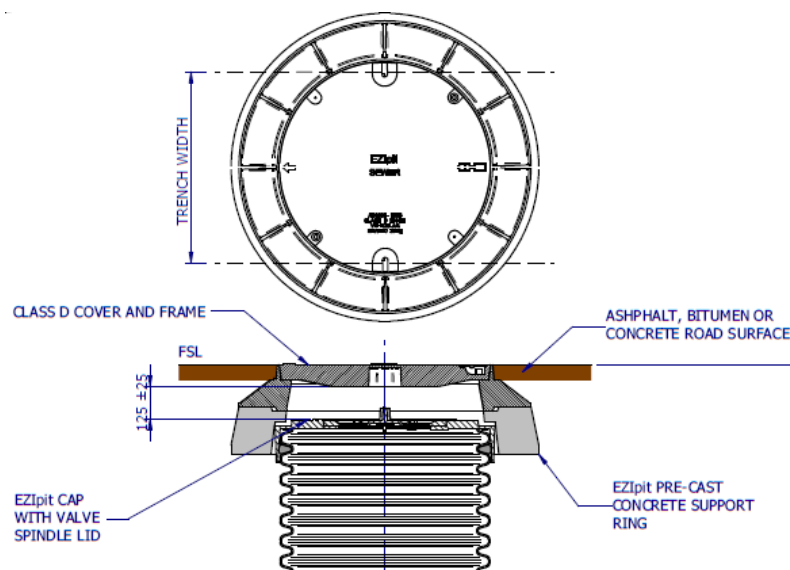


**FIGURE 1**  
**EZIPIT® 600 MC FRAME AND ACCESS COVER (CLASS B) CONVENTIONAL TYPE**

#### 4.3.5.2 EZIpit® 600 MC frame and access cover (Class D) - conventional type

For trafficable areas Iplex can supply a Class D cast ductile iron circular solid top access cover and frame (GME300S6D2) with 610 mm diameter clear opening.

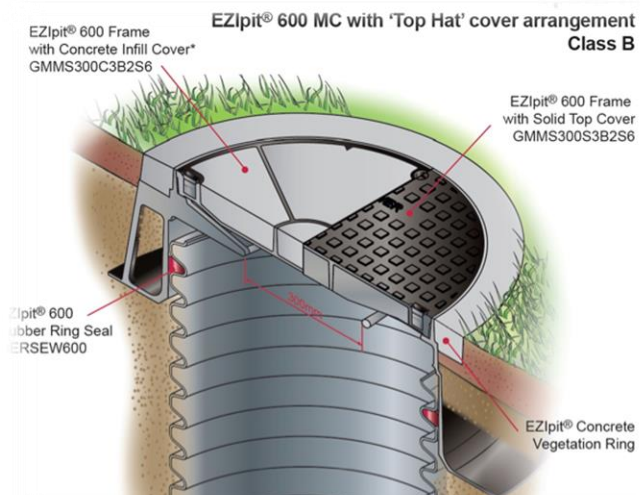
The EZIpit™ 600 MC Class D frame and access cover (GME300S6D2) is supplied with a concrete support ring designed for use in roadways. The concrete support ring is designed to provide appropriate support for the frame and cover and transfers traffic loads onto the compacted granular refill material. Refer to Figure 2.



**FIGURE 2**  
**EZIPIT™ 600 MC FRAME AND ACCESS COVER (CLASS D) CONVENTIONAL TYPE**

#### 4.3.5.3 EZIpit® 600 MC frames and access covers (Class B) ‘Top Hat’

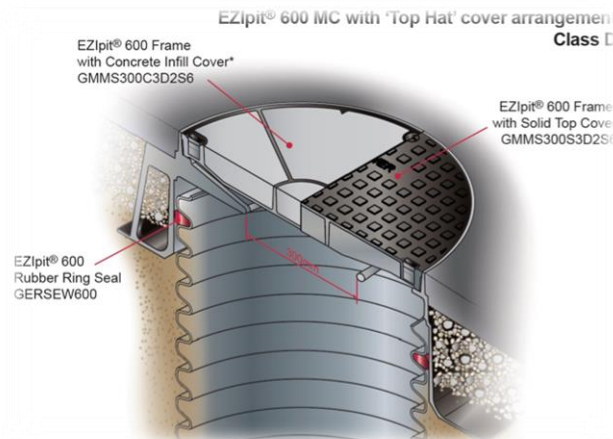
The Class B Cover arrangement is comprised of a ductile ‘Top Hat’ frame with a 600mm circular cover. The circular cover is available as either a solid top (GMMC300S3B2S6) or concrete infill (GMMC300C3B2S6). The ‘Top Hat’ is assembled on top of the riser and sealed with an EZIpit® 600mm ring (GERSEW600). The frame is designed with a 300mm clear opening for prevention of falls from heights. In landscaped areas, an EZIpit®600 precast concrete vegetation ring (GME300VEGRINGMC) is placed around the frame to limit the growth of any vegetation over the cover. The Top Hat frame can be tilted to allow for surface drainage. Typically 1 in 40 can be achieved during installation.



**FIGURE 3**  
**EZIPIT™ 600 MC TOP HAT COVER ARRANGEMENT CLASS B**

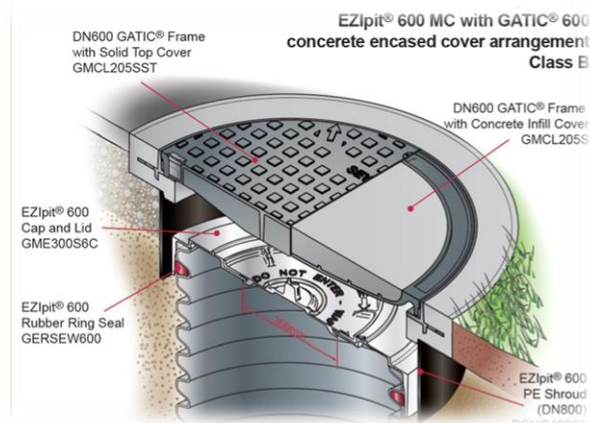
#### 4.3.5.4 EZIpit® 600 MC frames and access covers (Class D) 'Top Hat'

The Class D cover arrangement is comprised of a ductile 'Top Hat' frame with a 600mm circular cover. The circular cover is available as either a solid top (GMMC300S3D2S6) or concrete infill (GMMC300C3D2S6). The 'Top Hat' is assembled on top of the riser and sealed with an EZIpit® 600mm ring (GERSEW600). The Frame is designed with a 300mm clear opening for prevention of falls from heights. In trafficable areas, the concrete pavement or bitumen surface is placed up to and around the perimeter of the frame for a neat finish. The Top Hat frame can be tilted to allow for surface drainage. Typically 1 in 40 can be achieved during installation.



**FIGURE 4**  
**EZIPIT™ 600 MC TOP HAT COVER ARRANGEMENT CLASS D**

For a Sloped surface a DN600 cap lid (GME300S6C) is assembled on top of the corrugated riser (TGPP600...) and sealed with an EZIpit® elastomeric ring (GERSEW600). A (concrete encased) frame and cover (GMCL205S or ST) is then assembled above the cap and lid with a PE shroud (POH04800T) directly underneath the frame. The PE Shroud permits height and slope adjustment in the field. See Figure 5.



**FIGURE 5**  
**EZIPIT™ 600 MC COVER ARRANGEMENT CLASS B FOR SLOPED SURFACES**

#### 4.3.5.5 EZIpit® 425 MS frames and covers

For non-trafficable areas Iplex can supply two types of Class B cover arrangements to suit different installation requirements. Figures 6 and 7.

For flat surfaces a ductile 'Top Hat' frame with a 360mm circular cover. The circular cover is available as either a concrete infill (GMMS300C3B2S4) or solid top (GMMS300S3B2S4)

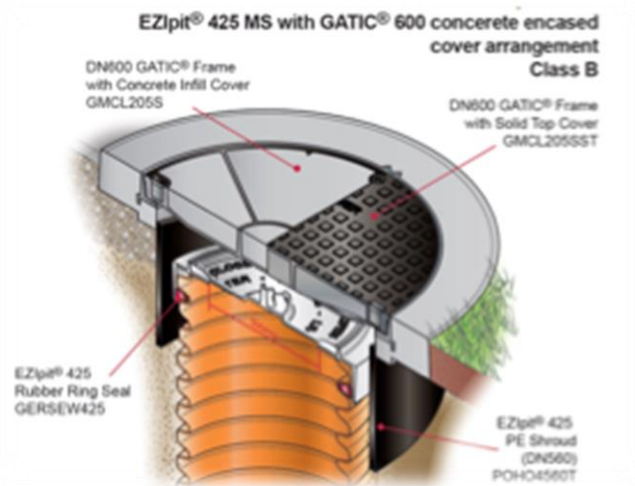


The Top Hat is assembled on top of the riser and sealed with an EZIpit® 425mm ring (GERSEW425). The Frame is designed with a 300mm clear opening for prevention of falls from height. In landscaped areas, an EZIpit® 425 precast concrete vegetation ring (GME300VEGRINGMS) is placed around the frame to limit the growth of any vegetation over the cover. The Top Hat frame can be tilted to allow for surface drainage. Typically 1 in 40 can be achieved during installation. See Figure 6.



**FIGURE 6**  
**EZIPIT™ 425 TOP HAT COVER CLASS B FOR FLAT SURFACES**

For a Sloped surface a DN 425 cap lid (GME300S42C) is assembled on top of the corrugated riser (TGPP425...) and sealed with an EZIpit® elastomeric ring (GERSEW425). A (concrete encased) frame and cover (GMCL205S or ST) is then assembled above the cap and lid with a PE shroud (POH04560T) directly underneath the frame. The PE Shroud permits height and slope adjustment in the field. See Figure 7.



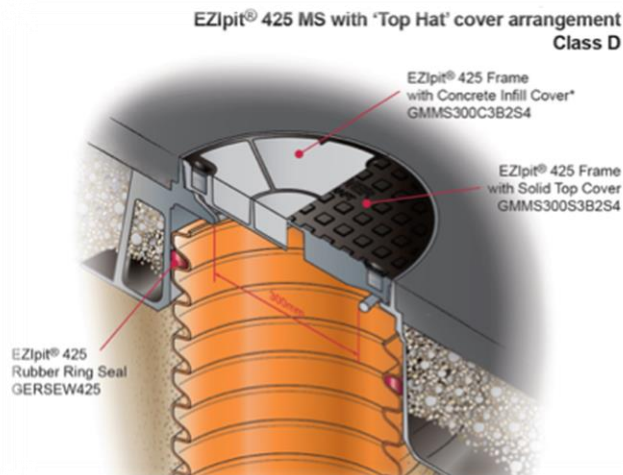
**FIGURE 7**  
**EZIPIT® 425 COVER CLASS B FOR SLOPED SURFACES**

#### **4.3.5.6 EZIpit®425 MS frames and access covers (Class D) 'Top Hat'**

The Class D cover arrangement is comprised of a ductile 'Top Hat' frame with a 360mm circular cover. The circular cover is available as either a solid top (GMMS300S3D2S4) or concrete infill (GMMS300C3D2S4). The 'Top Hat' is assembled on top of the riser and sealed with an EZIpit® 425mm ring (GERSEW425). The Frame is designed with a 300mm



clear opening for prevention of falls from heights. In trafficable areas, the concrete pavement or bitumen surface is placed up to and around the perimeter of the frame for a neat finish. Top Hat frame can be tilted to allow for surface drainage. Typically 1 in 40 can be achieved during installation.



**FIGURE 8**  
**EZIPIT® 425 TOP HAT COVER CLASS D**

**TABLE 5: EZIPIT® FRAME AND ACCESS COVER ARRANGEMENTS**

Product Code	Description	Material	Class	Standard
GMMC300C3B2S6	EZipit® 600 Top Hat Frame with concrete infill cover. Class B.	Ductile Iron to AS 1831 Grade 500/7	Class 'B' Sealed	AS 3996:2006 and WSA PS-290
GMMC300S3B2S6	EZipit® 600 Top Hat Frame with solid top cover. Class B			
GMCL205S	DN600 Circular Cover 'sewer' concrete infill cover and frame. Class B			
GMCL205SST	DN600 Circular Cover 'sewer' solid top cover and frame. Class B			
GME300S6B2	EZipit® 600 Conventional frame with solid top cover Class B		Class 'B' Sealed	AS 3996:2006 and WSA PS-290
GMMC300C3D2S6	EZipit® 600 Top Hat Frame with concrete infill cover. Class D.		Class 'D' Sealed	AS 3996:2006 and WSA PS-290
GMMC300S3D2S6	EZipit® 600 Top Hat Frame with solid top cover. Class D			
GMMS300C3B2S4	EZipit® 425 Top Hat Frame with concrete infill cover. Class B.		Class 'B' Sealed	AS 3996:2006 and WSA PS-290
GMMS300S3B2S4	EZipit® 425 Top Hat Frame with solid top cover. Class B			
GME300S6D2	EZipit® 600 Conventional frame with solid top cover Class D		Class 'D' Sealed	AS 3996:2006 and WSA PS-290

Product Code	Description	Material	Class	Standard
GMMS300C3D2S4	EZipit® 425 Top Hat Frame with concrete infill cover. Class D.		Class 'D' Sealed	AS 3996:2006 and WSA PS-290
GMMS300S3D2S4	EZipit® 425 Top Hat Frame with solid top cover. Class D			

#### 4.3.6 EZIpit™ cap and lid

The DN 600 and DN 425 EZIpit® caps and lids are supplied by Gatic Pty Ltd. The material used in the manufacturer of the DN 600 and DN 425 EZIpit® cap and lid complies with the requirements in WSA PS-292 and AS 1831. The mechanical properties comply with the minimum grade ductile iron 500/7. Refer to Table 6.

**TABLE 6: EZIPIT® CAP AND LIDS**

Product Code	Description	Material	Coating
GME300S42C	DN 425 EZIpit™ Cap and Lid	Ductile Iron to AS 1831 Grade 500/7	Hot dipped galvanised to AS/NZS 4680
GME300S6C	DN 600 EZIpit® Cap and Lid		

#### 4.3.7 EZIpit™ Assessories

Other accessories items available with the EZIpit® MC and MS products are identified in Table 7. Refer to Appendix A for further details.

**TABLE 7: EZIPIT® ACCESSORIES**

Product Code	Description	Material
POH04800T	DN800 x 300mm EZIpit® Shroud	Polyethylene
POH04560T	DN560 x 300mm EZIpit® Shroud	Polyethylene
GMTG300CR	EZIpit® Concrete Support Ring	Concrete
TGU425	DN 425 EZIpit® Riser Union	PVC
GME300VEGRINGMS	EZipit425 Concrete Vegetation Ring for Top Hat cover. Class B only.	Concrete
GME300VEGRINGMC	EZipit600 Concrete Vegetation Ring for Top Hat cover. Class B only.	Concrete
TGU425150	DN 425 x dn150 EZIpit® Riser Junction	PVC
GR58600	DN 600 EZIpit® Riser Union	Polypropylene and SBR elastomeric ring seal

Product Code	Description	Material
TGU425X150	DN 425 x dn 150 (4 way) Riser Coupling	Polypropylene
TGU600150AV	DN600 x dn150 x 1500mm EZIpit® Riser Junction	Polypropylene
TGU600150C	DN600 x dn150 x 3000mm EZIpit® Riser Junction	Polypropylene
TGU600150DV	DN600 x dn150 x 4500mm EZIpit® Riser Junction	Polypropylene
GME300SLV	DN300 EZIpit® Vacuum testing lid	Galvanised Mild Steel
GME425SLV	DN425 EZIpit® Vacuum testing lid	Galvanised Mild Steel
GME600SLV	DN600 EZIpit® Vacuum testing lid	Galvanised Mild Steel

## 5 APPRAISAL CRITERIA

### 5.1 Quality Assurance Requirements

The WSAA product appraisal network accepts:

- polypropylene maintenance chambers/shafts manufactured in compliance with EN 13598-2 Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticised Poly vinyl chloride (PVC-U), polypropylene (PP) and polyethylene (PE) – Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations, 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.
- Class B & D circular solid top ductile iron access covers and frames manufactured in compliance AS 3996: 2006 *Access covers and grates* 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.
- EZIpit® DN 600 corrugated riser, manufactured in compliance AS/NZS 5065 *Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications*, 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 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

#### 5.2.1 EZIpit® 600 MC and EZIpit® 425 MS polypropylene base components

The EZIpit® 600 MC and 425 MS polypropylene base components have been appraised for compliance with EN 13598-2 'Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticized Poly vinyl chloride (PVC-U), polypropylene (PP)

and polyethylene (PE) – Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations.

Appraisal criteria are also determined by the WSAA Infrastructure Products and Materials Network 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-337 Maintenance Chambers (MC) – Polypropylene (PP) for Non-Pressure Applications – Gravity Sewerage.
- WSA PS-341 Maintenance Shafts (MS) - Polypropylene (PP) for Non-Pressure Applications – Gravity Sewerage.

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

### **5.2.2 EZIpit® DN 425 and DN 600 Corrugated Polypropylene (PP) riser**

The EZIpit® DN 600 riser used in the assembly of the EZIpit® 600 MC has been appraised for performance compliance with the relevant clauses of AS/NZS 5065, *Polyethylene and Polypropylene pipes and fittings for drainage and sewerage applications*.

The EZIpit® DN 425 riser used in the assembly of the EZIpit® 425 MS has been appraised for performance compliance with EN 13598-2 *Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticised Poly vinyl chloride (PVC-U), polypropylene (PP) and polyethylene (PE) – Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations*.

The following Product Specification is also relevant to this application:

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

To view or download a copy of WSA PS-240 visit the WSAA website.

### **5.2.3 EZIpit® DN 425 x dn 150 4way Riser coupling**

The material characteristics of the EZIpit® DN 425 x dn 150 4-way riser coupling has been appraised for performance compliance with WSA 137 -2013 Appendix B Table B2 .i.e. Density, OIT and MFR.

The elastomeric seal joint of the EZIpit® DN 425 x dn 150 4way Riser coupling was also appraised against the WSA 137-2013, Clause 3.7.4 Water tightness between riser and accompanying components.

## **6 COMPLIANCE WITH APPRAISAL CRITERIA**

### **6.1 Compliance with Quality Assurance Requirements**

Iplex operates a Quality Management System in accordance with ISO AS/NZS 9001:2008 as certified by SAI Global, Certificate Number QEC0037.

Gatic Milnes operates a Quality Management System in accordance with ISO 9001:2008 as certified by International Standards Certifications Pty Ltd, Registration Number QAC/R61/0123, for design, importation and manufacture of access covers and grates.

Wavin Polska S.A. (Poland) operates a Quality Management System in accordance with ISO 9001:2008 as certified by Urząd Dozoru Technicznego NCSJS/048, for design, production and delivery of plastic end products and plastic semi manufactured products.

Details of quality certificates are provided in Appendix B and copies are available from Iplex or WSAA.

## **6.2 Compliance with Performance Requirements**

The polypropylene components, except for the DN 600 riser are manufactured in accordance with EN 13598-2 Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticised Poly (vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) – Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations.

The EZIpit® DN 600 riser used in the assembly of the EZIpit® 600 MC complies with the relevant sections of AS/NZS 5065:2005.

The DN 600 SewerMax® elastomeric ring seal used with the EZIpit® DN 600 riser is manufactured in Vietnam and supplied by Hultec Vietnam. SAI Global has issued a joint StandardsMark Licence No. SMKP20138 for compliance with AS 1646 – *Elastomeric seals for waterworks purposes*.

The EZIpit® 425 MS and 600 MC bases are manufactured by Wavin Metalplast-Buk Sp. Z.o.o. in Poland. Product Certification Licence No 2070 has been issued by Insta-Cert for compliance of Tegra® 600 and Tegra® 425 to EN 13598-2.

Wavin Metalplast-Buk Sp. Z.o.o. has also issued a declaration claiming that the base of EZIpit® MS and MC product covered by this application conform in all respects with the requirements of the nominated specifications. See Appendix B.

### **6.2.1 Materials for bases and risers**

Refer to EN 13598-2 Clause 4.1.1, Table 1 and Table A.1. and Clause 2.2.2 and Appendix B of WSA 137-2013

The materials used for the manufacture of the EZIpit® bases and DN 425 corrugated PP risers have been tested in accordance with EN 13598-2.

The Polypropylene (PP) material used by Nordisk Wavin Buk Poland for the base of EZIpit® MS and MC is DOW C123-01N PP. The material DOW C123-01N PP satisfies the material requirements of ISO 8773.

Iplex Pipelines has submitted test results for a 1000-hour durability test as specified in Table 2, EN 13598-2:2009. The durability and material testing was conducted by the Danish Technological Institute Test Report Reg. No. 300 TEGRA 600 and TEGRA 425 inspection chambers for underground drainage and sewerage'. The results are shown in Table 8.

**TABLE 8: EZIPIT® DURABILITY AND MATERIAL TESTING**

Test sample	Ground water Cover (m)	Rating factor	Test Temperature ° C	Vacuum bar	Testing Time (h)	Cracks	Requirements Met	
							Yes	No
160x600 TP 1	6	3.4	80	0.147	1000	No	Yes	
110x425 TP1	6	3.4	80	0.176	1000	No	Yes	

At completion of testing the bases were inspected and no evidence of cracking was observed.

The durability and material testing specified in Clause 2.2.2 and Appendix B of WSA 137-2013, is equivalent to the ISO 13272:2011 and EN 13598-2:2009.

The EZIpit® DN 600 riser used in the assembly of the EZIpit® DN 600 MC is manufactured from polypropylene block copolymer, which is a thermoplastic of the polyolefin group with excellent chemical resistance, strength, stiffness and elevated temperature performance.

The materials used for the manufacture of the Iplex Pipelines DN 600 SewerMax® pipe riser have been tested in accordance with AS/NZS 5065. Refer to Table 9 for the typical physical properties of SewerMax® polypropylene.

**TABLE 9 TYPICAL PHYSICAL PROPERTIES OF DN600 SEWERMAX® POLYPROPYLENE**

Property	Description / Value	Relevant Standard/ Reference
Polypropylene (PP) pipe compound	block copolymer	EN13476-1 and EN1852-1
Density of pipe compound	901 kg/m <sup>3</sup>	ISO 1183
Circumferential flexural modulus (2mm/min)	1300 MPa	ISO 178
Creep ratio (2 years)	3	ISO 9967
Circumferential flexural creep modulus (50 years)	325 MPa	derived from AS/NZS 2566.2
Flexural yield stress	24.5 MPa	ISO- 178
Tensile yield stress (50mm/min)	28 MPa	ISO 527-2
Tensile yield strain (50mm/min)	6%	ISO 527-2
Poisson's ratio	0.45	ISO 527-2
Charpy impact notched at (+23°C) at (- 20°C)	65 kJ/m <sup>2</sup> 7 kJ/m <sup>2</sup>	ISO 179/1eA ISO 179/1eA
Melt Flow Rate (230°C / 2.16 kg)	0.3 g/10 min	ISO 1183
Thermal co-efficient of linear expansion	150 x 10 <sup>-6</sup> / K	DIN 53752
Shore D Hardness	60	ISO 868

Property	Description / Value	Relevant Standard/ Reference
De-rating factor at 30 0C	0.85	Borealis BA202E
De-rating factor at 40 0C	0.70	Borealis BA202E
De-rating factor at 50 0C	0.55	Borealis BA202E

Note: These are typical values which may vary for different sources of polymer.

The polypropylene material used by Nordisk Wavin Buk Poland for the EZIpit® DN 425 riser is Hostalen PP H2483. The material Hostalen PP H2483 satisfies the material requirements of ISO 8773:2006 *Plastics piping systems for non-pressure underground drainage and sewerage -- Polypropylene (PP)*.

The materials used for the manufacture of the Nordisk Wavin Buk EZIpit® DN 425 corrugated polypropylene riser have been tested in accordance with EN 13598-2:2009.

Refer to Table 10 for the scope of tests, applied test methods and tested results verifying tested properties of EZIpit® DN 425 riser are in compliance with requirements specified in EN 13598-2:2009.

**TABLE 10 TYPICAL PHYSICAL PROPERTIES OF EZIPIT®DN 425 POLYPROPYLENE**

Method	Standard	Parameter	Requirement	Result
Tightness	PN-EN 1277:2005	Water Pressure 0.05 bar/15min	No Leak	No Leak
		Water Pressure 0.5 bar/15min	No Leak	No Leak
		Air pressure - 0.3 bar/15min	≤ -0.27 bar	≤ -0.297 bar
Determination of ring stiffness	PN-EN 14982+A1:2011		≥ 4 kN/m2	5.28 kN/m2
Hydrostatic strength	PN-EN ISO 1167-1:2007 PN-EN ISO 1167-2:2007 PN-EN ISO 1137-3:2008 PN-EN ISO 1167-4:2008	Temperature:80°C Time: 140h Stress:4.2 MPa	No failure during test period on any test pieces	No failure, test terminated at 140h
		Temperature: 95°C Time: 1000h Stress:2.5 MPa		No failure, test terminated at 140h
Melt mass-flow (MFR)	PN-EN ISO 1133-1:2011	Temperature:230°C Loading mass: 2.16Kg	≤ 1.5 g/10min	0.34 g/10min
Thermal stability (OIT)	PN-EN 728:1999	Temperature:200°C	≥ 8 min	>30 min

The above tests were conducted by Wavin Metalplast-Buk Sp.żo.o Laboratory, Poland. The Wavin Metalplast-Buk Sp.żo.o Laboratory is accredited by the Polish centre for Accreditation, No B 1256. Further details are contained in Test Report 030/2012 PP corrugated shaft pipe Tegra 425'.

### 6.2.2 EZIpit® DN 425 x dn 150 4way Riser coupling

The EZIpit® DN 425 x dn 150 4-way Riser coupling is manufactured from a rotational moulding grade black polypropylene compound RMPP141. The material characteristics of the EZIpit® DN 425 x dn 150 4-way riser coupling has been appraised for performance compliance with WSA 137 -2013 Appendix B Table B2 .i.e. Density, OIT and MFR.

The RMPP141 PP rotational moulding grade material shall have density up to maximum deviation of  $\pm 25\text{kg/m}^3$  from the agreed value at  $900\text{ kg/m}^3$

The permitted maximum MFR (Temperature:  $230^\circ\text{C}$ /2.16 kg processed compound = 14.4 g/10 min. Refer to Table 11.

**TABLE 11 EZIPIT® DN 425 X DN 150 4-WAY RISER COUPLING**

Method	Standard	Parameter		Requirement	Result
Density	ISO 1183-1 method A- immersion method	Sample 1 921.3 kg/m3	Mean 918.1 kg/m3	± 25 kg/m³	Complies
		Sample 2 914.8 kg/m³			
Melt mass-flow (MFR)	ISO 1355	MFR Sample 1 @ 230°C/2.16 kg 10.62g/10 min MFR Sample 1 @ 230°C/2.16 kg 11.06g/10 min		14.4 g/10 min	Complies
Thermal stability (OIT)	ISO 11357-6	Temperature:200°C		≥ 8 min	Complies

Iplex has submitted NATA Report No 386 N – DN425 EZIpit Riser Coupling material characteristics demonstrating compliance with WSA 137 -2013 Appendix B Table B2 .i.e. Density, OIT and MFR.

### 6.2.3 Structural integrity of the EZIpit® DN 425 MS base (Tegra® 425) and EZIpit® DN 600 MC (Tegra® 600) Base

Refer to EN 13598-2 Clause 4.1.1, Table 1 and Table A.1 and Clause 3.2 and Appendix C of WSA 137-2013

The EZIpit® bases have been tested in accordance with EN13598-2 and WSA 137, Clause 3.2 'Structural integrity of maintenance base'.

#### 6.2.3.1 EZIpit® DN 600 MC (Tegra® 600) Base

The structural integrity of the EZIpit® 600x250 Type 1 MC (Tegra® 600) base has been determined in accordance with the test procedures given in ISO 13267.

The result of the extrapolated predicted 50-year vertical deformation was 3.49 mm which is less than the required  $\leq 12.5\text{ mm}$  or  $\leq 5\%$  of the main sewer outside diameter. The extrapolated predicted 50-year horizontal deformation was 22.98 mm or  $\leq 10\%$  of the main sewer outside diameter. Refer to Table 11.

#### 6.2.3.2 EZIpit® DN 425 MS (Tegra® 425) Base

The structural integrity of the EZIpit® 425x250 Type 1 MS (Tegra® 425) base has been determined in accordance with the test procedures given in ISO 13267.

The results of the extrapolated predicted 50-year vertical deformation were -6.46 mm which is less than the required  $\leq 12.5\text{ mm}$  or  $\leq 5\%$  of the main sewer outside diameter. The extrapolated predicted 50-year horizontal deformation was 13.35 mm or  $\leq 10\%$  of the main sewer outside diameter. Refer to Table 12.



**TABLE 12 RESULTS OF THE EXTRAPOLATED 50 YEAR HORIZONTAL AND VERTICAL DEFORMATION**

Product		1000 (h)	50 years	Requirement	Requirement Met
EZIpit® DN 600x 250 Type 1 MC (Tegra® 600) base	Vertical	2.00	3.49	Max 12.5	Yes
	Horizontal	13.96	22.98	Max 25	Yes
EZIpit® DN 425x 250 Type 1 MS (Tegra® 600) base	Vertical	-2.51	-6.46	Max 12.5	Yes
	Horizontal	12.64	13.35	Max 25	Yes

The extrapolated 50 year vertical and horizontal deformations were determined from test data obtained from 'Danish Technological Institute Test Report Reg. No. 300 TEGRA600 and TEGRA425 inspection chambers for underground drainage and sewerage' Order Nos 413084 and 559107.

#### **6.2.4 Impact resistance of the EZIpit® DN 425 MS base (Tegra® 425) and EZIpit® DN 600 MC (Tegra® 600) Base**

Refer to EN 13598-2 Clause 7, Table 3 and Annex D and Clause 3.3 and Appendix E of WSA 137-2013

The EZIpit® DN 425 MS base (Tegra® 425) and EZIpit® DN 600 MC base (Tegra® 600) has been tested in accordance with EN13598-2 and WSA 137, Clause 3.3 'Impact resistance of maintenance base'.

The Test Report supplied by Iplex Pipelines 'Danish Technological Institute Test Report Reg. No. 300 TEGRA600 and TEGRA425 inspection chambers for underground drainage and sewerage' indicates the no cracks or damage were observed after the impact resistance, drop test was performed.

#### **6.2.5 Ring stiffness of risers**

Refer to Clause 3.4 of WSA 137-2013

The risers used with the EZIpit® 425 MS base (Tegra® 425) and EZIpit® DN 600 MC (Tegra® 600) base have been tested in accordance with EN13598-2, AS/NZS 5065 and WSA 137, Clause 3.4 'Ring stiffness of riser'.

The ring stiffness of a single wall DN 600 SewerMax® pipe (EZIpit® DN600 riser) was performed using AS/NZS 1462:1992 *Method for determination of pipe stiffness*. According to the test results reported on Iplex NATA Report No: 2332 titled '*DN 600 EZIpit® - Shaft Pipe Stiffness*' the calculated mean pipe stiffness was determined to  $\geq 8000\text{N/m/m}$  (SN8).

The ring stiffness of the DN 425 PP EZIpit® was performed using PN-EN 14982+A1:2011 *Plastics piping and ducting systems - Thermoplastics shafts or risers for inspection chambers and manholes - Determination of ring stiffness*.

According to the test results reported on Wavin Metalplast-Buk Sp.zo.o 'Test Report 030/2012 PP corrugated shaft pipe Tegra 425' the calculated mean pipe stiffness was calculated to be  $\geq 5000\text{N/m/m}$  or (SN5). Refer to Table 10 for test results.

The EZIpit® DN 600 and DN 425 riser test pipes both exceed the minimum requirement of  $4000\text{N/m/m}$  or SN4.

## 6.2.6 Accessibility

Refer to Clause 3.6 of WSA 137-2013

There is no requirement in EN 13598-2 to undertake an Accessibility Test.

## 6.2.7 Elastomeric seals

### 6.2.7.1 Base to pipe connection

Refer to Clause 4.4 and Clause 9 of EN 13958 -2 and Clause 3.7.2 of WSA 137-2013

Iplex supply elastomeric ring seals, which fit into the integral sockets provided on the EZIpit® DN 425 MS base (Tegra® 425) and EZIpit® DN 600 MC base (Tegra® 600) arrangements. The integral sockets and elastomeric ring seals are suitable for smooth wall PVC sewers complying with AS/NZS 1260:2009 PVC-U pipes and fittings for drain, waste and vent application.

The elastomer is SBR conforming to AS 1646-2007 *Elastomeric seals for waterworks purposes*.

The assemblies shown in Table 13 and 14 were tested by the Danish Technological Institute and laboratory Test Report Reg. No. 300 has been submitted to WSAA as part of the appraisal application demonstrating compliance with the type test requirements of EN 13958-2 Clause 4.4 and Clause 9 of WSA 137 Clause 3.7.2.

**TABLE 13 ELASTOMERIC SEAL JOINT INTERNAL POSTIVE PRESSURE TEST**

Nominal size	1st internal Pressure bar	2nd internal pressure Bar	Testing time min	Diametric deflection socket/spigot %	Angular deflection °	leakage	Permitted leakage
160*600 Solid	0.05		15	0/10	2	No	None
		0.5	15	0/10	2	No	None
250*600 Solid 60°	0.05		15	0/10	2	No	None
		0.5	15	0/10	2	No	None
110*425 Solid	0.05		15	0/10	2	No	None
		0.5	15	0/10	2	No	None
250*425 Solid 30°	0.05		15	0/10	2	No	None
		0.5	15	0/10	2		None

**TABLE 14 ELASTOMERIC SEAL JOINT INTERNAL NEGATIVE PRESSURE TEST**

Nominal size	Vacuum bar	Testing time min	Diametric deflection socket/spigot %	Angular deflection °	Vacuum after 15 min bar	Permitted drop of vacuum bar	Requirement Met
160*600 Solid	0.3	15	10	2	0.3	<0.03	Yes
250*600 Solid 60°	0.3	15	10	2	0.3	<0.03	Yes
110*425 Solid	0.3	15	10	2	0.3	<0.03	Yes
250*425 Solid 30°	0.3	15	10	2	0.3	<0.28	Yes

**6.2.7.2 Watertightness of the base to the riser connection**

Clause 9 of EN 13958-2 and Clause 3.7.3 of WSA 137-2013

Iplex supply a SBR elastomeric ring seals for the joint between the EZIpit® 600 base and the EZIpit® DN 600 riser and the joint between the EZIpit® DI cap and lid and Top Hat Frame. This is the same seal Iplex supply with their DN 600 SewerMAX® pipeline system.

Iplex supply a SBR elastomeric ring seals for the joint between the EZIpit® 425 base and the EZIpit® DN 425 riser and the joint between the EZIpit® DI cap and lid and Top Hat Frame..

The material requirements for EZIpit® 425 and EZIpit® 600 riser joint seals comply with AS 1646 *Elastomeric seals for waterworks purposes* and EN 681 *Elastomeric seals*.

SBR compounds exhibit chemical resistance to mineral acids, alkalis, oils and organic solvents. SBR has shown to be immune to microbiological attack that occurs with NR when the sacrificial antioxidants

The elastomeric seal joints used with the EZIpit® 600 MC and 425 MS are manufactured to AS 1646 *Elastomeric seals for waterworks purposes* and EN 681 *Elastomeric seals*. Material requirements for pipe joint seals used in water and drainage applications. Refer to Appendix B 'SAI Global Standardsmark Licence SMKP20138' and Det Norske Veritas Product Certificate No 112.1107.1-01.

The assemblies shown in Table 15 and 16 were tested by the Danish Technological Institute and laboratory Test Report Reg. No. 300 has been submitted to WSAA as part of the appraisal application demonstrating compliance with the type test requirements of Clause 9 of EN 13958-2 and Clause 3.7.3 of WSA 137.

**6.2.7.3 Watertightness of the inlet connector in the riser**

Clause 3.7.7 of DR WSA 137 and Clause 3.7.4 of WSA 137-2013

Iplex supply a SBR elastomeric ring seals for the joint between the EZIpit® DN 425 riser, and the EZIpit® DN 425 x dn 150 4-way Riser coupling.

A riser coupling assembled together with 2 short lengths of riser shafts, capped at each end, in the vertical position, were hydrostatic pressured tested to 72 kPa for two hours. No leak was observed for the entire time the under pressure.

Iplex has submitted NATA Report No 385 N – DN425 EZIpit Riser Coupling Elastomeric Seal Joint assessment demonstrating compliance with WSA 137-2013, Clause 3.7.4 *Water tightness between riser and accompanying components*.

**TABLE 15 ELASTOMERIC SEAL JOINT INTERNAL POSTIVE PRESSURE TEST**

Nominal size	Low Test Pressure kPa	2nd internal pressure Bar	Testing time kPa	Diametric deflection socket/spigot %	Angular deflection °	leakage	Permitted leakage
600 PP	0.05		15	0/0	0	No	None
		0.5	15	0/0	0	No	None
425 PP	0.05		15	0/0	0	No	None
		0.5	15	0/0	0	No	None

**TABLE 16 ELASTOMERIC SEAL JOINT INTERNAL NEGATIVE PRESSURE TEST**

Nominal size	Vacuum bar	Testing time min	Diametric deflection socket/spigot %	Angular deflection °	Vacuum after 15 min bar	Permitted drop of vacuum bar	Requirement Met
600 PP	0.3	15	10	2	0.3	<0.03	Yes
425 PP	0.3	15	10	2	0.27 bar	<0.03	Yes

When tested in accordance with EN 13598-2 and WSA 137 Clause 3.7.2 “Joints between a pipe and the base of a maintenance shaft or chamber”, the elastomeric seal joints for joining the chambers and risers to pipes or risers comply with the specified requirements in Clause 9 of EN 13598-2 and Clause 3.7.3 of WSA 137.

#### **6.2.7.4 Effective seal**

Refer to Clause 3.7.7 of WSA 137-2013

When tested in accordance with Clause 3.7.7 of WSA 137, the elastomeric seal contact pressure shall exceed 0.4 MPa over a continuous width of  $\geq 4$  mm.

The effective seal test, applicable to the DN 600 EZIpit® riser to base elastomeric ring joint, was conducted using test methods described in AS/NZS 1462.13:2006 *Methods of test for plastics pipes and fittings - Method for the determination of elastomeric seal joint contact width and pressure*.

Iplex has submitted a NATA Test Report No: 250N for the effective seal for a DN 600 EZIpit® riser to base elastomeric ring joint, demonstrating compliance with the type test requirements of Clause 3.7.7 of WSA 137.

Iplex has submitted NATA Test Report No 352N to verify an effective seal test for the DN 425 EZIpit® riser to base and base to pipe connections, using test methods described in AS/NZS 1462.13:2006 *Methods of test for plastics pipes and fittings - Method for the determination of elastomeric seal joint contact width and pressure*.

### **6.2.7.5 Integrity of the Cap and lid seal**

Refer to Clause 3.8 of WSA 137-2013

Iplex has provided Test Certificate No M201701 to verify that a Liquid infiltration test has been conducted in accordance with Clause 3.8.2 of WSA 137 using the test method described in AS/NZS 1462.8.

## **7 FITTING INSTRUCTIONS, TRAINING AND INSTALLATION**

Assembly instructions and installation procedures are included in the Iplex EZIpit® Inspection and Maintenance Chamber Product Guide and Iplex standard drawings 'EZIpit® Typical Installation in Trafficable and Non-Trafficable Conditions - Class B and D Refer to Appendix A.

## **8 PRODUCT MARKING**

### **8.1 EZIpit® 600 MC and EZIpit® 425 MS base**

Refer to EN 13598-2:2009 Clause 10 Table 7 and Clause 5 of WSA 137-2013

The EZIpit® shall be legibly and permanently marked in accordance with EN 13598-2, Table 7 'minimum required marking of inspection chamber bases and Section 10.2 'Marking of components other than bases. Typical markings include:

- (a) Manufacturer's name or registered trademark.
- (b) Date of manufacture identified by at least the month and year.
- (c) Material identification in the form 'PVC-U' (or 'PVC'), 'PE' or 'PP' as appropriate.
- (d) Nominal size in the form 'DN 425' or '425' or 'DN 600' or '600'
- (e) Configuration of the flow profile in the chamber
- (f) Identification of the place of manufacture if the manufacturer is producing the product in more than one location either nationally or internationally. The manufacturer's code is acceptable, e.g. 'P1'.
- (g) Safe installation depth in the form '5 m' or '6m'
- (h) The number of this Standard.

The marking satisfies the requirements of the WSAA Appraisal criteria.

### **8.2 EZIpit® 425 and EZIpit® 600 Access covers and frames (Class B and D)**

The Gatic covers are legibly and permanently marked in accordance with AS 3996. Typical markings include:

Gatic covers have a raised pattern surface and a 3mm high locating mark on the cover. Gatic covers have the following marking on the upper surface:

- 'SEWER'
- 'GATIC' or EZIpit 425 or EZIpit 600 or EZIpit lettering;
- 'WEIGHT' Approximate mass (Kg)
- 10 mm high lettering indicating the Ultimate limit state design load (kN);
- Load Classification to AS 3996 Class B and D. In addition, EZIPIT 600 has 'Vehicular' and 'Non-Vehicular'.
- SEALED
- Australian Standard E.g. AS 3996

- Location marks in 3 mm high raised on the cover and frame for visual orientation.

Gatic covers have the following marking on the underside of the cover:

- 'Day/Month/Year'; or batch number
- 'Ductile Iron 500/7';
- Foundry identification.

The marking satisfies the requirements of the WSAA Appraisal Criteria.

### **8.3 EZIPIT® Cap and Lid Data**

The following warning message is cast onto the lid for safety reasons, 'Warning, Live Sewer, Do not Enter'.

WSAA members requested this during the preliminary design stage.

## **9 PACKAGING STORAGE, HANDLING AND TRANSPORTATION**

The EZI pits® are strapped to a pallet in their upright position with nylon strapping to avoid damage. The pits are then shrunk wrapped to protect them from dust.



**FIGURE 9**

### **EZIPIT® PACKAGING**

## **10 PRODUCT WARRANTY**

This product is covered by the normal commercial and legal requirements of Competition and Consumer Act 2010, which covers manufacture to relevant standards. Additional warranties may be negotiated on a project specific basis.

## **11 LIFE EXPECTANCY**

The EZI pit® base and riser are manufactured from block co-polymer polypropylene (PP-R). These components are designed to have a service life in excess of 100 years. The 'greater-than-100-year' anticipated service life is based on the following: -

The viscoelastic characteristics of the polypropylene material used in the EZI pit® base and shaft are such that the modulus and strength characteristics at 100 years are essentially the same as the extrapolated values used as the design basis.

WSAA undertook a comprehensive appraisal of BlackMAX® and SewerMAX® made of block co-polymer polypropylene and concluded that these products have an anticipated service life in excess of 100 years.

Iplex has been actively involved in a number of research projects investigating the longevity of plastics pipelines and has expert knowledge in this field. The results of the research projects have been presented at a number of national and international conferences.

The convention applied by Iplex to the design of the EZIpit® is the same as used for many years in International (ISO), Australian and European (CEN) Standards for the design of plastics pipes. The design philosophy takes into account the visco-elastic behaviour of plastics together with the mechanical and chemical properties of the material. On the basis of the conservative design, the service life can be expected to exceed 100 years.

If the design and installation is in accordance with the relevant standards and manufacturer's advice, this EZIpit® has been rated 'A' – with a life expectancy in excess of 100 years before major rehabilitation.

These ratings are only a general guide to life expectancy. The rating may increase or decrease as a result of the system operating conditions, operating environment and other geographical and site-specific factors.

## **12 WATER AGENCY EXPERIENCE WITH THE PRODUCT OR FIELD TESTING REPORT**

A mixture of EZIpit® 600 and EZIpit®1000 units were installed in 2005 in the Priority sewerage program for Wallacia and Silverdale backlog sewers in Sydney. There were in excess of 100 installed with the majority being EZIpit® 600.

A project report summary of recent installations has been provided in Appendix F.

Since publication of the original report the product has been approved and installed by a large number of water agencies. Urban water agency approvals include City West Water, Yarra Valley Water, South East Water and Sydney Water and many regional water agencies.

## **13 OUTCOMES OF EXPERT PANEL PRODUCT REVIEW**

Refer to Appendix D for information of the outcomes of the Expert Panel Product Review. The minutes of the meeting are available to WSAA Members Only.

## **14 FUTURE WORKS**

There are no outstanding future works items.

## **15 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](mailto:carl.radford@wsaa.asn.au).

### **15.1 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 each person involved in the preparation of the Report that the Recipient has understood and accepted the terms of this Disclaimer.

### **15.2 Limits on Reliance on Information and Recommendations**

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#### **15.2.3 Need for independent assessment**

The information and any recommendation contained (expressly or by implication) in this Report are provided in good faith (and subject to the limitations noted in this Report). However, you should treat the information as indicative only. You should not rely on that



information or any such recommendation except to the extent that you reach an agreement to the contrary with the Publisher(s).

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 indemnity 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.

### **15.3 No Updating**

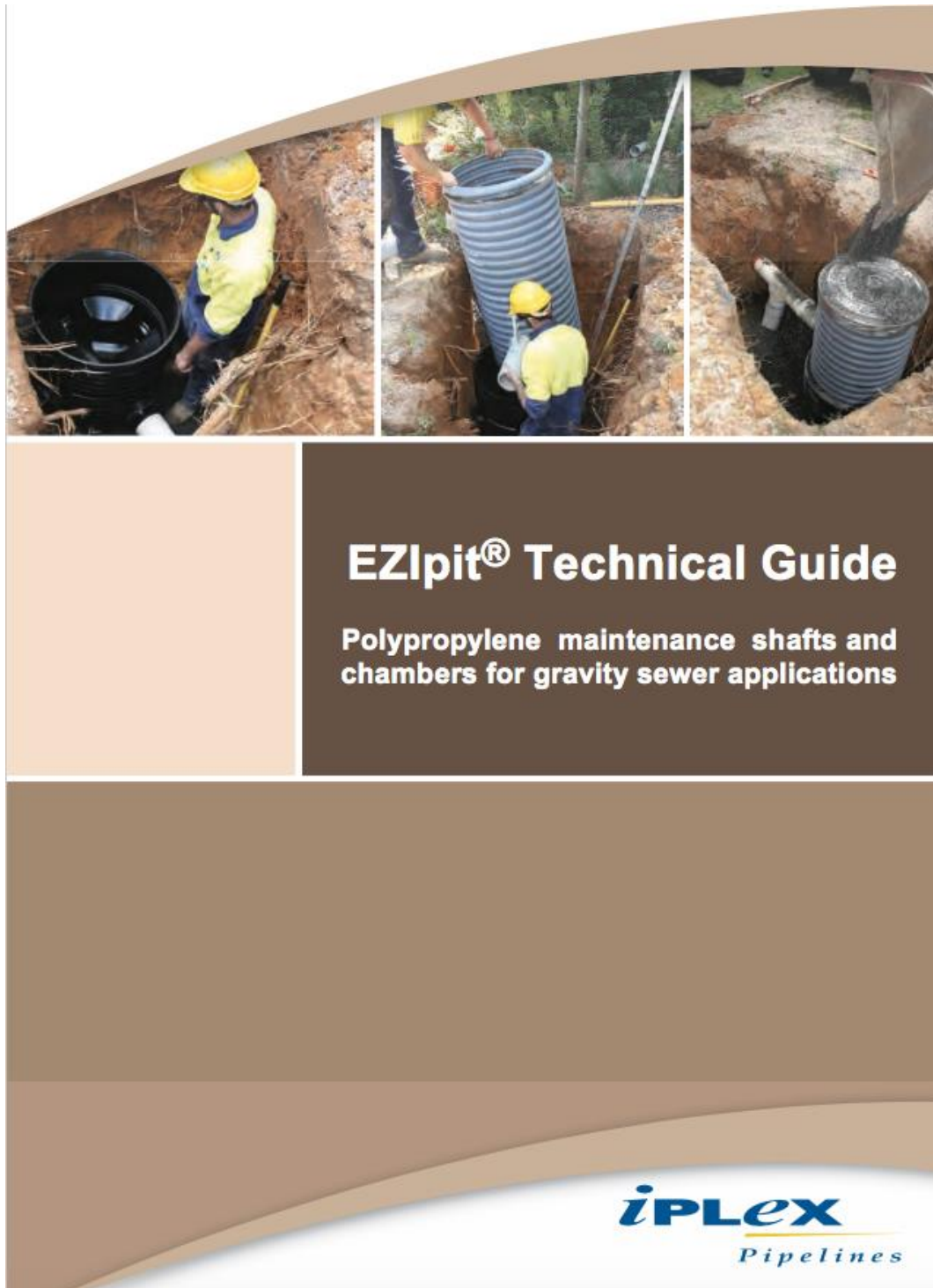
Neither the Publisher(s) nor any person involved in the preparation of this Report [has] [have] any obligation to notify you of any change in the information contained in this Report or of any new information concerning the Publisher(s) or the Product or any other matter.

### **15.4 No Warranty**

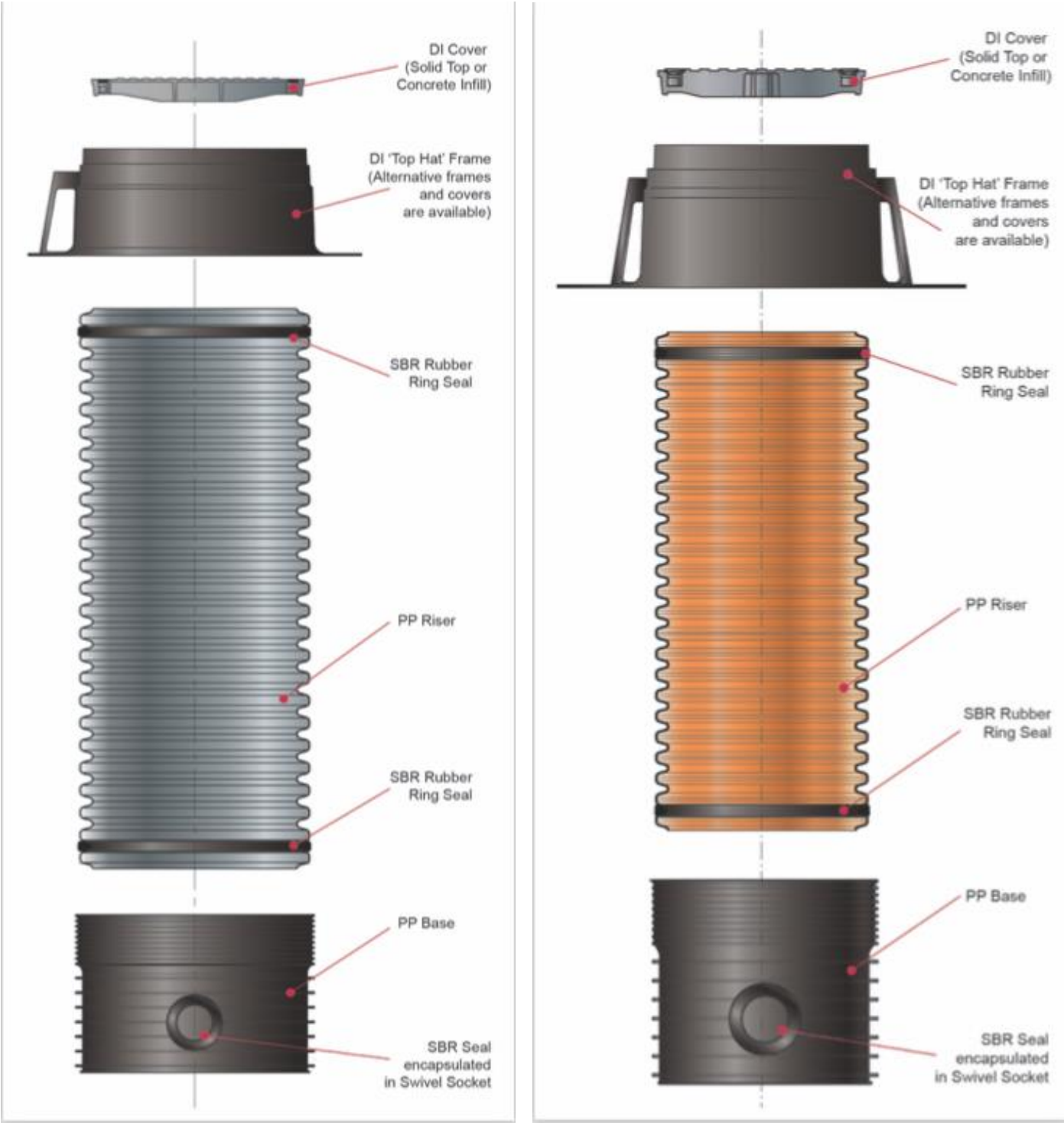
The Publisher(s) do[es] not, in any way, warrant that steps have been taken to verify or audit the accuracy or completeness of the information in this Report, or the accuracy, completeness or reasonableness of any recommendation in this Report.

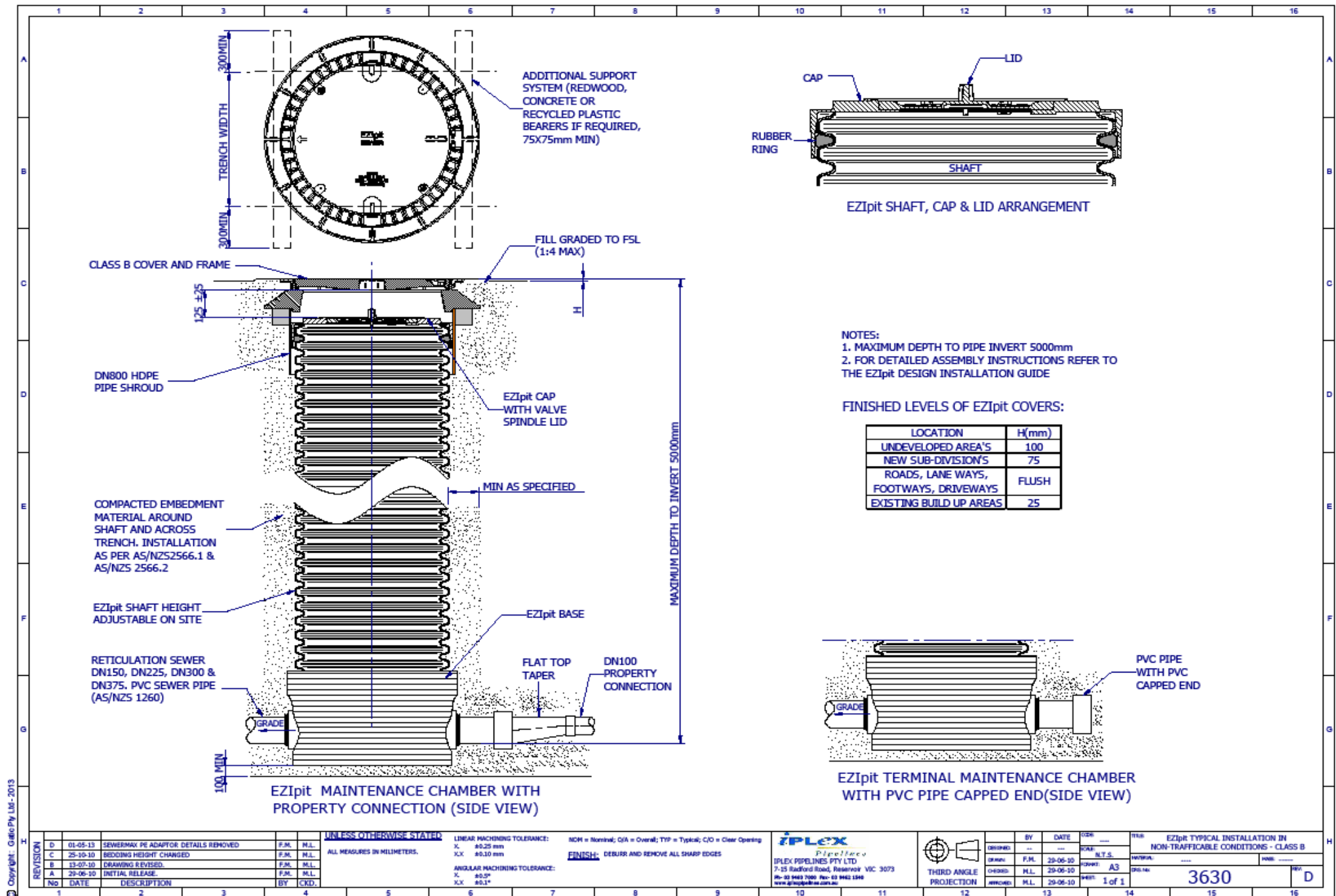
## APPENDIX A – TECHNICAL MANUALS BROCHURES

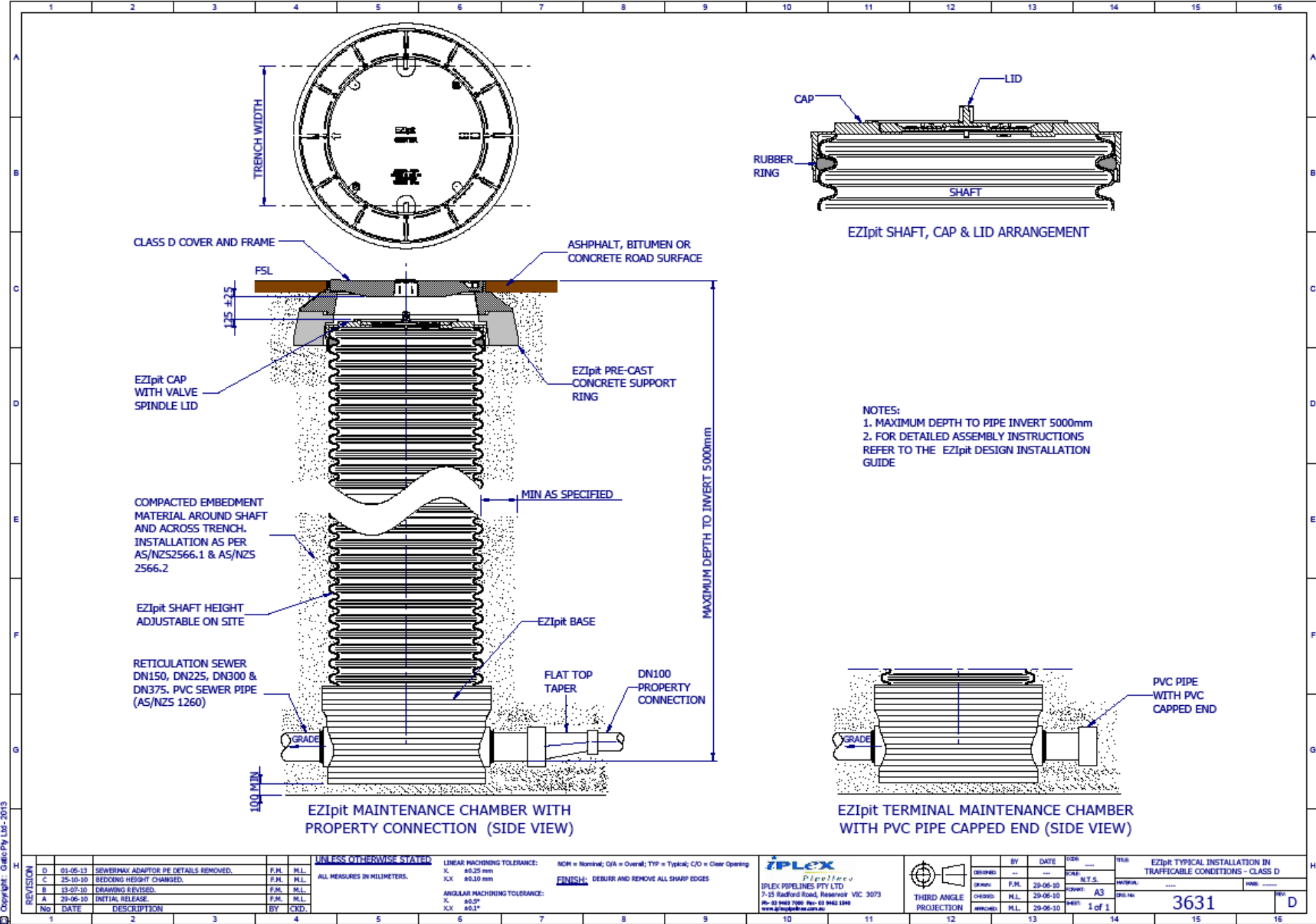
The complete publication of the EZIpit Technical Guide is available from Iplex



**FIGURE A1: EZIPIT™ 600 AND 425 CLASS B (NON-TRAFFICABLE) AND CLASS D (TRAFFICABLE) ASSEMBLIES**

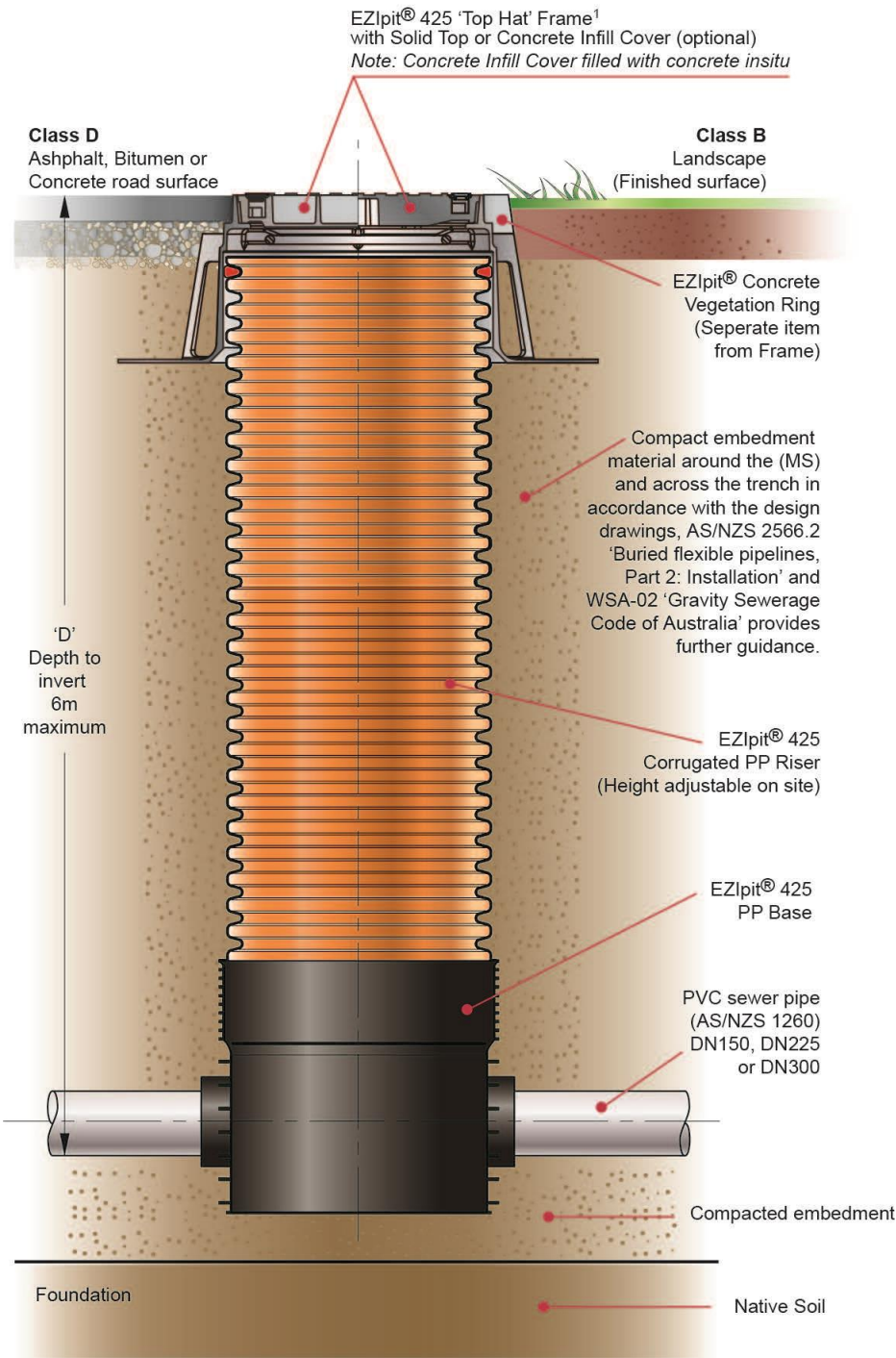




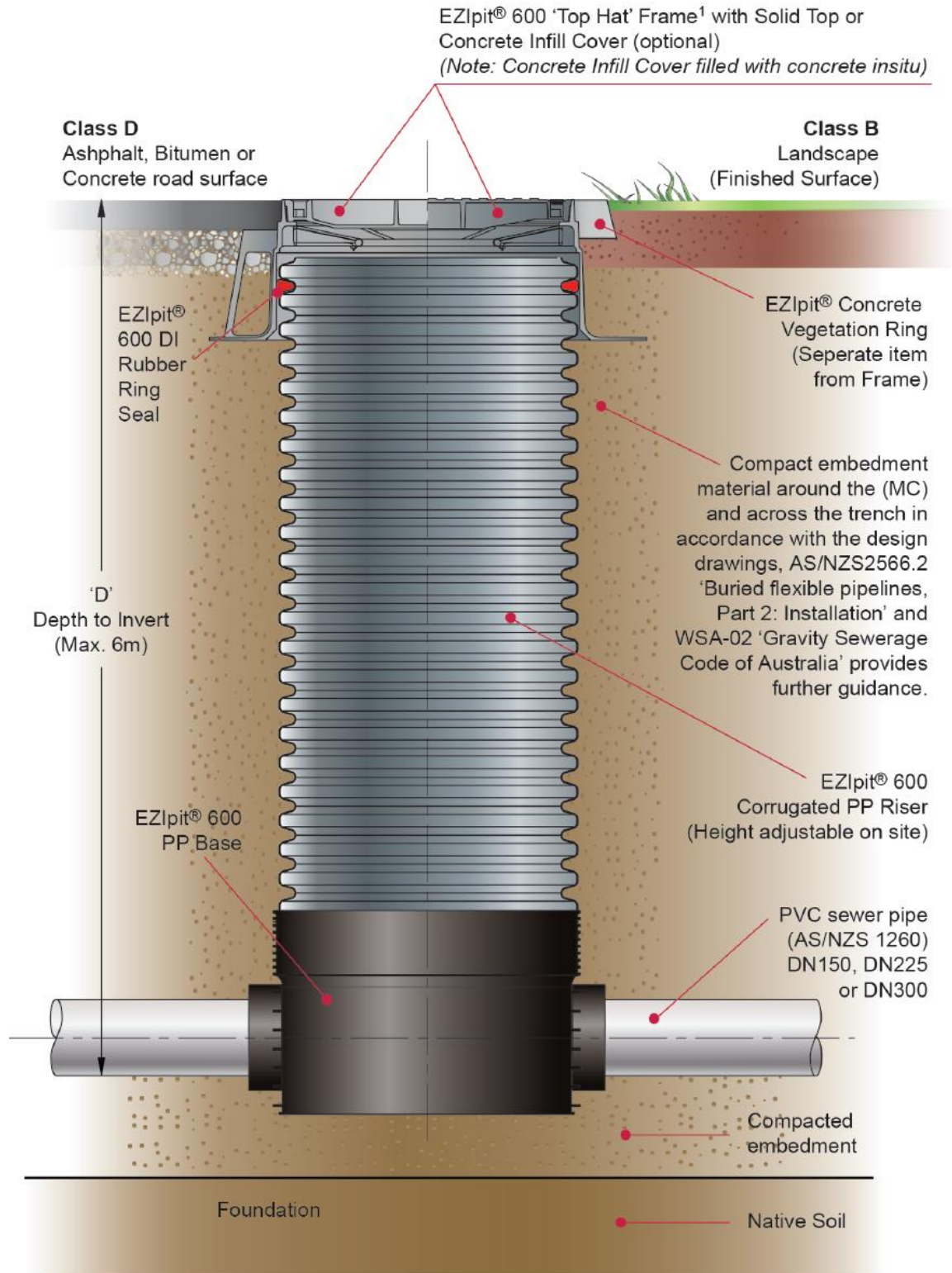




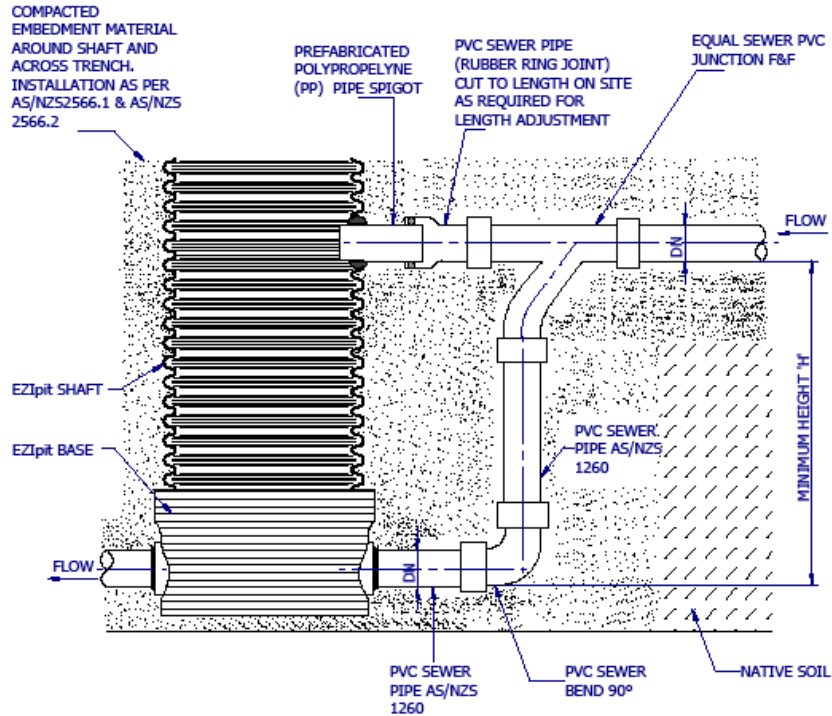
**Option 1 and 2:**  
**EZlpit® 425 Maintenance Shaft**  
**with ‘Top Hat’ cover arrangement**  
**Class B or D**



**Elevation**

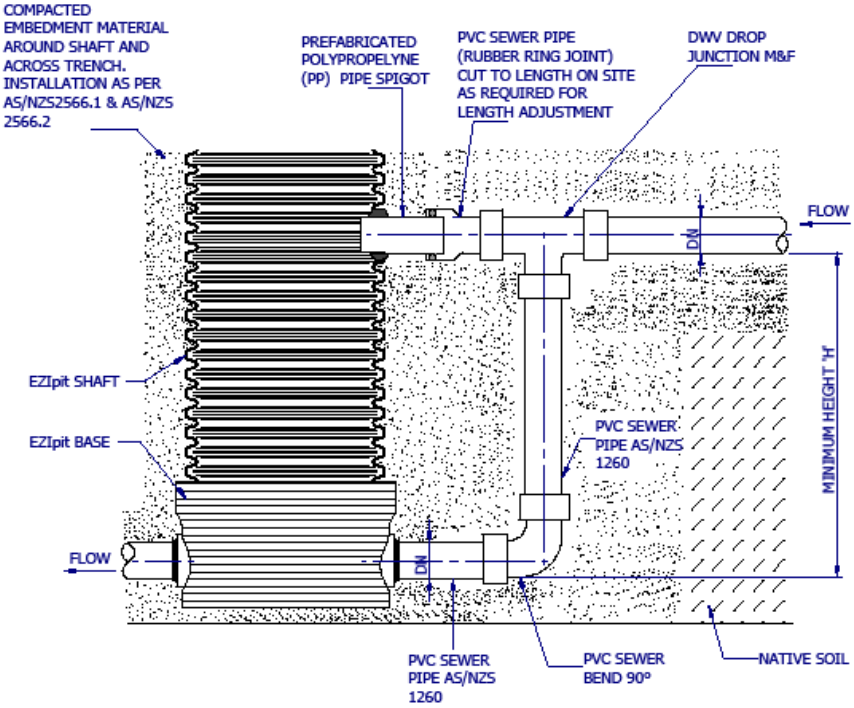
**Option 1 and 2:****EZIpit® 600 MC with 'Top Hat' cover arrangement  
Class B or D****Elevation**

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TYPICAL EXTERNAL SEWER DROP STRUCTURE (SIDE VIEW)  
TYPE A - 45° SLOPE JUNCTION

TYPE A	
DN (SIZE)	MINIMUM HEIGHT 'h' (mm)
150	500
225	1000
300	1300
375	1550



TYPICAL EXTERNAL SEWER DROP STRUCTURE (SIDE VIEW)  
TYPE B - 90° DROP JUNCTION

TYPE B	
DN (SIZE)	MINIMUM HEIGHT 'h' (mm)
150	750
225	900
300	1100

NOTES:  
-JOINING TYPES CAN BE SUBJECT TO LOCAL REQUIREMENTS. BOTH RUBBER RING JOINT OR SOLVENT WELD JOINT PVC FITTINGS CAN BE SPECIFIED AS REQUIRED.

REVISION

B	13-07-10	DRAWING REVISED	F.M.	M.L.
A	20-06-10	INITIAL RELEASE	F.M.	M.L.
No	DATE	DESCRIPTION	BY	CHKD.

UNLESS OTHERWISE STATED

ALL MEASURES IN MILLIMETERS.

LINEAR MACHINING TOLERANCE:  
X .025 mm  
X.X .030 mm

ANGULAR MACHINING TOLERANCE:  
X .05°  
X.X .03°

NOM = Nominal; O/A = Overall; TYP = Typical; C/D = Clear Opening

FINISH: DEBURR AND REMOVE ALL SHARP EDGES

**IPLEX**  
*Pipelines*  
IPLEX PIPELINES PTY LTD  
7-15 Radford Road, Reservoir VIC 3073  
Ph: 03 9460 7100 Fax: 03 9460 1949  
www.iplexpipelines.com.au

THIRD ANGLE  
PROJECTION

DESIGNED	BY	DATE	CODE	TRN
DRAWN	F.M.	20-06-10	N.T.S.	
CHECKED	M.L.	20-06-10	FORM	AS
APPROVED	M.L.	20-06-10	DATE	1 of 1

3632

B

TYPICAL EXTERNAL DROP STRUCTURE  
ASSEMBLY WITH EZIPIT CHAMBER

1 of 1

3632

B

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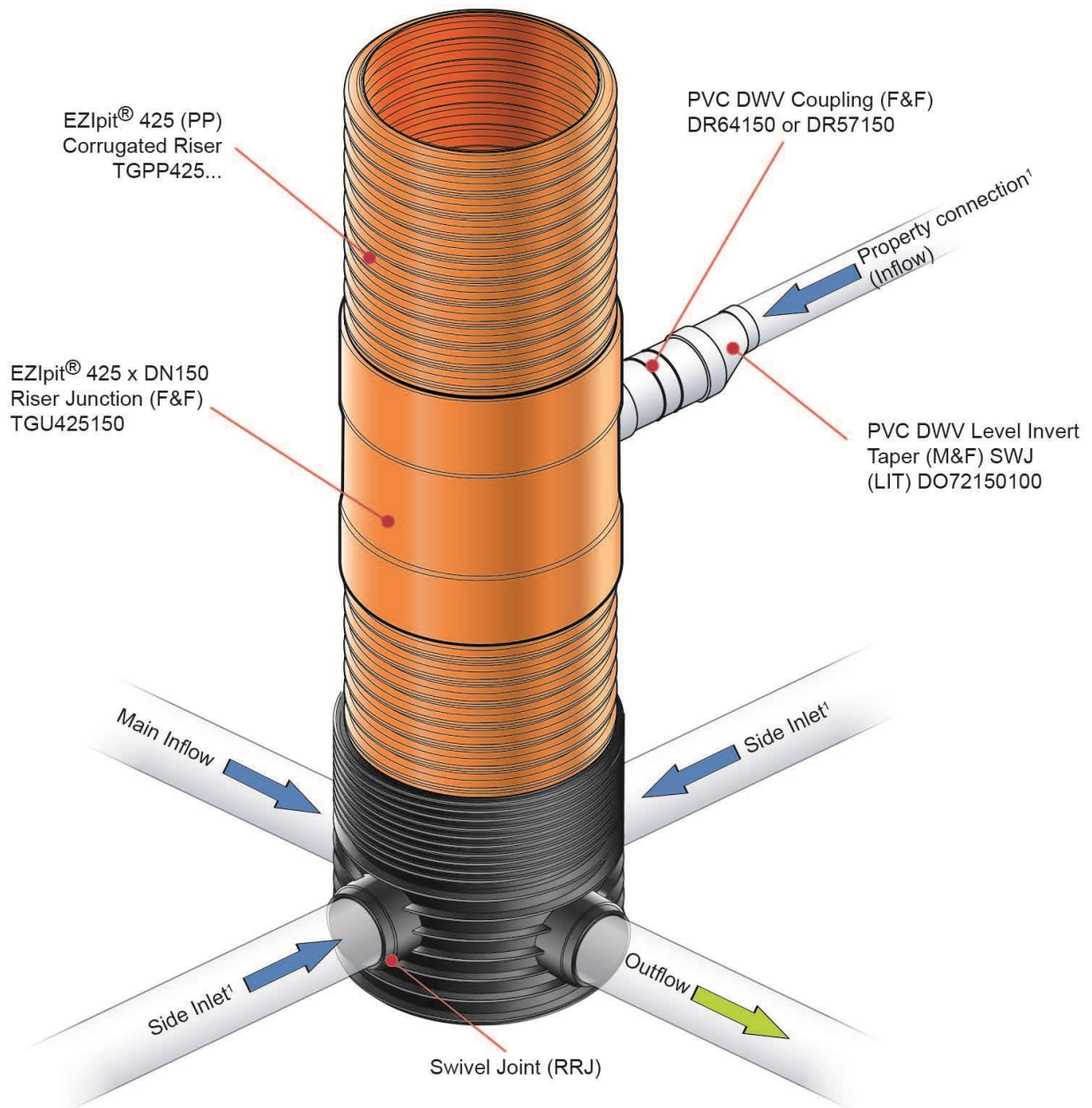
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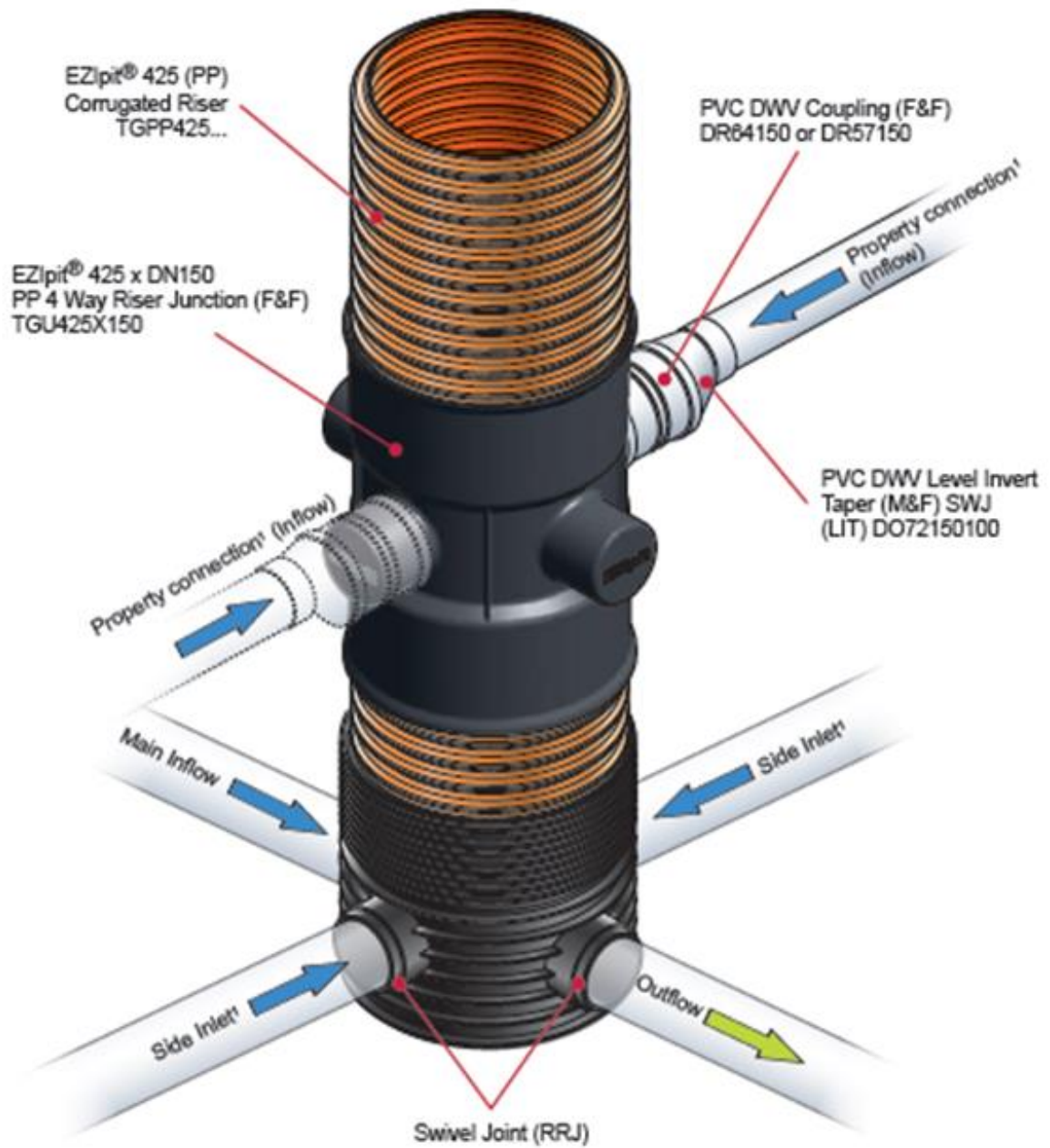
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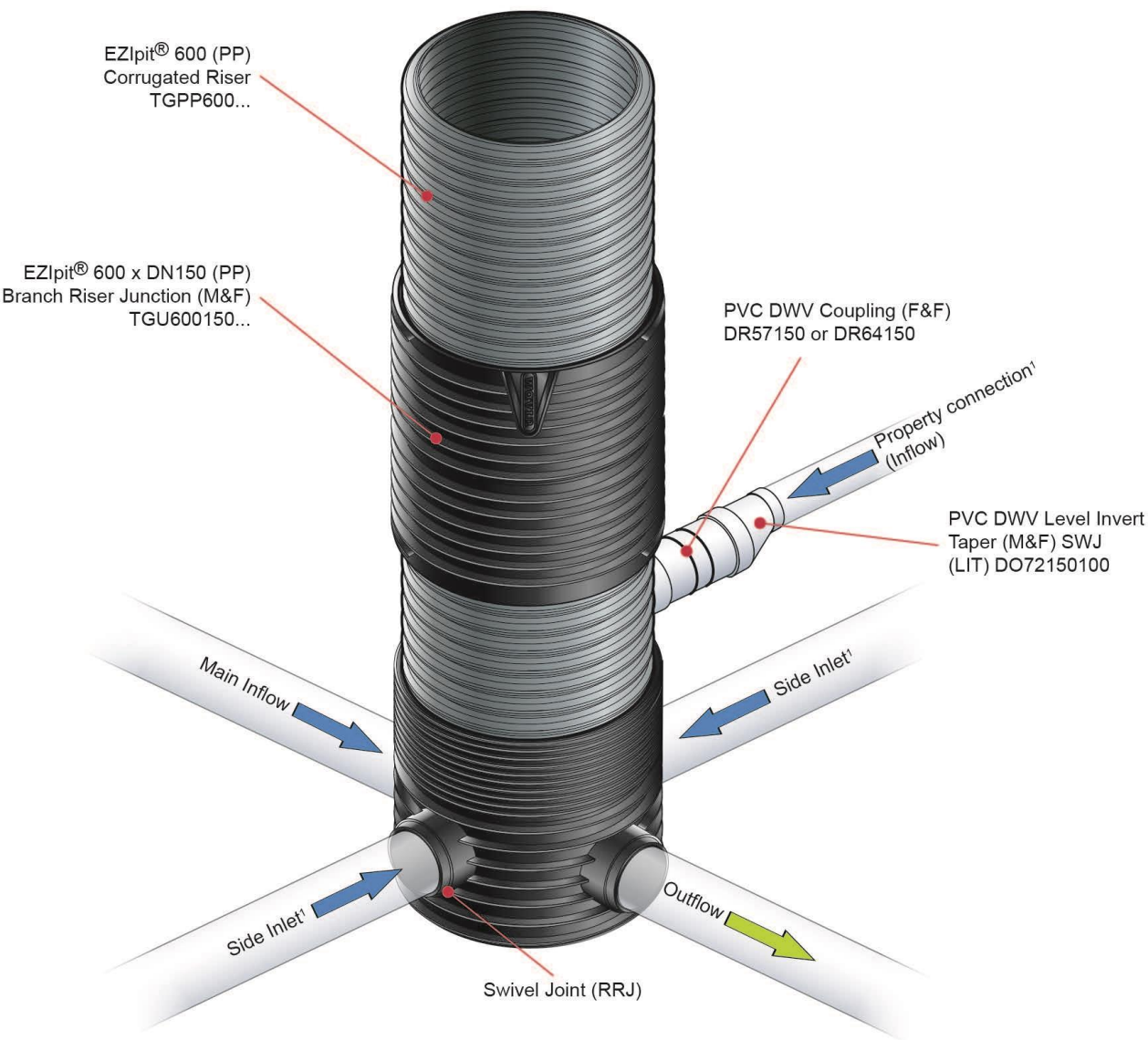


**EZIPIT™ 425 – CONNECTION TO RISER OPTION 2 – TO BE PHASED OUT IN 2<sup>ND</sup> QUARTER 2018 TO BE REPLACED WITH OPTION 3**



**EZIPIT™ 425 – CONNECTION TO RISER OPTION 3**

INFLOWS VIA THE 600 MAINTENANCE CHAMBER MC RISER USING THE PP RISER JUNCTION





## FINISHED LEVELS OF COVERS:

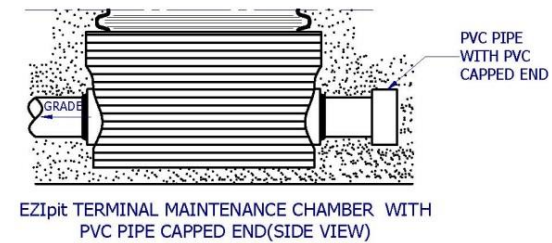
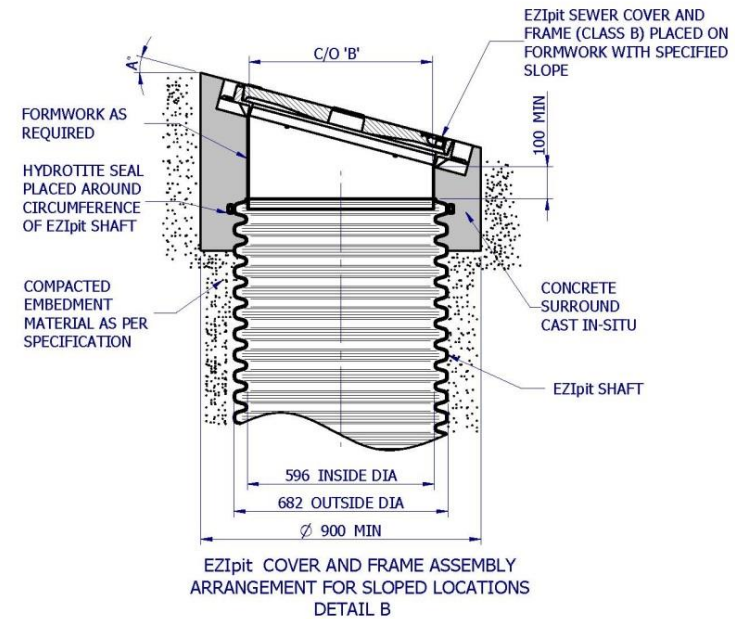
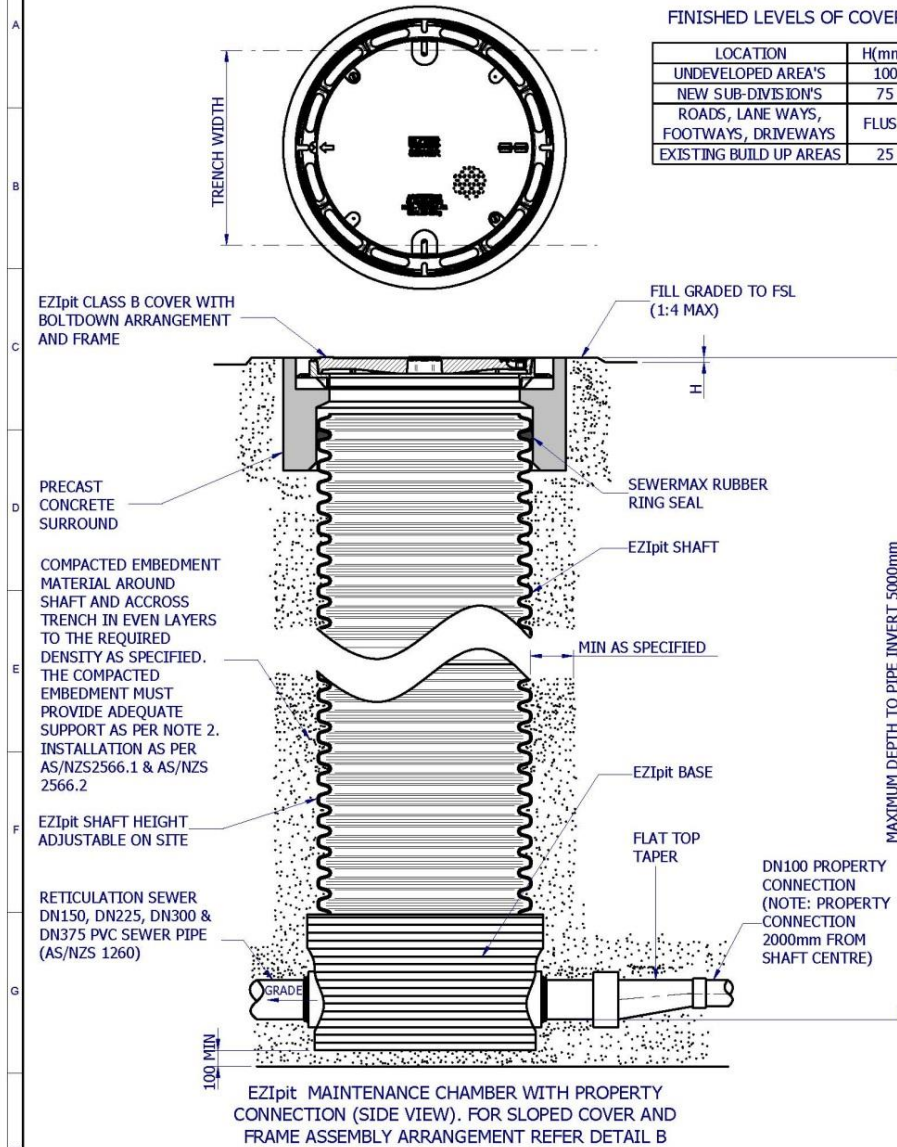
LOCATION	H(mm)
UNDEVELOPED AREA'S	100
NEW SUB-DIVISION'S	75
ROADS, LANE WAYS, FOOTWAYS, DRIVEWAYS	FLUSH
EXISTING BUILD UP AREAS	25

## CLEAR OPENINGS FOR DIFFERENT SLOPES:

SLOPE ANGLE 'A'	C/O 'B'	SLOPE ANGLE 'A'	C/O 'B'
0°	606	10°	597
2°	606	12°	593
4°	605	14°	588
6°	603	16°	583
8°	600	18°	576

## NOTES:

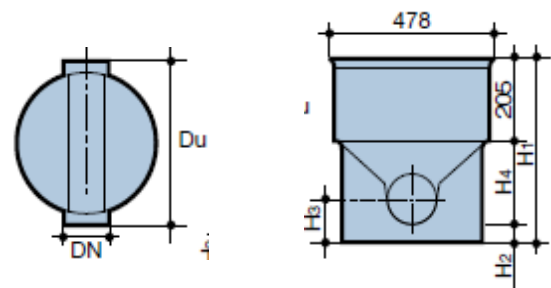
1. MAXIMUM DEPTH TO PIPE INVERT 5000mm
2. ACCESS COVER AND PRECAST CONCRETE SURROUND IS DESIGNATED AS CLASS B TO "AS3996 - ACCESS COVERS AND GRATES". THE CONTACT PRESSURE BETWEEN THE CONCRETE SURROUND AND COMPACTED SOIL (CALCULATED WITH THE ULTIMATE STATE DESIGN LOAD) FOR CLASS B (80kN) APPLICATION IS  $P_{max} = 0.4MPa$



THIRD ANGLE PROJECTION	CODE	---	TITLE	QUEENSLAND TYPICAL INSTALLATION IN NON-TRAFFICABLE CONDITIONS - CLASS B
	SCALE	1:1	MATERIAL	---
	FORMAT	A3	ORIGIN	---
	SHEET	1 of 1	3816	E



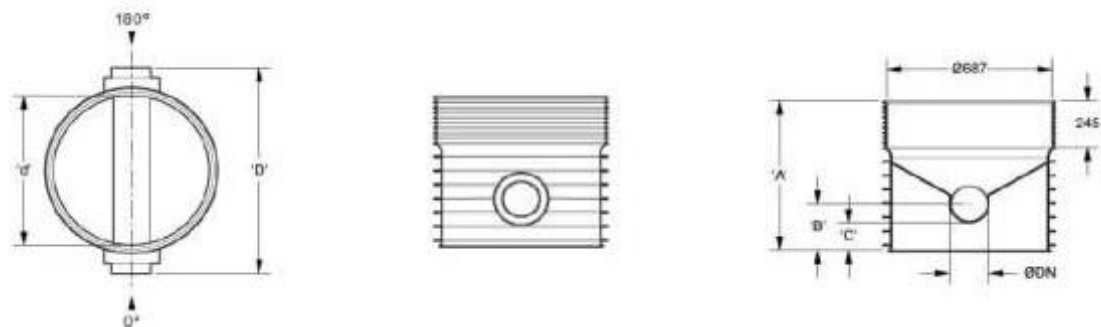
**A1.1 EZIpit® (PP) BASE: STRAIGHT THROUGH (180°) FLOW PROFILE WITH RRJ ADJUSTABLE CONNECTIONS.**



**FIGURE A1.1: DN 425 EZIPIT™ (PP) BASE: STRAIGHT THROUGH (180°) CHANNEL**

**TABLE A1.1: DN 425 EZIPIT® (PP) BASE: STRAIGHT THROUGH (180°) CHANNEL DIMENSIONS AND DATA**

Product Code	Description	H <sub>1</sub> (mm)	H <sub>2</sub> (mm)	H <sub>3</sub> (mm)	H <sub>4</sub> (mm)	D <sub>u</sub> (mm)	Kg (each)	m <sup>3</sup> (each)
TGB425100	DN 425 x 100 base x 180° Channel RRJ	582	81	111	296	538	15.0	0.10
TGB425150	DN 425 x 150 base x 180° Channel RRJ	611	85	115	320	570	15.5	0.11
TGB425225	DN 425 x 225 base x 180° Channel RRJ	611	80	205	326	909	15.5	0.11
TGB425300	DN 425 x 300 base x 180° Channel RRJ	668	79	237	383	1005	16.9	0.12



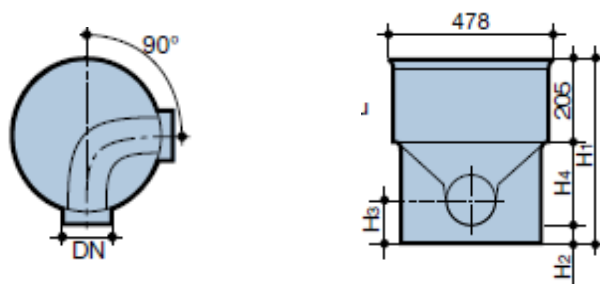
**FIGURE A1.2: DN 600 EZIPIT® (PP) BASE: STRAIGHT THROUGH (180°) CHANNEL**

**TABLE A1.2: DN 600 EZIPIT® (PP) BASE: STRAIGHT THROUGH (180°) CHANNEL DIMENSIONS AND DATA**

Product Code	Description	'A' (mm)	'B' (mm)	'C' (mm)	"D" (mm)	'd' (mm)	Kg (each)	m <sup>3</sup> (each)
TGB600150	DN 600 x 150 base x 180° Channel RRJ	679	163	88	756	566	23.3	0.53
TGB600225	DN 600 x 225 base x 180° Channel RJJ	738	222	103	775	507	27.0	0.56
TGB600300	DN 600 x 300 base x 180° Channel RRJ	738	222	74	762	452	29.2	0.56 *
TGB600375	DN 600 x 375 base x 180° Channel RRJ	748	237	72	1149	632	29.0	0.56

Note: All dimensions and data are approximate only. If critical contact Iplex Pipelines.

### A2.1 EZIpit® (PP) BASE: BEND (90°) CHANNEL WITH RRJ ADJUSTABLE CONNECTIONS.

**FIGURE A2.1 DN 425 EZIPIT® (PP) BASE: BEND (90°) CHANNEL****TABLE A2.1: DN 425 EZIPIT® (PP) BASE: BEND (90°) CHANNEL DIMENSIONS AND DATA**

Product Code	Description	H <sub>1</sub> (mm)	H <sub>2</sub> (mm)	H <sub>3</sub> (mm)	H <sub>4</sub> (mm)	Kg (each)	m <sup>3</sup> (each)
TGB4251590	DN 425 x 150 base x 90° Channel RRJ	611	85	115	320	15.5	0.11

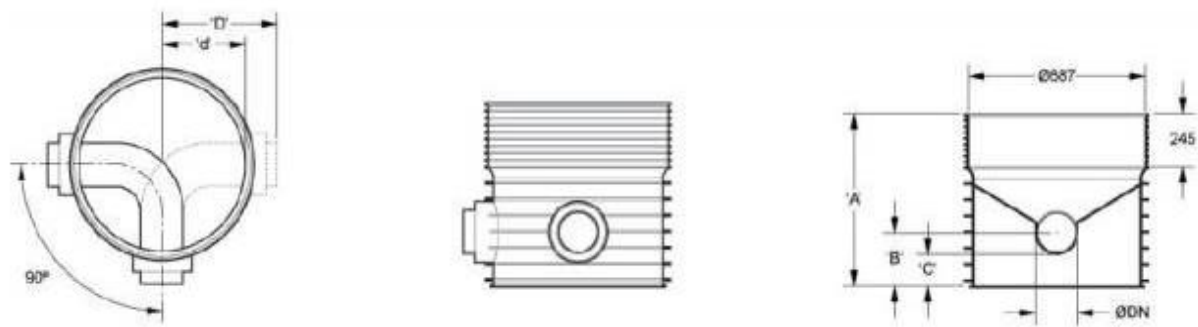


FIGURE A2.2: DN 600 EZIPIT® (PP) BASE: BEND (90°) CHANNEL

TABLE A2.2: DN 600 EZIPIT® (PP) BASE: BEND (90°) CHANNEL DIMENSIONS AND DATA

Product Code	Description	'A'(mm)	'B'(mm)	'C'(mm)	'D'(mm)	'd'(mm)	Kg(each)	m <sup>3</sup> (each)
TGB60015090	DN 600 x 150 base x 90° Channel RRJ	679	163	88	376	283	23.3	0.53
TGB60022590	DN 600 x 225 base x 90° Channel RRJ	738	222	103	388	254	27.0	0.56
TGB60030090	DN 600 x 300 base x 90° Channel RRJ	738	222	74	381	226	29.2	0.56

Note: All dimensions and data are approximate only. If critical contact Iplex Pipelines

A3.1 EZIpit® (PP) BASE: BEND (60°) CHANNEL WITH RRJ ADJUSTABLE CONNECTIONS.

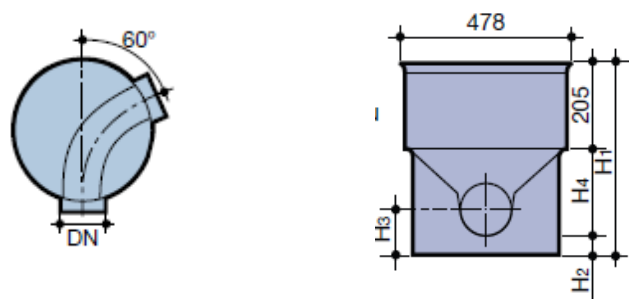
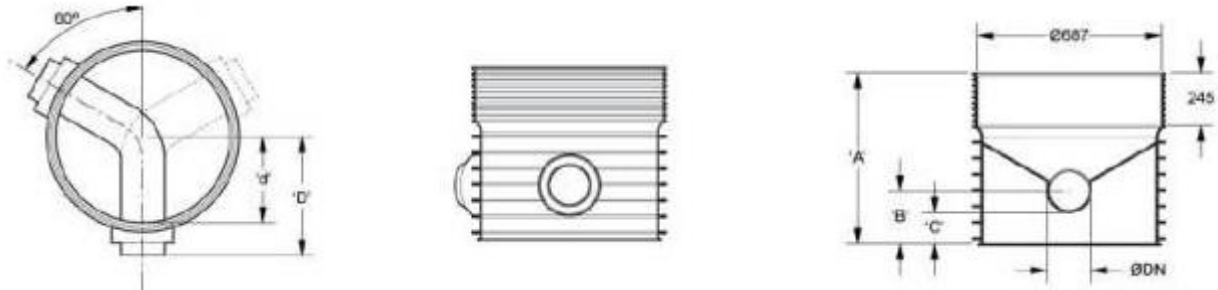


FIGURE A3.1: DN 425 EZIpit® (PP) BASE: BEND (60°) CHANNEL



**TABLE 3.1: DN 425 EZIpit® (PP) BASE: BEND (60°) CHANNEL DATA**

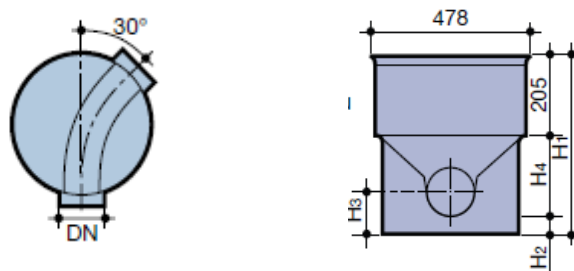
Product Code	Description	H <sub>1</sub> (mm)	H <sub>2</sub> (mm)	H <sub>3</sub> (mm)	H <sub>4</sub> (mm)	Kg (each)	m <sup>3</sup> (each)
TGB425150120	DN 425 x 150 base x 60° channel RRJ	611	85	115	320	15.5	0.11

**FIGURE A3.2 DN 600 EZIPIT® (PP) BASE: BEND (60°) CHANNEL****TABLE A3.2 DN 600 EZIPIT® (PP) BASE: BEND (60°) CHANNEL DIMENSIONS AND DATA**

Product Code	Description	'A'(mm)	'B'(mm)	'C'(mm)	'D'(mm)	'd'(mm)	Kg(each)	m <sup>3</sup> (each)
TGB600150120	DN 600 x 150 base x 60° channel RRJ	679	163	88	378	283	23.3	0.53
TGB600225120	DN 600 x 225 base x 60° channel RRJ	738	222	103	388	254	27.0	0.56
TGB600300120	DN 600 x 300 base x 60° channel RRJ	738	222	74	381	226	29.2	0.56

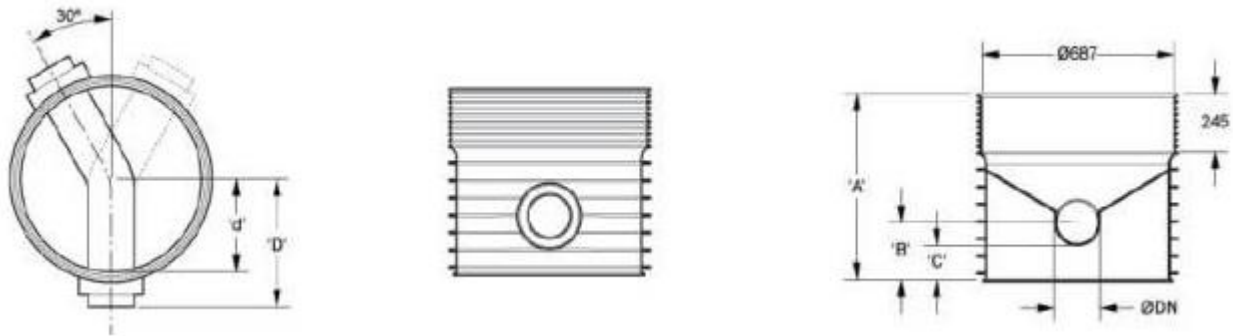
Note: All dimensions and data are approximate only. If critical contact Iplex Pipelines.

#### **A4.1 EZIpit® (PP) BASE: BEND (30°) CHANNEL WITH RRJ ADJUSTABLE CONNECTIONS.**

**FIGURE A4.1 DN 425 EZIPIT® (PP) BASE: BEND (30°) CHANNEL**

**TABLE A4.1: DN 425 EZIPIT® (PP) BASE: BEND (30°) CHANNEL DIMENSIONS AND DATA**

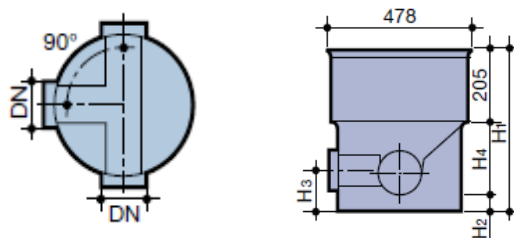
Product Code	Description	H <sub>1</sub> (mm)	H <sub>2</sub> (mm)	H <sub>3</sub> (mm)	H <sub>4</sub> (mm)	Kg (each)	m <sup>3</sup> (each)
TGB425150150	DN 425 x 150 base x 30° channel RRJ	611	85	115	320	15.5	0.11

**FIGURE A4.2: DN 600 EZIPIT® (PP) BASE: BEND (30°) CHANNEL****TABLE A4.2 DN 600 EZIPIT® (PP) BASE: BEND (30°) CHANNEL DIMENSIONS AND DATA**

Product Code	Description	'A'(mm)	'B'(mm)	'C'(mm)	'D'(mm)	'd'(mm)	Kg(each)	m <sup>3</sup> (each)
TGB600150150	DN 600 x 150 base x 30° channel RRJ	679	163	88	378	283	23.3	0.53
TGB600225150	DN 600 x 225 base x 30° channel RRJ	738	222	103	388	254	27.0	0.56
TGB600300150	DN 600 x 300 base x 30° channel RRJ	738	222	74	381	226	29.2	0.56

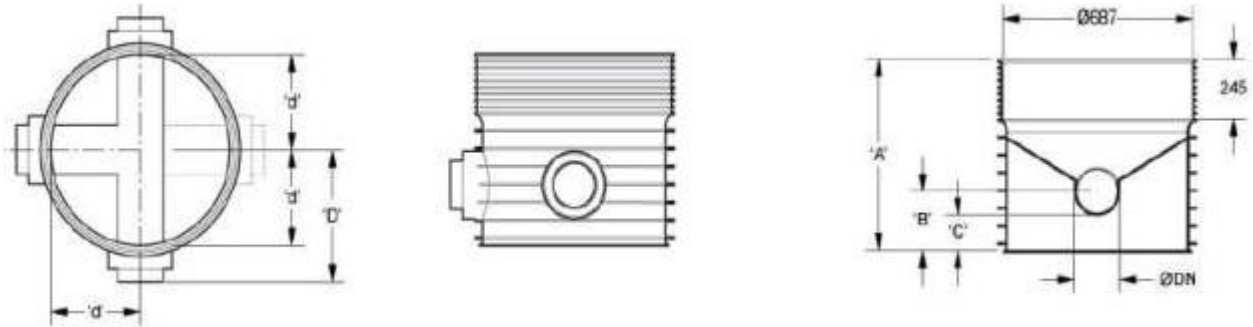
Note: All dimensions and data are approximate only. If critical contact Iplex Pipelines.

### A5.1 EZIpit® (PP) BASE: TEE CHANNEL WITH RRJ ADJUSTABLE CONNECTIONS.

**FIGURE A5.1 DN 425 EZIPIT® (PP) BASE: TEE CHANNEL**

**TABLE A5.1: DN 425 EZIPIT® (PP) BASE: TEE CHANNEL DIMENSIONS AND DATA**

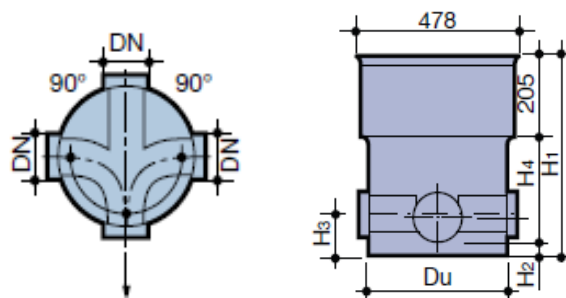
Product Code	Description	H <sub>1</sub> (mm)	H <sub>2</sub> (mm)	H <sub>3</sub> (mm)	H <sub>4</sub> (mm)	D <sub>u</sub> (mm)	Kg (each)	m <sup>3</sup> (each)
TGB425T150	DN 425 x 150 base Tee channel RRJ	611	85	115	320	570	15.5	0.11

**FIGURE A5.2: DN 600 EZIPIT® (PP) BASE: TEE CHANNEL****TABLE A5.2: DN 600 EZIPIT® PP BASE: TEE CHANNEL DIMENSIONS AND DATA**

Product Code	Description	'A'(mm)	'B'(mm)	'C'(mm)	'D'(mm)	'd'(mm)	Kg (each)	m <sup>3</sup> (each)
TGB600T150	DN 600 x 150 base Tee channel RRJ	679	163	88	378	283	23.9	0.53
TGB600T225	DN 600 x 225 base Tee channel RRJ	738	222	103	388	254	29.1	0.56
TGB600T300	DN 600 x 300 base Tee channel RRJ	738	222	74	381	226	32.6	0.56

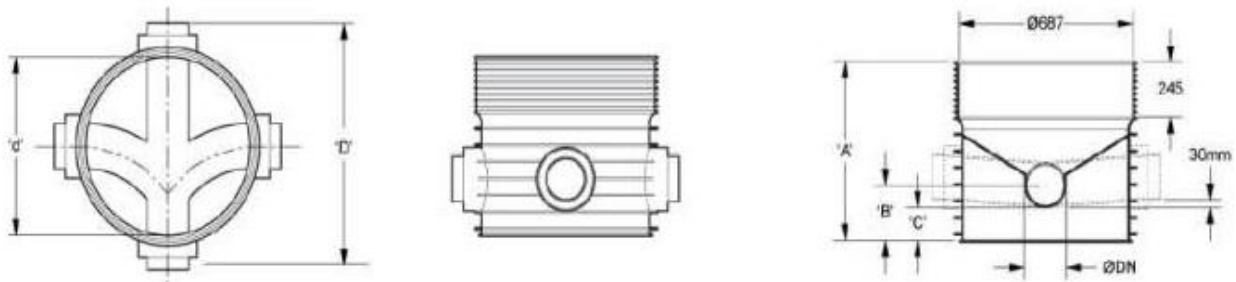
Note: All dimensions and data are approximate only. If critical contact Iplex Pipelines.

### A6.1 EZIpit® (PP) BASE: DOUBLE TEE CHANNEL WITH RRJ ADJUSTABLE CONNECTIONS.

**FIGURE A6.1: DN 425 EZIPIT® (PP) BASE: DOUBLE TEE CHANNEL**

**TABLE A6.1: DN 425 EZIpit® (PP) BASE: DOUBLE TEE CHANNEL DIMENSIONS AND DATA**

Product Code	Description	H <sub>1</sub> (mm)	H <sub>2</sub> (mm)	H <sub>3</sub> (mm)	H <sub>4</sub> (mm)	D <sub>u</sub> (mm)	Kg (each)	m <sup>3</sup> (each)
TGB425X100	DN 425 x 100 base Double Tee RRJ	582	81	111	296	538	15	0.10
TGB425X150	DN 425 x 150 base Double Tee RRJ	611	85	115	320	570	15.5	0.11

**FIGURE 6.2: DN 600 EZIPIT® (PP) BASE: DOUBLE TEE CHANNEL****TABLE 6.2: DN 600 EZIPIT® PP BASE: DOUBLE TEE CHANNEL DIMENSIONS AND DATA**

Product Code	Description	'A'(mm)	'B'(mm)	'C'(mm)	'D'(mm)	'd'(mm)	Kg(each)	m <sup>3</sup> (each)
TGB600X150	DN 600 x 150 base Double Tee RRJ	679	163	88	756	566	24.9	0.53
TGB600X225	DN 600 x 225 base Double Tee RRJ	738	222	103	775	507	30.9	0.56
TGB600X300	DN 600 x 300 base Double Tee RRJ	738	222	74	762	452	35.7	0.56

Note: All dimensions and data are approximate only. If critical contact Iplex Pipelines.

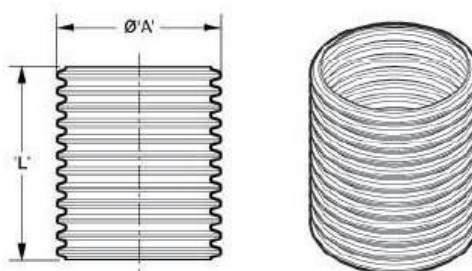
### A7.1 EZIpit® (PP) Base: Empty Base



**FIGURE A7.1: DN 600 EZIPIT® (PP) BASE: EMPTY BASE****TABLE A7.1: DN 600 EZIPIT® (PP) BASE: EMPTY BASE DIMENSIONS AND DATA**

Product Code	Description	'A'(mm)	Kg (each)	m <sup>3</sup> (each)
TGB600	Empty Base	753	20.3	0.41

Note: All dimensions and data are approximate only. If critical contact Iplex.

**A8.0 EZIpit® RISER DIMENSIONS AND DATA****FIGURE A8: EZIpit® PP RISER****TABLE A8: EZIPIT™ RISER DIMENSIONS AND DATA**

Product Code	Material	Colour	Description	' A ' (mm)	Kg>(each)
TGPP425B	PP	Orange brown	DN 425 x 2000mm EZIpit®Riser	476.0	20.0
TGPP425C	PP	Orange brown	DN 425 x 3000mm EZIpit®Riser		30.0
TGPP425F	PP	Orange brown	DN 425 x 6000mm EZIpit®Riser		60.0
TGPP600A	PP	Light grey	DN 600 x 1000mm EZIpit®Riser	682.8	22.5
TGPP600AV	PP	Light grey	DN 600 x 1500mm EZIpit®Riser		45.1
TGPP600B	PP	Light grey	DN 600 x 2000mm EZIpit®Riser		33.8
TGPP600C	PP	Light grey	DN 600 x 3000mm EZIpit®Riser		67.6
TGPP600D	PP	Light grey	DN 600 x 4000 EZIpit®Riser		90.0
TGPP600DV	PP	Light grey	DN 600 x 4500mm EZIpit®Riser		101.4
TGPP600F	PP	Light grey	DN 600 x 6000mm EZIpit®Riser		135.2

Note: All dimensions and data are approximate only. If critical contact Iplex Pipelines.

## A8 DN 425 and DN 600 EZIpit® Riser SEALS

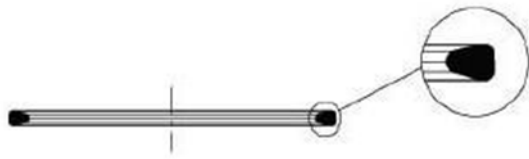


FIGURE A8.1 DN 600 EZIpit® Seal



FIGURE A8.2 DN 425 EZIpit® Seal

TABLE A8: EZIPIT™ RISER SEALS

Product Code	Description	Kg(each)
GERSEW425	EZIpit®425 Seal	0.8
GERSEW600	EZIpit®600 Seal	2.2

## A9 EZIpit® CAP AND LID ARRANGEMENT

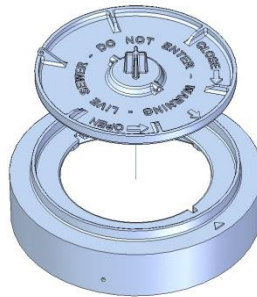


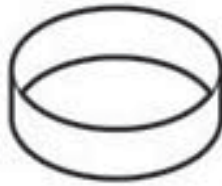
FIGURE A9: EZIPIT® CAP AND LID ARRANGEMENT

TABLE A9: EZIPIT® CAP AND LID DATA

Product Code	Description	Kg(each)	m <sup>3</sup> (each)
GME300S42C	DN 425 EZIpit® Cap and 300 mm clear opening which is sealed with a Lid	21	0.02
GME300S6C	DN 600 EZIpit® Cap and 300 mm clear opening which is sealed with a Lid	33	0.07

Note: Mass & volume are approximate only. If critical contact Iplex Pipelines.

**A10 EZIpit® PE Shroud for CLASS B (NON-TRAFFICABLE) ASSEMBLIES ONLY.  
(Non-trafficable conditions.)**



**FIGURE A10: EZIPIT® PE SHROUD**

**TABLE A10: EZIPIT® PE SHROUD DATA**

Product Code	Description	Kg(each)	m <sup>3</sup> (each)
POH04560T	DN560 X 300mm EZIpit® Shroud (non-trafficable)	7.2	0.09
POH04800T	DN800 X 300mm EZIpit® Shroud (non-trafficable) conditions)	14.4	0.19

Note: Data is approximate only. If critical contact Iplex Pipelines.

**A11 EZIpit® Concrete Support Ring for DN 600 CLASS D (TRAFFICABLE) ASSEMBLIES ONLY**



**FIGURE A11: CONCRETE SUPPORT RING**

**TABLE A11: EZIPIT® CONCRETE SUPPORT RING DATA**

Product Code	Description	Kg(each)	m <sup>3</sup> (each)
GMTG300CR	EZI pit Concrete Support Ring	140.0	0.120

Note: Data is approximate only. If critical contact Iplex Pipelines.

**A12 DN 600 EZIpit® FRAME AND ACCESS COVER ARRANGEMENT CLASS B (NON TRAFFICABLE) ASSEMBLIES ONLY.**



**FIGURE A12: DN 600 EZIPIT® FRAME AND ACCESS COVER ARRANGEMENT WITH VEGETATION RING (CLASS B)**

**TABLE A12: DN 600 EZIPIT® FRAME AND ACCESS COVER ARRANGEMENT DATA**

Product Code	Description	Kg(each)	m <sup>3</sup> (each)
GME300S6B2	DN 600 EZIpit® Frame and Cover – Class B	92	0.14

Note: Data is approximate only. If critical contact Iplex

**A13 DN 600 EZIpit® FRAME AND ACCESS COVER ARRANGEMENT CLASS D (TRAFFICABLE) WITHOUT VEGETATION RING**



**FIGURE A13: DN 600 EZIPIT® FRAME AND ACCESS COVER ARRANGEMENT (CLASS D)**

**TABLE A13: DN 600 EZIPIT® FRAME AND ACCESS COVER ARRANGEMENT DATA**

Product Code	Description	Kg(each)	M <sup>3</sup> (each)
GME300S6D2	DN 600 EZIpit® Frame and Cover – Class D	113	0.14

Note: Data is approximate only, If critical contact Iplex Pipelines



**A13 DN600 EZIPIT® DI ‘TOP HAT’ FRAME AND COVER CLASS B OR D**



**FIGURE A13A: DN600 EZIPIT® DI ‘TOP HAT’ FRAME AND COVER CLASS B OR D**

**TABLE A13A: DN600 EZIPIT® DI ‘TOP HAT’ FRAME AND COVER CLASS B OR D**

Product Code	Description	Kg(each)
GMMC300C3B2S6	DN600 EZIpit® Top Hat Cover arrangement – Class B concrete infill	98
GMMC300C3D2S6	DN600 EZIpit® Top Hat Cover arrangement – Class D concrete infill	104
GMMC300S3B2S6	DN600 EZIpit®™ Top Hat Cover arrangement – Class B Solid Top	102
GMMC300S3D2S6	DN600 EZIpit® Top Hat Cover arrangement – Class D Solid Top	108

**A13B DN 600 Gatic® concrete encased DI Frame and Circular Cover (Class B) for Sloped Surfaces**

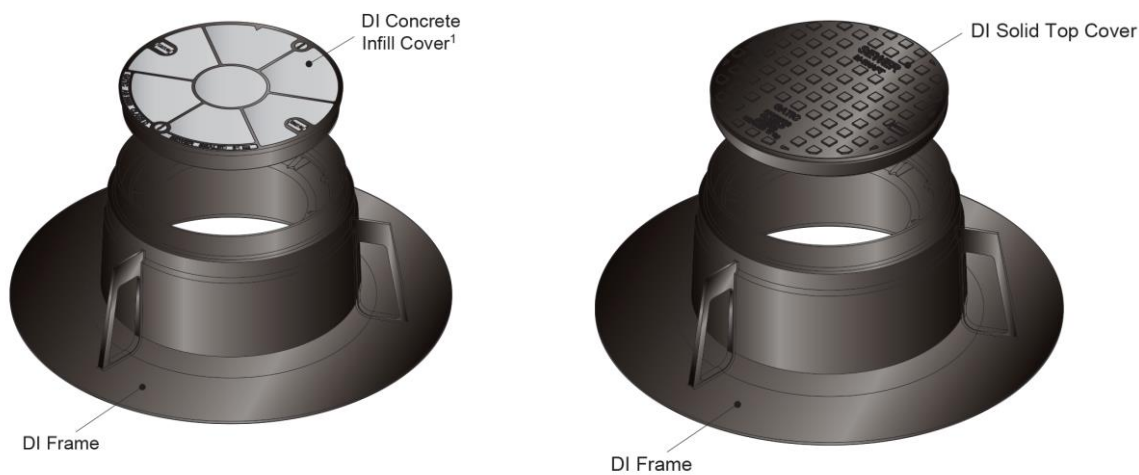


**FIGURE A13B: DN 600 GATIC® CONCRETE ENCASED DI FRAME (CLASS B) WITH CIRCULAR COVER (SOLID TOP OR CONCRETE INFILL)**

**TABLE A13B: DN 600 EZIPIT® FRAME AND ACCESS COVER ARRANGEMENT DATA**

Product Code	Description	Kg(each)
GMCL205S	DN 600 GATIC® 'Sewer' concrete infill cover and frame assembly Class B	140
GMCL205SST	DN 600 GATIC® 'Sewer' Solid Top Cover and frame assembly Class B	135

**A14 DN 425 EZIPIT® (MS) COVER ARRANGEMENTS. (Flat Surfaces)**



**FIGURE A14: DN 425 EZIPIT® (MS) COVER ARRANGEMENT (CLASS D) TOP HAT WITH CONCRETE INFILL AND SOLID TOP COVER (FLAT SURFACES)**

**TABLE A14: DN 425 EZIPIT® COVER ARRANGEMENT DATA**

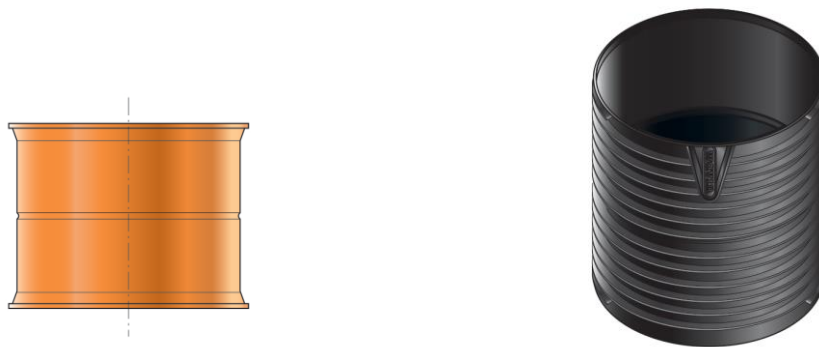
Product Code	Description	Kg(each)
GMMS300C3B2S4	DN 425 EZIpit® Top Hat Cover arrangement –Class B concrete infill	67
GMMS300C3D2S4	DN 425 EZIpit® Top Hat Cover arrangement – Class D concrete infill	69
GMMS300S3B2S4	DN 425 EZIpit®™ Top Hat Cover arrangement – Class B Solid Top	68
GMMS300S3D2S4	DN 425 EZIpit® Top Hat Cover arrangement – Class D Solid Top	70

**A15 Gatic Sealing Compound****TABLE A15: GATIC® SEALING COMPOUND FOR EZIPIT™ COVERS AND LIDS**

Product Code	Description	kg (each)
GM37501	Gatic® sealing compound x 1kg	1
GM37504	Gatic® sealing compound x 4kg	4
GM37520	Gatic® sealing compound x 20kg	20

**A16 Iplex Pipe Lubricant****TABLE A16: IPLEX PIPE LUBRICANT**

Product Code	Description	kg (each)
JL010500	Iplex pipe lubricant x 0.5kg	0.5
JL011000	Iplex pipe lubricant x 1kg	1
JL014000	Iplex pipe lubricant x 4kg	4

**A17 EZIpit®425 Riser Union****FIGURE A17: EZIPIT® 425 & 600 UNIONS****TABLE A17: EZIPIT™ UNION DIMENSIONS AND DATA**

Product Code	Description	D <sub>y</sub>	D <sub>u</sub>	L <sub>1</sub>	Mass (kg)
TGU425	DN 425 EZIpit® Riser Union	425	488	410	4.1
GR58600	DN 600 EZIpit® Riser Union	685	751	596	10

A18 EZIPIT® 600 X DN150 RISER COUPLING

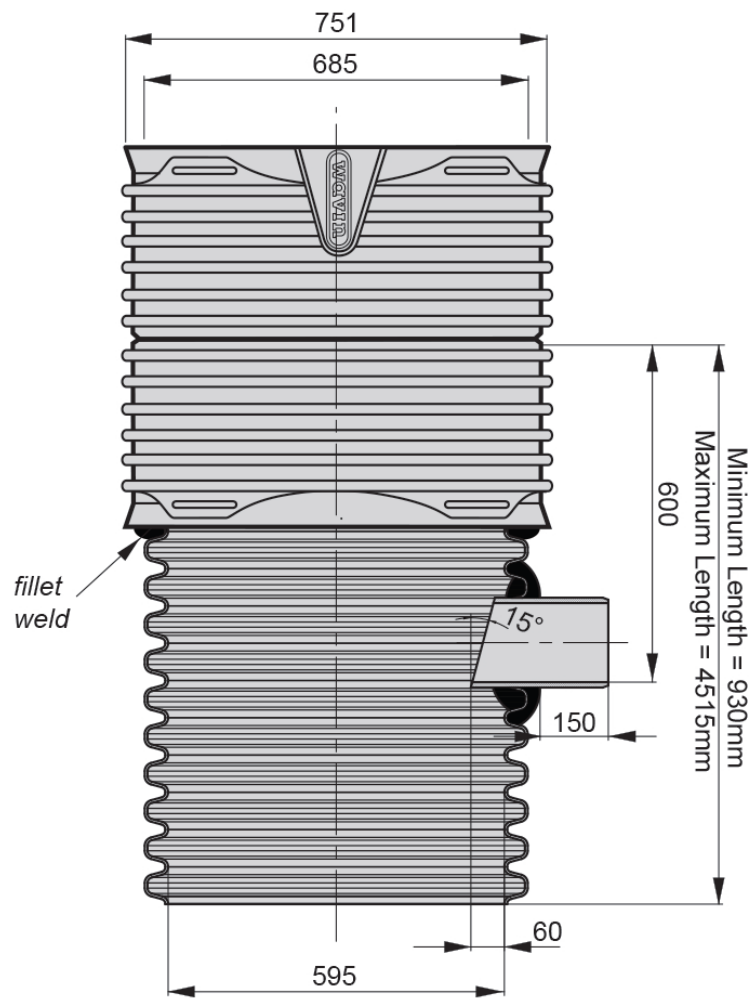


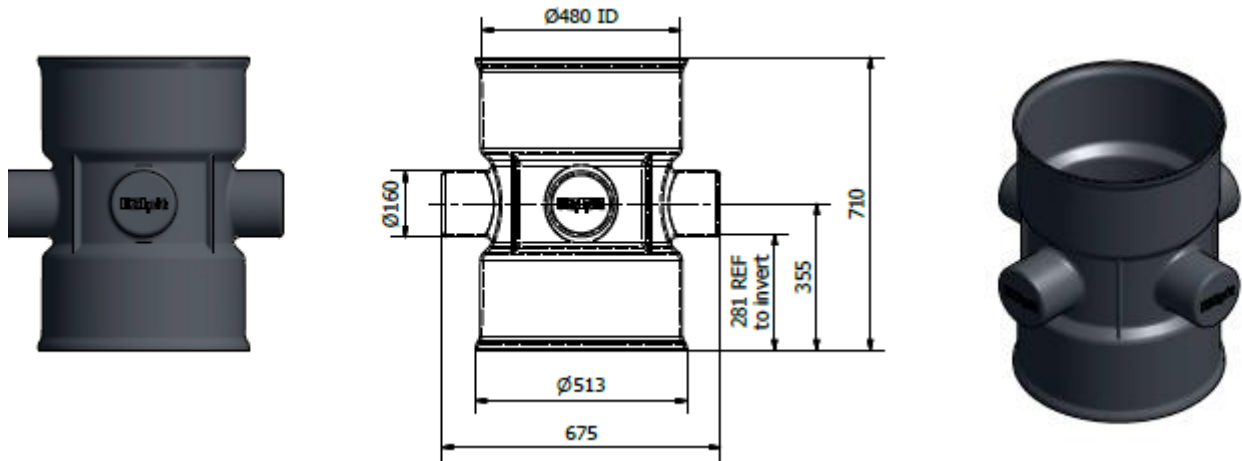
FIGURE A18: EZIPIT® 600 X DN150 RISER COUPLING

TABLE A18 EZIPIT®600 X DN150 (160MM OD) PP BRANCH RISER JUNCTION (M&F)

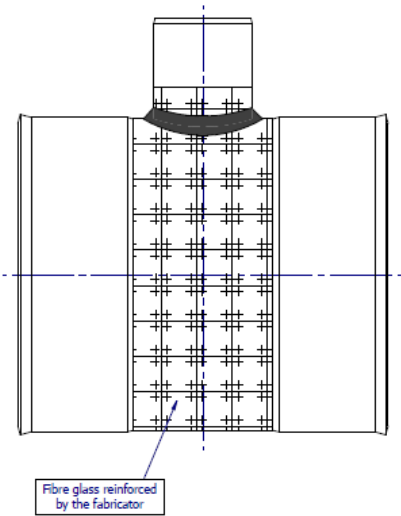
Product Code	Description	L (mm)	Mass (kg)
TGU600150AV	EZIpit600 x dn150 x 1500mm Riser Coupling (M&F)	1500	49
TGU600150C	EZIpit600 x dn150 x 3000mm Riser Coupling (M&F)	3000	82
TGU600150DV	EZIpit600 x dn150 x 4500mm Riser Coupling (M&F)	4500	115

**A19 EZIPIT®425 X DN150 RISER COUPLING (F&F)**

Product Code	Description	L (mm)	Mass (kg)
TGU425150	EZlpit425 x dn150 (PVC) Riser Coupling (F&F)	600	13
TGU425X150	EZlpit425 x dn150 x (4way) (PP) Riser Coupling (F&F)	710	7



**FIGURE A19: EZIPIT425 XDN150 X (4-WAY) PP RISER COUPLING (F&F)**



**FIGURE A20: EZIPIT425 X DN150 PVC RISER COUPLING (F&F)**

## APPENDIX B - QUALITY CERTIFICATIONS

Copies of the following Quality Certification Certificates are available for downloading from the WSAA Member's Website.

**TABLE B1 IPLEX PIPELINES AUSTRALIA PTY LIMITED – MANAGEMENT SYSTEMS**

These sites are registered under the Certificate No: QEC0037: IPLEX PIPELINES AUSTRALIA PTY LIMITED.	
Manufacturing & Distribution:	35 Alfred Road Chipping Norton NSW 2170 Australia.
Manufacturing & Distribution:	31 Terry Court, Thurgoona NSW 2640 Australia
Sales, Manufacturing & Distribution:	Cnr South Pine & Johnstone Roads Brendale QLD 4500
Manufacturing & Distribution:	169 Philip Highway, Elizabeth SA 5112, Australia
Manufacturing & Distribution	884 Ingham Road BOHLE QLD 4818 Australia
Sales, Manufacturing & Distribution	25 King Edward Road Osborne Park WA 6017 Australia
Manufacturing:	66 Buckingham Drive Wangara WA 6065 Australia
Quality Systems Standard	ISO 9001
Certification licence no.	QEC0037
Certifying agency	SAI Global Limited
Current date of certification	9 February 2015
First date of certification	3 April 1990
Expiry date of certification	9 January 2018

**TABLE B2 GATIC-MILNES – MANAGEMENT SYSTEMS**

Applicant's Business GATIC-MILNES 9-15 Radford Road, Reservoir Vic 3073, Australia.	
Quality Systems Standard	ISO 9001
Certification licence no.	QAC/R61/0123
Certifying agency	International Standards Certifications Pty Ltd
First date of certification	18 February 2009
Current date of certification	27 March 2015
Expiry date of certification	18 Feb 2018

**TABLE B3 WAVIN POLSKA S.A. MANAGEMENT SYSTEMS**

Manufacturing Address: ul. Dobiezynska 43; Buk; Wielkopolskie ; 64-320 Poland.	
Quality Systems Standard	ISO 9001:2008
Certification licence no.	CSJS/048/2015
Certifying agency	URZAD DOZORU TECHNICZNEGO UDT - CERT
First Date Certification	24 February 2003
Current date Certification	2 August 2015
Expiry date of certification	6 August 2018

**TABLE B4 IPLEX PIPELINES AUSTRALIA PTY LIMITED – PRODUCT CERTIFICATION**

Manufacturing Address: Cnr South Pipe & Johnstone Roads, Strathpine, QLD 4500, Australia.	
Product Standard	AS/NZS 5065:2005
Certificate No.	SMKP20603
Conformity Assessment Body	SAI Global Limited
First date of Certification	9 August 2006
Current date of certification	18 October 2016
Expiry date of certification:	8 August 2021

**TABLE B6 GATIC-MILNES – PRODUCT CERTIFICATION**

Applicant's Business GATIC-MILNES 9-15 Radford Road, Reservoir Vic 3073, Australia.	
Product Standard	AS 3996:2006
Registration No.	PRD/R61/0123
Conformity Assessment Body	International Standards Certifications Pty Ltd
First date of Certification	4 June 2010
Current date of certification	27 March 2015
Expiry date of certification:	18 February 2018

**TABLE B7 WAVIN POLSKA S.A.– PRODUCT CERTIFICATION**

Manufacturing Address: WAVIN METALPLAST-BUK SP. Z O.O. ul. Dobiezyńska 43; Buk; Wielkopolskie; 64-320 Poland.	
Product Standard	EN13598-2
Registration No.	2070
Conformity Assessment Body	INSTA-CERT
Date of valid edition	22 May 2015
Date of first issue	2 February 2011

INSTA-CERT is a Nordic group of certification bodies. Certification by INSTA-CERT means that the certificates will be valid and useful in all the Nordic countries, Denmark, Finland, Norway and Sweden.



**Wavin Metalplast-Buk Sp. z o.o.**  
ul. Dobieżyńska 43  
64-320 Buk k/Poznań  
tel. (0-61) 891-10-00, fax (0-61) 891-10-11  
NIP 788-00-08-752, Regon 630517296

## Declaration of Conformity

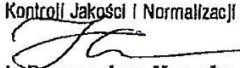
1. Producer: Wavin Metalplast-Buk Sp. z o.o.  
ul. Dobieżyńska 43, 64-320 Buk- Polska  
(full name and address of item producer)
2. Product name: Base of inspection chamber PP - Tegra 425  
(name, trade name, type, variety, brand, class)
3. Product classification: PKWIU 22.21.29.0  
(product code)
4. Destination and application field: for non-pressure drainage and sewerage system  
(as stated in referred document)
5. Document of reference: EN 13598-2:2009  
**EN 13598-2:2009** Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE)- Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations  
(number, title and year of norm establishment or number, title and year of edition of technical approval and name of approving institute)

Hereby I declare with full sense of responsibility that products are consistent with document of reference mentioned in point 5.

Buk, 2012-08-29

(Issuing place and date)

Kierownik  
Działu Kontroli Jakości i Normalizacji

  
dr inż. Przemysław Hruszka

(Name, surname and signature of authorized person)

**Wavin Metalplast-Buk Sp. z o.o.**  
ul. Dobieżyńska 43  
64-320 Buk i/Poznań  
tel. (0-61) 891-10-00, fax (0-61) 891-10-11  
NIP 788-00-08-752, Regon 630517296

## Declaration of Conformity

1. Producer: Wavin Metalplast-Buk Sp. z o.o. ul. Dobieżyńska 43; 64-320 Buk - Poland

(full name and address of item producer)

2. Product name: Base of Inspection Chamber Tegra 600

(name, trade name, type, variety, brand, class)

3. Product classification: PKWIU 22.21.29.0

(product code)

4. Destination and application field: for non-pressure drainage and sewerage systems

(as stated in referred document)

5. Document of reference: \_\_\_\_\_

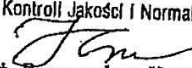
**EN 13598-2:2009** Plastics piping systems for non-pressure underground drainage and sewerage  
- Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE)- Part 2:  
Specifications for manholes and inspection chambers in traffic areas and deep underground  
installations

(number, title and year of norm establishment or number, title and year of edition of technical approval and name of approving institute)

Hereby I declare with full sense of responsibility that the products are consistent with document of reference mentioned in point 5.

Buk, 2012-08-29  
(Issuing place and date)

Kierownik  
Działu Kontroli Jakości i Normalizacji

  
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(Name, surname and signature of authorized person)

**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 channelled base or spherical base with up to three inlets  $\leq$ 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 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 <sup>2</sup> [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 <sup>1</sup>	
Surface cover and frame <sup>3</sup>	

NOTES: See over

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- 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.

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**PRODUCT SPECIFICATION****WSA PS - 341 MAINTENANCE SHAFTS (MS) – POLYPROPYLENE (PP) FOR  
NON-PRESSURE APPLICATIONS – SEWERAGE****341.1 SCOPE**

This specification covers 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  $\leq$ 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) 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 <sup>2</sup> [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 <sup>1</sup>	
Surface cover and frame <sup>3</sup>	

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## 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.

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## APPENDIX D – OUTCOMES OF EXPERT PANEL PRODUCT REVIEW

An expert panel meeting was conducted on the 30 April 2009 to progress the Product Appraisal application for PA 0902 EZIpit 600 Maintenance chamber. The minutes of the meeting are available to WSAA website IPAM Portal (Members only).

The IPAM members and representatives from the Applicant participating in the Expert Panel review are listed in Table D1.

**TABLE D1 EXPERT PANEL PARTICIPANTS**

Expert Panel Members	Representatives from the Applicant
Mohamed Yoosuf, Senior Engineer Standards, City West Water	Michael Lancuba , Product Portfolio Manager, Engineered Products.
Kevin Dawson, Manager Delivery Services, Yarra Valley Water	
Carl Radford, Manager Standards, City West Water	
Henry Pisanko, Standards Engineer, Infrastructure Delivery, Sydney Water	
Andy Krumins, Manager Infrastructure Planning, Brisbane City Council.	
Lance Fletcher, Development Inspector, MidCoast Water	

**Question 1** Whole structure should be certified to EN 13598-2 not just the base. This standard calls up other standards and tests for the base and shaft etc.

**Response 1** The EZIpit® 600 riser is manufactured locally in Australia providing the benefit of local availability and lower cost. The riser complies with the relevant sections in AS/NZS5065, which is essential for the acceptance and approval of the EZIpit® in Australia. The EZIpit® 600 riser made by Iplex exceeds those requirements specified in EN13598-2. For example the risers used in Europe are manufactured with stiffness's SN2 and SN4, whereas Iplex manufacture the EZIpit® 600 Riser as SN8.

The EZIpit® 425 riser used for the EZIpit® MS is manufactured by WAVIN in Europe and complies fully with EN13598-2.

**Question 2** The EZIpit® cover arrangements need to address the requirements of WSA PS290, not just AS 3996. Sydney Water requires that covers used for sewer structures meet the gas and water tightness requirements of AS 3996 Need to verify gas and water tightness conformance to WSA PS-290.

**Response 2** The EZIpit® cover arrangements comply fully with WSA PS-290 and AS 3996.

Compliance reports for gas and water tightness to WSA PS-290 and AS 3996 were supplied with the WSAA appraisal. See Gatic Test Reports Nos, 2008/054 'Tegra® Solid Top Assembly (EZIpit®) Gas Tightness' and 2008/055 'Tegra® Solid Top Assembly (EZIpit®) Water Tightness'.

**Question 3** A key lock inserted in the lug on the inner lid would soon be inoperable in the field environment. It would present added maintenance issues and costs. What alternatives are available to prevent unauthorised access?

**Response 3** A locking mechanism in the lid and cap was requested by WSAA members to restrict unauthorised access. The lugs were designed to lock with a padlock when in a closed

position. Iplex are not aware of what 'added maintenance costs and issues' are involved, but are happy to discuss this further.

**Question 4** Are high level connections, drop junctions or vent lines intended for use on these structures and how would these connections be done (Initial construction and in the future)? I think Iplex stated that there are several PP welders that can do connections to shafts. Iplex recommend against mechanical connections but didn't say why.

**Response 4** Side connections For the EZIpit® 600 MC can be prefabricated and welded into the side of the EZIpit® Riser, at the specified level. This provides a completely water and gas tight connection. The WAVIN 'insitu pipe connector' has been trialled by Iplex on the DN 600 EZIpit® Riser and found that the in-situ pipe connector was not designed for use with the Iplex manufactured DN 600 Riser. As a result, it was decided that a welded joint provided greater security and significantly less risk to infiltration. Future side connections can be completed insitu by properly trained technicians. Alternatively, the existing riser can also be replaced with a new riser complete with the required connections. (Note: On site poly welding and fabrication is common practice in Australia).

Property connections via the corrugated riser are possible using the prefabricated riser junction with spigot branch.

**Question 5** What connection details (specs) and instructions are available for (PP) welders to make up the connections to the Iplex Risers? SEW-1314-V in Sydney Water's edition of the Sewerage Code shows curves at the shaft connections. This helps prevent drag and damage to cleaning equipment, CCTV cables etc. There is more taper at the obvert of the connection to help equipment enter the connection. The internal wall of the EZIpit® (Like Tegra® 600 MC) is corrugated and would present a challenge to provide a suitable connection. Mechanical connections were easily done in the field for Tegra® MC used at Wallacia in Sydney but they did not have a taper at the invert and obvert. Constructors liked the mechanical connections because they made it easy to line up constructed sewers.

**Response 5** Iplex pipelines are able to pre-fabricate a variety of poly fittings to suit special requirements. Therefore, if specified, a DN 250 x DN 160 level invert taper can be welded into the side of the shaft to prevent drag and damage to cleaning equipment. It is also worth noting that the larger DN 600 EZIpit® shaft facilitates the cleaning, inspection and maintenance operation and in Europe most of this is completed via the shaft.

**Question 6** Do high-level connections present adverse load connections on the shaft?

**Response 6** Connections into the side of the shaft are common practice in Europe. Polypropylene because of its ductile nature can accommodate movement without cracking or breaking and therefore provides a strong and reliable connection.

**Question 7** Can shaft height be raised after initial construction?

**Response 7** Yes it can be raised by using a DN 425 Union for the EZIpit® Shaft and a DN 600 Union for the EZIpit® 600 MC .Height adjustment can also be achieved with the shroud, which forms part of the Class B cover arrangement.

**Question 9** What depth are the shafts to be limited to? The Sewerage Code currently limits MSs to 5.0m (4.5m at Sydney Water) and pre cast MHs to 6m on sewers.

**Response 9** The EZIpit® is suitable for depths up to 6m from pipe invert to finished surface level.

**Question 10** Testing should assume the worst-case loads, i.e. full depth water table and cohesive soils.

#### **Iplex – Response 10**

WAVIN completed a number of field tests with the Tegra® 600 Chambers and Tegra 425 Shafts.



Chambers with a black riser (SN2) were installed in non-cohesive soils and chambers with a brown/red riser (SN4) were installed in cohesive or soft soils. Depth to invert was 5m with full water table to ground surface. The trials confirmed that the Tegra chambers and shafts did not float or buckle and were completely water tight even under these severe conditions.

It therefore makes sense that the Iplex EZIpit® riser with more than twice the ring stiffness will provide a more robust chamber and shaft under the same conditions.

Structural designs in accordance with AS/NZS 2566 have also been completed. Design parameters specified in Sydney Water Document 'Performance Requirements and assessment criteria for DN 1000 Maintenance Holes and DN 600 Inspection Chambers' were used in the structural design.

The safety factor for an SN8 shaft in soft cohesive soils ( $E' = 2\text{MPa}$ ) with a 5 m water table is 4.5. This significantly exceeds the requirement in AS/NZS2566, which specifies a minimum SF of 2.5.

#### **Question 11**

Sewer designers need to consider product limitations when choosing between MHs, DN425 MSs and DN 600 MCs such as the EZIpit® or Tegra® products.

#### **Response 11**

Agree. The EZIpit® is not a MH, but both a maintenance and inspection chamber (DN 600) or shaft (DN 425). However, because of the larger diameters (DN 425 & 600) it facilitates the inspection, cleaning operation.

#### **Question 12**

Deflections of roughly 7 degrees are claimed as possible. The brochure indicates that sockets for smooth bore pipe have a elastomeric ring, whilst ribbed pipe doesn't need a elastomeric ring. Does the socket pivot within the base to allow the claimed deflections?

#### **Response**

1. The socket pivots within the base to allow an angular deflection of up to 7.5 deg deflection in all directions.
2. The bases we are using within the EZIpit® unit is for smooth bore pipes (PVC DWV sewer pipes). The seal is encapsulated in the base socket and provides a elastomeric ring seal joint connection.

## APPENDIX E - FIELD TEST REPORTS

Blue Mountains trial installations of Iplex EZIpit®.

Sydney Water comment

Installation of a basic pit was easy and quick. One day for an EZIpit® vs 2 days for a pre-cast MH.

High-level connections and drop structures to the shaft were difficult. Welded connections were pre-made off site and it was awkward to line up the sewers with the openings in the field. I don't have photos of what the connections looked like.

Iplex – comment

The side connection is a fixed connection into the side of the DN 600 riser, however the riser can be cut or trimmed on site to make up any adjustment. Note: for the DN 425 Riser used in the EZIpit® shaft a connection can be made in the field with an in-situ connector (Figure 24) available from Iplex.

Sydney Water – comment

The inner lid was difficult to unscrew. The handle broke during the opening attempts, as did the lugs on the lid when they were bashed. Iplex indicated that there were quality issues that made the lids a tight fit and that these have been rectified. Also a lubricant is used on the lid. This is an added maintenance issue for the future.

Iplex – comment

The issues raised in this trial were acted upon as soon as Iplex were made aware of them.

Iplex have modified the lid to include a 'valve spindle which is an integral part of the lid. A standard valve key available from Iplex and Crevet can be used to lock onto the spindle rotate the lid to the open position and then crack the seal and lift the lid out. See Fig E1

Gatic also recommends an approved sealing compound be applied to all mating surfaces between the cover and frame and lid and cap for corrosion protection. This also applies to all metal covers and grates complying with AS 3996.

Sydney Water – comment

The inner opening presented sharp edges that could damage hoses and cables.

Iplex – comment

The caps inner edge is the same as the edge on any other standard 600-manhole cover. However if this is a major concern, Iplex can review this.

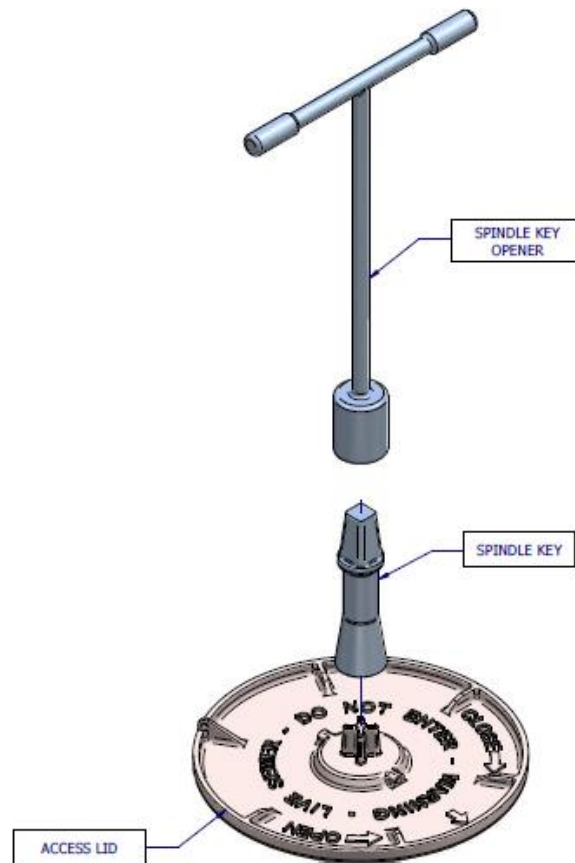
Sydney Water – comment

Sydney Water Operations preference is for external covers to have a bolt down arrangement and options to help prevent unauthorised entry. These are available on standard MH covers from various companies. There would seem to be no need for an inner cover in that case and there would be more shaft space for maintenance equipment. If an inner cover were still to be provided, it would need to be more easily opened with less maintenance requirements than the current cover. If a locking arrangement was still to be incorporated it should be something more durable and maintenance free than a padlock type system.

Iplex – comment

The EZIpit™ cover does have provision for a bolt down arrangement.

The cap ensures compliance with AS/NZS 4798 by restricting man entry. The lockable lid also prohibits unauthorised access (illegal dumping) and has the following branded warnings for safety reasons, 'Danger, Live Sewer, Do not Enter'. WSAA members requested this during the preliminary design stage.



**FIGURE E1**

## APPENDIX F - USAGE REPORTS

## Usage/References

PROJECT	CLIENT	CONTACT	DATE OF INSTALLATION	OVERVIEW
Priority sewerage program for Wallacia and Silverdale backlog sewers in Sydney	Sydney Water	Simon Davis Project Manager PSP Alliance <a href="mailto:simon.davis@hrg.com.au">simon.davis@hrg.com.au</a>	2005	A mixture of TEGRA600 and TEGRA1000 units were installed with the majority being TEGRA600. There were in excess of 100 installed.
Priority sewerage program for Blue Mountains Western Sydney	Sydney Water	Adam Podolski Site Engineer 0447 390 300	2008	Approximately 40 EZipit™ units were installed with some of the units fabricated with backdrops.
Nebo Waste Water Treatment Plant, Nebo North Queensland	Nebo Shire Council	Alex McPhee Site Supervisor 0412 880 577	2008	40 EZipit™ units have been installed to date.
Oasis Subdivision, Mission Beach, North Queensland	Baracon P/L	Black & Moore Engineers Barry Smith Site Engineer 0407 623 938	2008	40 EZipit™ units have been installed so far.
Hughenden Sewer Scheme, North Queensland	RMS	Bruce Olsen Construction Manager 0413 482 632	2009	60 EZipit™ units have been installed so far
Smithfield Sewer, North Queensland	Ken Frost	Alby Donnelly 0418 744 838	2009	10 EZipit™ units were installed
Cassowary Coast / Johnstone Shire, North Queensland	Regional council	Ross Jennings	2009	4 EZipit™ Units were installed to replace manholes
Marian Shire, North Queensland	Mackay Regional Council	John Lemura 0418 775 882	2009	2 EZipit™ were supplied to replace existing manholes.
Kippa-Ring / Moreton Bay Region, South East Queensland	Unity Water	Tony Fernandez 0429 898 512	2011	30 EZipit™ Units were installed
Toowoomba Region, South West Queensland	Toowoomba Regional Council	David McCallum 0418 739 502	2011	12 EZipit™ Units were installed
Maryborough, Wide Bay Queensland	Wide Bay Water Corp.	Gary Dalkey 0409 536 766	2011	1 EZipit™ Units was installed
Margate / Moreton Bay Region, South East Queensland	Unity Water	Michael Gri from Dormway 0411 428 989	2011	4 EZipit™ Units were installed
Dysart / Central Highlands, Central Queensland	Central Highlands Regional Council	Shane Moran 0428 737 740	2011	4 EZipit™ Units were installed

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