SAINT-GOBAIN

CI/Sfb
(52.6)
AUGUST 2018

Ensign

EEZI-FIT

Timesaver

VortX

Cast Iron above and below ground gravity drainage systems

• Ensign • EEZI-FIT • Timesaver • VortX

PAM SAINT-GOBAIN

Saint-Gobain PAM UK specialises in the manufacture of cast iron above and below ground drainage systems, for Commercial, Public and Residential buildings.

LEADING DRAINAGE PRODUCTS

We lead markets in the supply of:

- Cast iron soil and rainwater systems, and suspended pipework in basements and car parks and buried under building drainage
- Ductile iron water and sewer pipes, fittings, valves & couplings & adaptors
- Ductile iron access covers & gratings

Across each of these categories we can provide:

- Innovative products and processes
- Specialist engineering services
- Total technical support

INNOVATION

With Saint-Gobain PAM UK and the PAM brand, you can be assured of Quality, Innovation and Technical Expertise at all times.

QUALITY ASSURANCE

All parts of our operation have audited quality management systems and fully satisfy ISO 9001:2008. The majority of products are third-party assessed and approved against all relevant worldwide regulations and standards.

SUSTAINABILITY

We continually invest time, energy and expertise to create an extensive range of innovative solutions which are easy to install, simple to joint and simply offer better value for money in terms of total life costs.

COMPLETE SERVICE GLOBAL EXPERTISE

Complete service integration.

Saint-Gobain PAM UK is the UK arm of Saint-Gobain PAM, the international pipelines company, which employs around 9000 people and generates annual sales of £1.2 billion in over 120 countries. Together they form part of the Saint-Gobain group, one of the world's leading multinational organisations.

TECHNICAL SUPPORT

With the international support of parent company Saint-Gobain, we are able to offer unrivalled technical support, a total solution approach and unparalleled quality and innovation. A UK-based business, with two foundries and a distribution centre in the Midlands, we combine international reach with local, specific solutions across all of our customers.

Contents

Includes new Ensign and EEZI-FIT manifolds
Coupling rotation added
All families now have "shared" parameters to ease scheduling
All files are lighter and have been purged

PAM services

Saint-Gobain PAM is the premier supplier of ductile iron and cast iron products to the UK's key utilities, telecoms, highways, civil engineering, construction and housing companies.

We lead markets in the supply of:

- Ductile iron water and sewer pipes, fittings, valves & couplings & adaptors
- Ductile iron access covers & gratings
- Cast iron soil and drainage and rainwater systems

Across each of these categories we can provide:

- Innovative products and processes
- Specialist engineering services
- Total technical support

With Saint-Gobain PAM UK and the PAM brand, you can be assured of Quality, Innovation and Technical Expertise at all times.

Technical advisory service

Saint-Gobain PAM offer a comprehensive technical advisory service. The team can provide:

- Complete CAD drawing take-off detailing a bill of materials
- Installation advice
- Site support
- Tool-box training

Telephone hotline: **01952 262529**
Fax: **01952 262592**
Email: **technical.soildrain.uk.pam@saint-gobain.com**

Customer collaboration – special fittings

At times – specifiers and installers come across difficult or unusual situations that may require special bespoke fittings. PAM is equipped with 3D printer technology that can provide that solution through collaboration, 3D modelling and sampling – from design to concept to casting approval within one week.

For further Information contact the technical department:
Telephone: **01952 262529**
Email: **technical.soildrain.uk.pam@saint-gobain.com**
Or liaise with your regional technical sales manager.

BIM services

PAM UK has been developing its BIM Level 2 libraries in Revit for its ranges of soil and drain products.

Contact the PAM UK BIM Manager: Matthew Hassall

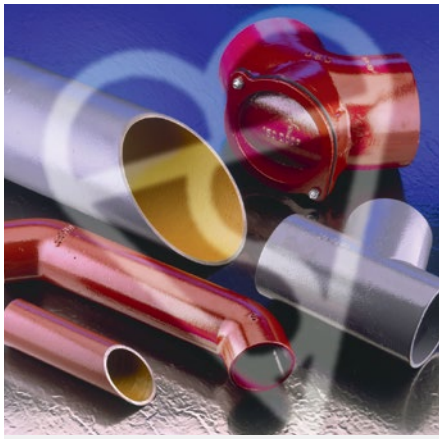
Telephone hotline: **01952 262561**
Mobile: **07815 800304**
Email: **matthew.hassall@saint-gobain.com**

Sales enquiries

Telephone hotline: **0115 930 0861**
Fax: **0115 930 0648**
Email: **sales.uk.pam@saint-gobain.com**

Customer services team

Email: **customerorders.uk.pam@saint-gobain.com**
Website: **www.saint-gobain-pam.co.uk**



PAM quality assurance

Environment Standard BS EN ISO 14001:2004/Licence: EMS83973
Saint-Gobain PAM UK manufacturing sites including Sinclair, at Telford, have been awarded the 'Manufacturing to Environmental Standards' accreditation BS EN ISO 14001:2004 which was developed to help manufacturers maintain and improve their management of environmental responsibilities and assist them in ensuring compliance with environmental laws and regulations. Saint-Gobain PAM UK operates Integrated Pollution and Preventative Control (IPPC) regulations and have implemented comprehensive environmental management systems throughout the manufacturing sites.

Quality assurance

BS EN ISO 9001:2008 – Registered No: FM12908
The Ensign System is manufactured under the BS EN ISO 9001: 2008 Quality Assurance Scheme. Continual checks made throughout the year by the BSI inspectorate, ensure that the set standards are maintained.

Product certification

BS EN 877:1999 A1:2006 Kitemark KM51733
Ensign is the only cast iron system to be tested and awarded Kitemark approval to the product standard in the UK. (See scope below). Ensign EEZI-FIT has been included in Kitemark certificate KM51733 for sanitary gravity applications and 0.5 bar (accidental static water pressure) performance.

BS EN 14366:2004
Ensign and EEZI-FIT have been tested to the criteria laid down in BS EN 14366:2004. Laboratory measurement of noise from waste water installations at the IBP laboratory in Stuttgart. A number of test reports are available.

CEMARS
Certified Emissions Measurement And Reduction Scheme. Certificate Number 2016053J. CEMARS certification demonstrates the Company's commitment to measuring, managing and reducing greenhouse gas emissions in a robust and credible way.

BES6001
Responsible Sourcing of Construction Materials. Kitemark Licence: BES600635

Summary of applicable standards

STANDARDS
European Standard BS EN 877:1999
This Product Standard applies to cast iron pipework elements used for the construction, normally as gravity pipe systems, of discharge systems for buildings and of drains. The range of nominal diameters extends from DN40 to DN600 inclusive. This standard specifies the requirements for the materials, dimensions and tolerances, mechanical properties, appearance and standard coatings for cast iron pipes, fittings and accessories. It also indicates performance specifications for all components, including joints. It covers, above ground soil, waste, rainwater and buried systems and performance requirements in these applications.

Product Standards
ISO 6594: International standard for socketless drainage systems in cast iron.

BS EN 681/ISO 4633: Specification for elastomeric seals for joints in pipework and pipelines.

Codes of Practice Standards
BS EN 12056-2: Code of practice for gravity drainage systems inside buildings – sanitary pipework.

BS EN 12056-3: Code of practice for gravity drainage systems inside buildings – for drainage of roofs.

BS EN 752-1: Code of practice for drain and sewer systems outside buildings.

Euroclasses		
A1	-	-
A2	s1	d1
A2	s2 s3	
B	s1 s2 s3	d0 d1
C	s1 s2 s3	d0 d1
D	s1 s2 s3	d0 d1
Classes other than E-d2 and F		

Sub-Class SMOKE production
s1: Low smoke production
s2: Medium smoke production
s3: High smoke production

FLAMING DROPLETS sub-classification
d0: No flaming droplets
d1: Flaming droplets that persist for less than 10 seconds
d2: Flaming droplets

A1
Classified

Why specify cast iron above ground

Fire safety and comfort

The following two concepts are applied as regards to fire safety:

1. Reaction to fire

Ensign and EEZI-FIT cast iron drainage systems are manufactured to a harmonised European standard BS EN 877 and as such, since July 2013 are required to be CE marked by law. The CE mark, whilst not a quality standard, is a self declaration of product performance with the exception of reaction to fire, which requires a mandatory certificate by independent testing at a recognised fire testing centre.

A summary of the Declaration of Performance (DoP) for the Ensign and EEZI-FIT ranges is shown on page 99 or available from our website www.saint-gobain-pam.co.uk. The Ensign and EEZI-FIT ranges were tested by Exova Warringtonfire to the requirements of BS EN 13501-1 incorporating: BS EN 1182, BS EN 1716, BS EN 13823 and achieved A1 Euroclass classification rating.

To support the CE mark Saint-Gobain PAM UK cast iron drainage systems carry the BS Kitemark to the product standard:

- Our system complies with all 27 clauses of the standard
- We are periodically audited by BSI
- This gives you the ultimate quality guarantee

Many buildings are not protected enough against fire hazards. It means that fire can spread rapidly, destroy the building in a short time and, more importantly, jeopardise the lives of the occupants. When a fire breaks out, the first objective is to slow down its spreading both horizontally and vertically. Drainage systems should be selected so that they restrict the passage of fire and do not feed it.

2. Fire resistance

It is a construction component's ability to withstand fire for a given period of time and to retain its serviceability in the event of fire. If a fire breaks out, it is essential to prevent any early collapse of the structure, and then to limit the extent of the damage, so as to ensure that occupants can be evacuated and/or the belongings will be protected.

Compartmental principles

Fire Safety Regulation for buildings is based on compartmental principle. Within a building, a compartment is a fire rated space designed to stop fire spreading for a given period of time. Above ground drainage systems as part of the building services (unless in a protected shaft), will pass through the separating wall/floor and as such must comply with the following:

- Building Regulations Approved Doc B
- Section 10: Protection of openings and fire stopping
- 10.5 openings for pipes in conjunction with Table 14

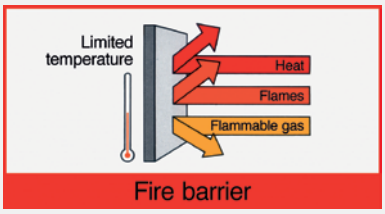
Multi-storey high rise buildings present several unique challenges not found in traditional low rise buildings – in particular longer egress times and distance, influencing evacuation strategies, considerations for accessibility for the fire department, smoke movement and fire control. The multiple floors of high rise buildings can create the cumulative effect of requiring a great number of people to travel great vertical distances in order to evacuate the building. Ensuring maximum fire protection and minimising the generation of toxic smoke has to be one of the highest priorities for the designer – to safe guard the occupants of the building.

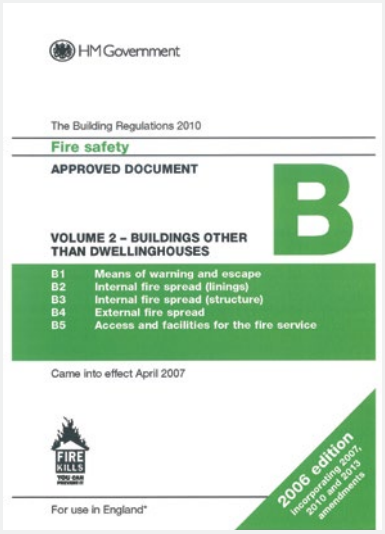
Therefore when specifying drainage systems for high rise buildings:

1) Specify non-combustible products wherever possible
2) Specify products which generate minimal smoke when exposed to fire
3) Specify products which will not feed a fire
4) Specify products that will give the occupants maximum time to evacuate the building
5) Specify products which are classified A1

Cast iron meets these requirements

Visit: www.saint-gobain-pam.co.uk





Why specify cast iron above ground

Fire safety and comfort

Waste water drainage systems and fire stopping requirements

Drainage systems passing through structures designed to withstand fire, should not provide open breaches. For a given time, specified in the applicable regulations, they should not allow the passage of fire, smoke, heat or combustion products from one compartment to the other.

For plastics, the fire-stopping rule consists in "plugging the hole". This function is achieved by using fire collars recommended by the manufacturers. Plastic materials which are highly sensitive to heat will not withstand the fire, and will not remain in place, even in the case of a contained fire.

As shown by the "Burning Question" laboratory tests in Germany, if the fire collars are not activated (particularly when installed under the fire compartment) they could pose a potential risk for fire to spread downwards in a multi-storey building. Some types of plastic material (eg. HDPE and Polypropylene) when exposed to fire generate molten droplets, which could potentially spread a fire down through the building.

Cast iron systems

Building Regs Doc B states the following: alternative A – non-combustible material; maximum nominal internal diameter up to 160mm; 10.6 – provide a propriety sealing system which has been shown by testing to maintain the fire resistance of the wall, floor or cavity barrier. Our systems require only a simple sealing material such as mortar and therefore reduces the need for a secondary process, such as fitting expensive fire collars thereby reducing installation time, labour and overall cost.

Key points for fire-stopping detailed in the building regulations are:

10.17b – all pipes openings should be: kept to as few as possible; and kept as small as practicable; and fire-stopped

10.19 – proprietary fire-stopping and sealing systems (including those designed for service penetrations) which have been shown by test to maintain the fire resistance of the wall/floor include: cement mortar and gypsum-based plaster

Saint-Gobain PAM has and will continue to periodically test their cast iron drainage systems with standard mortar penetrations and other solutions in order to understand the potential effect of fire on its integrity, resistance and overall performance.

Cast iron drainage systems are robust and have a 4 hour structural integrity so should not collapse causing potential danger to evacuating people or fire fighters.

The performance level of fire resistance will be influenced by a number of factors: the pipe diameter, the thickness of the floor or wall, size of the penetration void, material used to seal the void and even the stack configuration through the penetration.

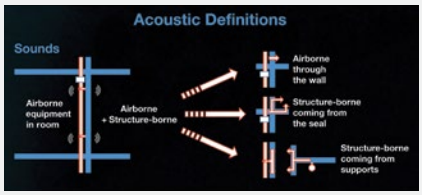
Considerations for building design – to insurers

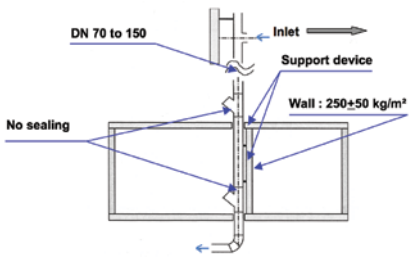
A report published to insurers entitled "Modern Methods of Construction and Fire Protection Considerations" by the FPA (Fire Protection Association) detail design guidance.

Some objectives noted from Table 1: To minimise the effect of fire on the business; To limit the effect of business interruption; To allow a business to be trading within 24 hours of a fire.

The report highlights some essential principles	Cast Iron
• Use building materials which will not make a significant contribution to a fire at any stage of its growth	✓
• Design a building's structure to have a resistance to collapse or excessive deflection in the event of a fire	✓
• Construct a building in such a way as to minimise the extent of fire and smoke damage in the event of fire	✓

At the time of going to print we recognise that fire safety in buildings and fire testing is under review and it is likely that the performance requirements may be revised. Therefore, if you have any questions our technical team can provide guidance and help you select the right configuration for optimal performance tel: 01952 262529





Pipe internal diameter (mm)	70-80	100-125	150
Upper flow rate (l/s)	1	4	8

Why specify cast iron above ground

Acoustics

Noise in buildings is considered to be detrimental to health and the quality of life. Efforts have been made in the last 30 years to attenuate the sounds coming from the street, worsening the perception of the sounds emitted within the buildings. Heat insulation policies aiming at reducing energy consumption will also heighten these perceptions.

Among the priority criteria in the comparative performances of drainage materials, acoustic performance is considered to be second only to fire safety: cast iron pipe systems have intrinsic acoustic properties. Owing to its density and the development in accessories equipment, they offer outstanding performances.

Pipe systems and equipment noise

Noise emitted by waste water pipe systems is classified under the regulation in the equipment noises.

Noise originating from pipe systems is due to the sound energy produced by water/air turbulence, but mostly by the mechanical effect of the water-flow on the internal pipe walls.

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Noise and regulations requirements

Noise is an energy affecting air pressure and is transmitted through vibration. Sound is measured in decibels (dB) using a nonlinear scale. For noise from equipment apparels, the following categories are identified and measured:

- Airborne noise: air vibrations that are propagated.
  In the case of waste water pipe systems, this noise is mainly heard in the room where the pipe is located. When a material is dense and thick, the pipe walls prevent air transmission; as is the case with cast iron which offers intrinsic acoustic properties
- Structure-borne noise: vibration of a building's structure.
  This noise will be noticed in rooms adjacent to the pipe. When the noise produced in a pipe is not transmitted by the air, the residual noise is transmitted by structural vibrations. Whilst the mass of the cast iron limits the vibratory level, the junctions and fixing to the building will propagate noise. Objective: dampen the vibrations at the connections with the solid structure

BS EN 14366:2004

A new standard introduced to provide manufacturers of all drainage materials with a simple testing criteria (see diagram left). The results recorded should be comparable and allow the specifier to make a more informed choice.

Ensign was the first UK drainage system to be tested to this new European Standard, carried out on the complete range of Ensign bracketry, providing independent assessed results. EEZI-FIT has also been tested.

Conclusion of tests

All brackets within the Ensign range meet the requirements of BS 8233*. For exceptionally low levels of acoustic performance, the standard ductile iron bracket fitted with an acoustic dampener should be used (see table on page 9).

Comparing systems

Please note: When comparing Ensign and EEZI-FIT to alternative systems – ensure comparing the same flow rate, and number or brackets used in the tests (eg. 2). For vertical stacks, Ensign often requires only one bracket per 3 metres, therefore acoustic performance will be even better in this instance.

*BS8233 – Code of Practice 'Sound Insulation and Noise Reduction for Buildings'.

Why specify cast iron above ground

Acoustics

Saint-Gobain PAM's solutions

Vibrations transmitted to the building structure are dampened by installing "sound absorbers" and by combining:

- Couplings equipped with elastomer sealing gaskets, which reduce metal to metal contact, and prevent the transmission of vibrations
- If required, rubber lined insulating brackets or for exceptional performance ductile iron brackets fitted with acoustic dampeners

Saint-Gobain PAM conducted a series of comparative tests on airborne and structure-borne noises in installation conditions, described by standard BS EN 14366 at the Fraunhofer Institute for Building Physics in Stuttgart.

As all manufacturers of waste water pipe systems apply the standard test protocol, it allows building project managers to compare their results.

Test results for the PAM pipe systems, in accordance with standard BS EN 14366 carried out on 100mm diameter pipes:

Waste water systems Ensign and EEZI-FIT - (100mm diameter) wall density 220kg/m²						
Flow rate l/s	AIRBORNE SOUND			STRUCTURE-BORNE SOUND		
	2.0	4.0	8.0	2.0	4.0	8.0
Ensign pipework fitted with two brackets – iron bracket EF048	45	48	54	27	32	34
Iron bracket fitted with acoustic dampener EF048AD	45	47	54	5	11	19
Ensign EEZI-FIT system fitted with two brackets – iron bracket EF048	45	48	51	23	28	36
Iron bracket and dampener EF048D	45	48	51	4	9	17
For test results on 150mm Ensign or further details on the tests, please contact Mike Rawlings on 01952 262502, or email mike.rawlings@saint-gobain.com						

For installation guidance on acoustic dampeners see page 70.

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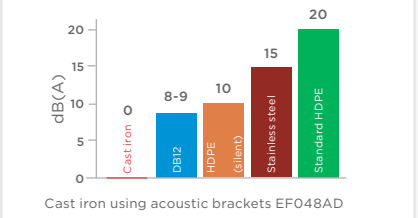
Ensign and EEZI-FIT cast iron silences its rivals

This exceptionally low level of noise transmission outperforms any other material by up to 10dB(A) for structure-borne noise and 4-5dB(A) for airborne noise. To put this into perspective, 4-5dB(A) equates to noise x 2, or a plasterboard supplier quotes "in order to increase the sound insulation of a solid partition wall by 4-5dB(A) the mass must be doubled".

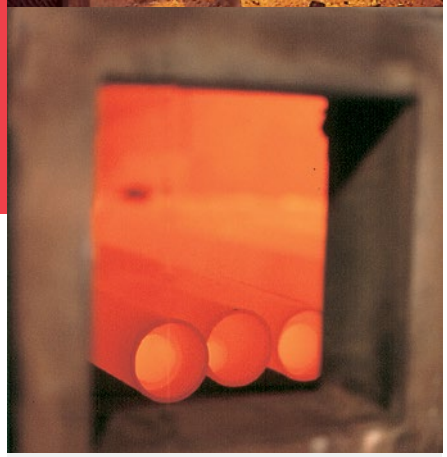
Material comparisons – THE DIFFERENCE



Cast iron using acoustic brackets EF048AD

Ensign avoids the hidden costs

When comparing costs of drainage materials, we have always stressed the need to factor in the total installed costs – when it comes to acoustic performance it becomes even more important. Specifying Ensign means there is significantly more opportunity to save money on acoustic insulation and, more importantly, all other systems require a significantly greater amount of insulation to match the performance of Ensign.



Why specify cast iron above ground

Robustness and mechanical strength

Pipe system components must withstand hazards before they reach the job site, such as accidental impact before and during installation, during storage, handling and transit. In service, outdoor exposed pipes may be damaged by accidental impacts or vandalism.

Impact strength and crush resistance

Cast iron is well-known for its robustness. The quality of PAM products is ensured by careful control of both metal composition and manufacturing process. The spinning of pipes in the De Lavaud process, followed by heat treatment, gives these products outstanding mechanical properties.

Key mechanical characteristics required by the standard EN 877 are controlled by three tests, carried out on pipes when coming out of the heat treatment furnace to assess tensile strength, ring crush resistance and hardness. In addition, operators have opted to maintain a further test which gives a good indication of the quality of heat treatment: the guillotine impact test.

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De Lavaud process

In this process, a constant flow of molten metal at a perfectly controlled temperature and composition is gradually input into a steel mould rotating at high speed. The external wall of the mould is cooled by circulating water and the evenly distributed molten metal cools on contact with the wall before extraction.

The process is characterised by its quick cooling that gives a finer solidification and thus, a more homogeneous metallurgical structure.

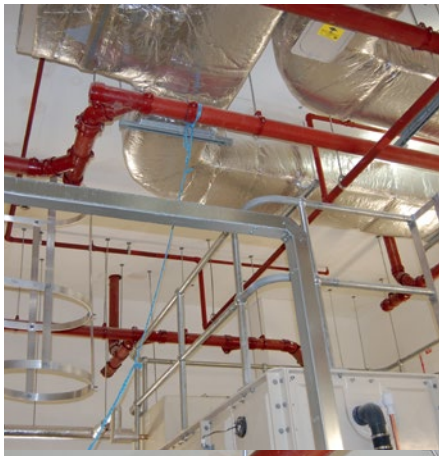
Heat treatment

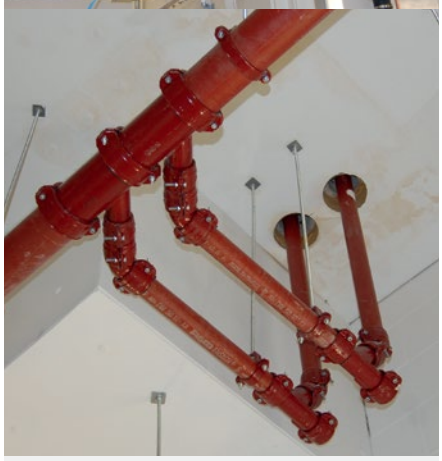
The spun pipes are placed and rotated in a heat treatment furnace at 950°C and then gradually cooled again. This step is essential to the process as it transforms the cast iron's metallurgical structure. The reduction of iron carbides and the increase of ferrite content considerably improve the mechanical properties of cast iron and reduce its surface hardness. The graphite of the cast iron resulting from the Saint-Gobain PAM process forms clustered graphite, halfway between lamellar and ductile iron.

The pipes	PAM pipes	BS EN 877
Tensile Strength on samples in MPa (average value)	300	200 min
Ring Crush Strength in MPa (average value, DN100 pipes)	470	350 min
Brinnell Surface Hardness in HB degree (average value)	205	260 max

These results demonstrate:

- Greater resistance to impact
- Greater resistance to crushing
- Easier to cut on site, making it easier to install than other cast iron systems





Why specify cast iron above ground

Longevity

There are two elements of an above ground drainage system that should be designed and specified to last the lifetime of the building:

1. The internal rainwater pipes
2. The soil discharge stacks

Even when a building is modernised every 15 or 20 years, these elements along with the structure, will likely remain. If the toilet or kitchen area is refurbished, the branch discharge pipes will often be renewed and therefore it may be appropriate to specify other materials for that element.

But if the main stacks are to be specified to last the lifetime of a building, perhaps 50-70 years or more, the appropriate material is cast iron, for it is one of few materials you can reasonably fit and forget, as recognised by specifiers on many of the PFI-type projects.

Ageing behaviour

As components that are integrated in buildings, waste water and rainwater drainage systems must remain in a serviceable condition over the long term in spite of adverse operating conditions. 'Ageing' refers to any gradual, irreversible change in a material's structure and/or composition, liable to affect its behaviour or serviceability. When a material is selected, the stability of its properties ensures operational reliability over time.

Stability of cast iron mechanical properties

The ageing of a material may be due to its own instability, to environment or chemical stresses, to mechanical strains, or a combination of any of those causes.

It is an established fact that cast iron offers long service, owing in particular to the stability of its mechanical properties over time.

- Its mechanical strength remains stable
- Its thermal expansion is very low compared to plastics
- Cast iron pipe systems are not liable to creep at operating temperatures
- Its ring stiffness (cold measurement) around 70 MPa is not affected by temperature and is 8 times that of PVC pipes, particularly appreciated for buried pipework
- Its longitudinal stiffness, which eases bracketing and protects water stream in horizontal sections, remains intact. Its Young modulus of elasticity is ranking from 80 to 120 GPa vs 2 to 5 GPa for PVC
- Cast iron's tensile strength is 8 times greater than that of PVC: 200 MPa vs 50 (residual resistance, 50 years according to the standards). This property is of utmost importance in case of network overloading

The properties of cast iron ensure the stability of systems and long lasting operational safety.

Why specify cast iron above ground

Resistance to thermal expansion

Most solids expand when they are heated and are liable to elongate under temperature increase. For pipe systems made of materials that are subjected to high levels of thermal expansion, precautions have to be taken at design stage.

Cast iron, which expands very little, does not require specific bracketing nor expansion collars. It makes the specifiers' design work easier and avoids extra cost at installation stage.

Thermal expansion coefficient of cast iron and other materials

The thermal expansion coefficient for cast iron – 0.01mm/m/°C – is very low and very similar to that of steel and concrete; the building and the pipe systems will move and will expand together. For cast iron, the bracketing system is designed to only carry the weight of the pipe and its content, which simplifies the design of the network. Plastic pipes expand considerably with increasing temperature. Their bracketing system must be designed and adapted accordingly, as it can deeply affect the stability of a pipework and its performances over time.

Thermal expansion of plastics

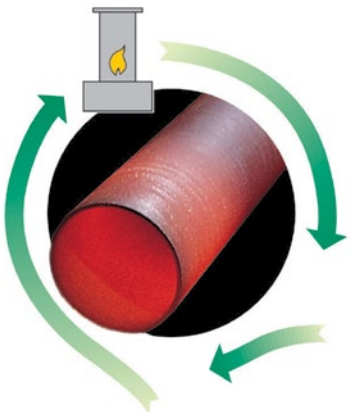
To allow expansion without damaging the drainage network, plastic pipe systems demand specific accessories – expansion collars or joints, brackets allowing axial movement, in general one of the two described.

If these precautions were not taken, expansion could be absorbed by the pipework and cause distortion.

Cast iron can do without these expensive accessories. It makes the design work easier and decreases the risk of mistakes at installation stage.

The properties of cast iron pipe systems are also valuable for engineering structures such as bridges where important expansions have to be carefully addressed to secure the construction project.

Thermal expansion of cast iron and other materials for a temperature rise of 50°C and 10m			
Thermal expansion coefficient			
0.0104mm/°C.m ➡ 5.2mm	**Cast iron**		
0.07mm/°C.m ➡ 35mm	**PVC**		**7 times more**
0.150mm/°C.m ➡ 75mm	**PP**		**14 times more**
0.02mm/°C.m ➡ 100mm	**HDPE**		**19 times more**



Why specify cast iron above ground

Internal pressure resistance

Internal overpressure in gravity drainage networks rarely occurs and is always accidental. Thrust efforts in the overloaded sections have to be addressed to guarantee both water tightness and mechanical stability.

As the robust cast iron components can address any pressure hazard, then the couplings will be submitted to the strain. The quality of the couplings and their careful selection according to their field of use will prevent misalignment or disconnection of the pipework.

Pressure resistance of couplings

- Low-pressure mechanical or push-fit (EEZI-FIT) couplings:
  Waste water drainage systems – which differ from rainwater drainage systems as regards pressure – are connected to sanitary appliances installed on each storey which may serve as outlets in case of accidental overloading (due to blockages, for example).
  The pressures that occur cannot therefore exceed the pressure corresponding to the height of one storey, ie. about 0.3 bars.
  The couplings we describe as "standard" are perfectly suitable for this common type of application
- High-pressure mechanical couplings:
  In some rare cases, a waste water drainage system may pass through a number of storeys without any outlet and there could be a risk of overloading (blockage due to operation or saturation of the sewer main). The pressure resistance required to ensure that these systems remain leak-tight and stable in such cases calls for high-pressure couplings able to withstand a pressure up to 10 bars

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Specific points of the pipework:

Some specific points on a pipe system may be subjected to thrust loads due to changes of direction and gradient, branches and plugs. To avoid any risk of disconnection or slippage of the pipe components, these loads must be addressed and the sections at risk must be anchored:

- A section of pipe may be held between two fixed points, by using ductile iron brackets for example
- Alternatively, a self-anchoring coupling or an ordinary coupling anchored with a grip collar can be used – see page 64

For full installation details, see the coupling section, page 55.

Environment

100% recyclable indefinitely without losing any of its properties

Cast iron is made from recycled raw materials and so saves natural resources. Unlike plastics, it can be completely and systematically recycled at the end of its life through processes that are not harmful to the environment.

PAM pipe systems can be recycled without any deterioration of their properties, so they can be reused for exactly the same purpose.
In other words, a pipe can be recycled as pipe. Owing to the stability of their mechanical properties, it is currently considered that the service life of PAM cast iron pipe systems is twice that of alternative products made of plastic materials.

Nothing is wasted: everything is recycled

Cast iron pipe systems are based on the principle of modular ranges of removable components. Their mechanical assemblies are reversible. You can change your mind today or even tomorrow. When pipe systems are disassembled or modified, these components can be reused.

Why specify cast iron below ground

Fit/forget drainage

Cast iron is often referred to as fit and forget material – impervious to degradation by UV light and most mechanical damage, including aggressive or careless maintenance. With a track record measured in centuries, cast iron is the only proven lifetime choice. Prestigious projects worldwide utilise cast iron systems, including multi-storey commercial and residential developments, retail parks, hospitals, schools, car parks and prisons, as prime examples.

Risk assessment – damage to buried pipe

To decide which of the three main types of material for below building use is appropriate, cast iron, vitrified clay and plastic, it is necessary to carry out a risk analysis. Most engineers would agree that the risk of settlement, sheer pressure and over zealous maintenance methods are potential problems more likely to take a clay or plastic system out of operation than a cast iron one. It can bridge major voids caused by settlement, resist sheer pressures and successfully take the internal knocks from the rodding.

Hazard	Vit clay	Plastic	Cast iron
Settlement	High risk	Med risk	Low risk
Sheer pressure	High risk	Low risk	Low risk
Rodding damage	Med risk	High risk	Low risk

Courtesy of GTA

The cost of failure

It is accepted that cast iron drainage systems will be least likely to fail in any situation. In order to establish when the use of cast iron drainage is most appropriate for any given application, it is best to consider the relative seriousness of the consequences arising from failure. Here a table has been compiled illustrating how such consequences may be compared under a series of different considerations.

Considerations	House or small commercial	Hospital or commercial/ residential	Retail store
People affected	Few	Many	Many
Potential losses	Low	High	High
Repair type	Cut in-situ slab or divert pipe	Cut RC slab	Cut RC slab
Consequences	Disturbance Noise Hygiene	Disturbance Noise Hygiene	Disturbance Noise Hygiene
Cost	Low	High	High

Courtesy of GTA

Ground movement

The demand for building land has resulted in the greater use of made-up land or other locations that may be subject to ground movement. Cast iron below ground offers greater resistance to such movement, and is less likely to fail in unfavourable conditions.

Less embedment

In areas where ground disturbance or extra loading is likely, other drainage materials may need additional protection, for example a covering concrete slab or a concrete surround. Cast iron needs no additional protection in most circumstances, saving time, labour and materials in construction (see page 88).

Red coated

Internal/external rainwater system

Soil and waste system

Suspended drainage system

Grey coated

Buried drainage system

Bridge drainage

Why specify Ensign

Complete pipe system – Kitemark approved to BS EN877

Ensign is the most comprehensive cast iron system on the market for above and below ground gravity drainage applications, offering the largest diameter range of up to 600mm in diameter all independently certified to the requirements of EN877.

When products are certified under Kitemark licence and are manufactured under ISO 9001 certified management systems you can be sure of consistent quality which is audited each year by the BSI inspectorate to ensure standards are maintained. Ensign provides the complete drainage solution for waste water systems transporting fluid waste from roof, through the building out and beyond.

The premier A1 fire safe solutions

Ensign and EEZI-FIT are fire classified A1. This means Ensign or EEZI-FIT provides the building owner and its occupants of high rise commercial and residential building with the highest level of fire safety.

The premier acoustic drainage systems

Cast iron has long been recognised for having excellent acoustic properties. Ensign and EEZI-FIT have been tested at the Fraunhofer Institute to BS EN 14366:2004 and have recorded the lowest level of acoustic measurement on the market significantly lower than acoustic plastic systems by 8-10 db(a)

Independent testing carried out in Holland by TVVL measuring areas that generate noise the most I.E where the pipe offsets or changes in direction – have confirmed 8 db(a) difference. When you consider 4 db(a) = noise x 2 the difference is significant.

High performing mechanical couplings

For gravity applications the Ensign systems are jointed by unique two-piece ductile iron couplings, which offer high performance and are quick and easy to install that incorporate iron nibs designed to provide built-in electrical continuity. These couplings will provide a level of pressure (see table page 57) which is based on accidental static pressure.

In applications where there is a requirement to withstand additional pressure Ensign offers two alternatives:

- A grip collar with over-clamps the ductile iron coupling which has the added benefit of being retro-fitted after the first install.
- High performance steel couplings capable of withstanding 10 bar

Push-fit couplings

For above ground EN877 PAM offer the EEZI-FIT push-fit range of fittings and couplings which gives all the inherent benefits of cast iron with the speed and simplicity of push-fit assembly.

For below ground applications Ensign is the only cast iron system to offer push-fit couplings in 100 and 150mm diameter to simplify installation and assist fast pipe laying in trenches.

Ductile Iron brackets

Versatile and strong ductile iron brackets which incorporate an elongated slot at the fixing point allowing adjustment without dismantling the pipe system.

The ductile iron brackets can be supplied with an acoustic dampener which eliminates the structural noise impact – to ensure Ensign and EEZI-FIT acoustically are the quietest systems on the market.

Compliance to BS EN12056 part 2 &3

The standard requires the use of a number of specified fittings to fully comply with its guidelines (see page 79).

- Swept branches from 70mm to 150mm required for discharge stacks – Ensign is the only cast iron system to offer the complete range and up to 200mm.
- Ensign also offer long tail swept fittings offer the flexibility of not having a joint in the slab.
- Access fittings to ensure the system can be maintain – Ensign has the widest range of access bends and branches.

Why specify Ensign

Flexible and economical connections to waste

The Ensign and EEZI-FIT ranges offer many solutions to connect waste pipes to the cast iron risers.

- Boss pipes with push-fit and BSP threaded connection
- Branches which can accommodate 50mm waste connections
- Various manifold fittings:-
- New multi-waste manifold
- Up to 6 low level waste connections (2" BSP)
- Extended spigot that will penetrate up to 400mm floor slab
- Ensign or EEZI-FIT push-fit versions

Ensign or EEZI-FIT?

Ensign being a mechanical system can accommodate higher pressures and can be used throughout the building and can be dismantled

EEZI-FIT is a push-fit gravity system designed for 0.5 bar sanitary applications and uses standard Ensign pipe

Interchangeable systems to BS EN 877

Both systems are manufactured to BS EN 877 and Kitemark approved and therefore can be used together. All Ensign fittings can be installed with EEZI-FIT couplings and connect with EEZI-FIT fittings for example a standard Ensign access pipe would be used at 1200mm in the stack to comply with BS EN 12056. PAM would recommend a mechanical coupling be used for this joint – to provide the future flexibility to dismantle if a change is required.

Easy access for maintenance

The Ensign system contains an extensive range of access fittings, providing ease of maintenance at vital points in the stack to relieve any blockages which may occur. The access door is contoured, specifically designed not to obstruct the flow of waste within the pipe system.

Superior internal coating for pipes

Ensign pipes for above and below ground applications, are now internally lined with a new two part epoxy (ochre in colour). The coating has been developed to provide greater performance against exposure to aggressive substances or high temperature waste, far exceeding the requirements stipulated in BS EN 877 (see coating – page 100). The epoxy coated fittings match the performance of the pipes.

Superior cast iron pipes

Ensign pipes are manufactured using the De Lavaud process which undergoes a rapid cooling stage followed by a specific dual heat treatment process which significantly improves its mechanical and impact resistant properties, and makes the pipes easier to cut.

Section 1

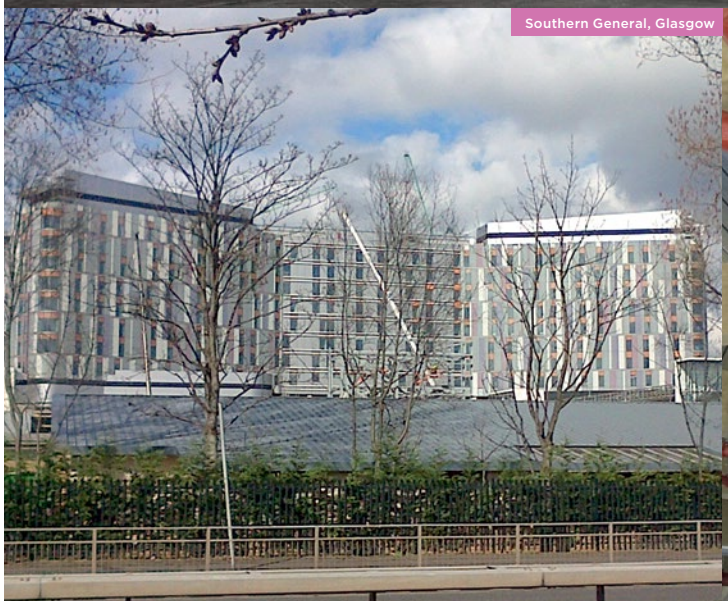
Pipes and Fittings Above Ground

Ensign cast iron drainage – 1st choice for hospitals

Strength and durability to maintain a safe environment, that's why the latest UK flagship hospitals all utilise Ensign to provide solutions for its sanitary drainage needs and rainwater systems.

- Non-combustible – will not burn, and drip molten droplets (like HDPE) or emit toxic smoke (like PVC) with smoke being recognised as the biggest killer in any fire
- Ensign cast iron is the quietest drainage solution on the market helping create a tranquil environment essential for recovering patients
- Ability to operate at high temperatures – up to 95°C
- High resistance to thermal expansion
- Dependable strength – minimising the risk of ward closure for repair or maintenance

QE Hospital, Birmingham



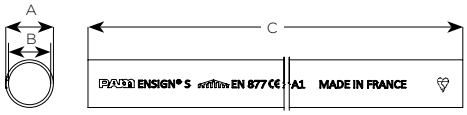
Southern General, Glasgow

Pipework installed on QE hospital

Section 1
Contents

Pipes Double Spigot

EP000



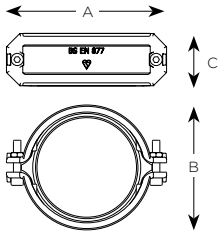
Product code	Dia	A Max O/dia	B Min I/dia	Min section	C Metre lengths available	Nominal wt/kg
156363	50	60	47.5	3	3	12.5
156455	70	80	68.25	3	3	17.0
156563	100	112	97.5	3	3	24.5
156736	125	137	121.87	3.5	3	34.3
156827	150	162	146.25	3.5	3	41.0
156951	200	212	195	4	3	67.4
157049	250	276.5	243.75	4.5	3	97.3
157114	300	328.5	292.5	5	3	126.8
157171	400	431	390	5	3	177.7
157187	500	534	487.5	5.2	3	230.0
157203	600	637	585	5.8	3	302.0

Pipes coated internally with a two part epoxy and externally with a red protective coating (see page 100).

Couplings

EC002
Two-piece iron coupling

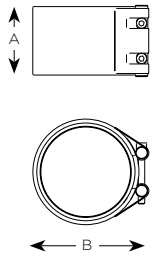
Ductile iron coupling with built-in electrical continuity



Product code	Dia	A	B	C	Nominal wt/kg
156398	50	113	79	58	0.6
156493	70	129	103	58	0.6
156634	100	170	137	58	0.8
156777	125	188	158	58	0.9
156888	150*	217	183	80	1.7
156998	200*	278	243	82	3.5
175552	250*	343	308	82	4.4
175510	300*	395	360	82	5.4

*150-300mm incorporates four socket bolts. Patent No. 2 305 481.
Nitrile gaskets will be considered on request, on a quotational basis.

EC002HP
High performance stainless steel

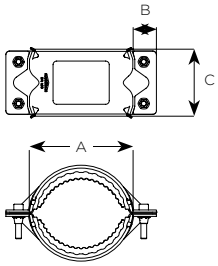


Product code with grip	Product code no grip	Dia	A	B	Nominal wt/kg
227336	228623	100	94	154	1.3
227338	228625	150	95	211	2.1
227339	228626	200	110	270	5.3
227340	228627	250	110	330	8.7
227351	228628	300	110	470	9.9
228629*	228629	400	142	520	7.1
228630*	228630	500	142	576	6.7
228631*	228631	600	142	635	7.6

Couplings technical section for applications (see page 59).
Capable of withstanding high pressure (up to 10 bar).

EC002GC
New grip collar

NEW



Product code	Dia	A	B	C	Nominal wt/kg
220750	100	145	33	93	0.9
221270	150	192	32	102	1.2
221271	200	252	32	118	1.7

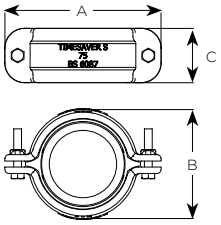
To overclamp the ductile iron coupling EC002 to give 5 bar pressure unrestrained.
See page 64 for assembly instructions.

Transitional Couplings

BS416 – GT12 – Ductile iron transitional coupling – Ensign to Timesaver

Product code	Dia	A	B	C	Nominal wt/kg
191429	70-75	158	110	55	1.0

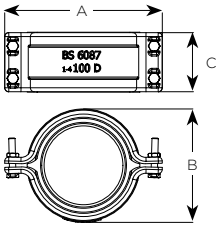
Timesaver coupling assembly. Black coated, incorporating two set screws and nuts, and transitional elastomer seal. For jointing 70mm Ensign system to 75mm Timesaver soil system BS 416. Black gasket with identity markings.



BS437 – TD02 – Ductile iron transitional coupling – Ensign to Timesaver

Product code	Dia	A	B	C	Nominal wt/kg
191297	100	203	140	75	2.8
191298	150	252	195	75	3.6

Timesaver drain coupling assembly. Black coated, incorporating four set screws and nuts, and transitional elastomer seal. For jointing Ensign system to Timesaver drain BS437. Transitional couplings incorporate black gaskets with identity markings.

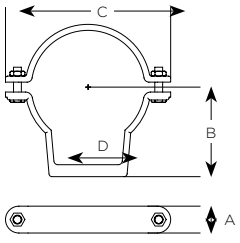


Brackets

EF048 – Ductile iron bracket

Product code	Dia	A	B	C	Nominal wt/kg
156408	50	27	64	110	0.3
156505	70	27	74	132	0.5
156646	100	27	90	166	0.6
156898	150	30	115	214	0.8
177745	200	35	150	266	1.6

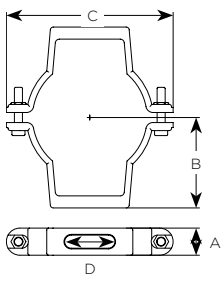
Elongated slot at fixing point (D) to ease fixing. Brackets for 125, 250, 300 and 400mm diameter (see mild steel brackets on page 21).



EF049 – Ductile iron bracket

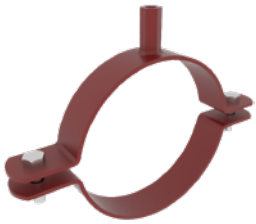
Product code	Dia	A	B	C	Nominal wt/kg
177744	100	27	90	166	0.8

Elongated slot at fixing point (D) to ease fixing.

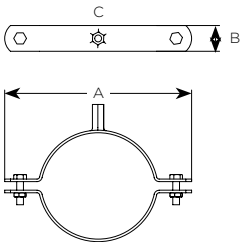


Brackets

EF048MS – Vertical mild steel bracket

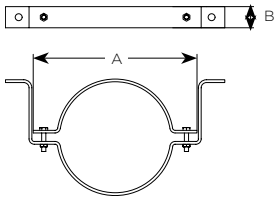


Product code	Dia	A	B	C	Nominal wt/kg
192259	125	247	20	M10	0.5



EF048MS – Stand-off mild steel bracket

Product code	Dia	A	B	Nominal wt/kg
192414	200	296	40	1.9
192260	250	371	40	2.3
192261	300	420	40	2.6
192362	400	555	40	3.2

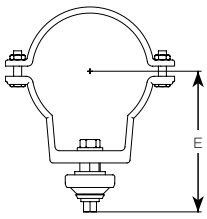


Acoustic Brackets

EF048AD – Ductile iron bracket with acoustic dampener

Product code	Dia	E	Nominal wt/kg
199881	50	112	0.3
199882	70	122	0.5
199883	100	138	0.6
199884	150	163	1.6

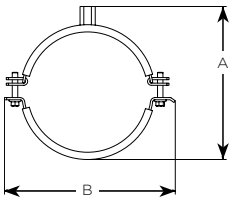
For exceptional acoustic performance see page 9 and installation advice page 70.



EF048MSL – Rubber lined steel bracket

Product code	Dia	A	B	Fixing bolt	Nominal wt/kg
251197	50	84-88	108	M6 x 20	0.1
251198	70	108-113	135	M6 x 25	0.2
251199	100	137-141	158	M8 x 35	0.3
251201	150	193-347	219	M8 x 45	0.6
251202	200	250-256	292	M10 x 40	1.2
251203	250	316-347	356	M10 x 40	1.4
251204	300	362	410	M12 x 40	2.9

Rubber lined steel brackets for use where extra sound insulation is required. 70mm available upon request.

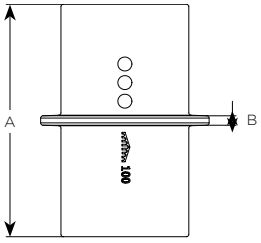


Stack Support Pipe

EF050

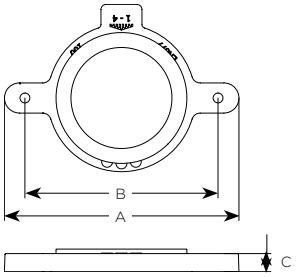
Product code	Dia	A	B	Nominal wt/kg
191856	70	220	8	1.6
191562	100	220	8	2.4
191563	125	220	8	3.2
191564	150	220	8	4.0
157014*	200	220	8	5.9
157097*	250	300	8	12.4
157160*	300	300	8	16.8

* Item supplied complete with bracket and seal (see dimensions below).



Stack Support Bracket

EF051 – Stack support bracket

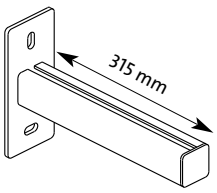


Product code	Dia	A	B	C	Nominal wt/kg
191857	70	215	170	20	1.1
191843	100	259	214	20	1.5
191844	125	275	228	20	1.7
191845	150	300	255	22	2.6
157014	200	362	310	22	3.5
157097	250	444	394	40	6.1
157160	300	498	448	40	14.0

Supplied with rubber sound deadening seal.
See page 69 for typical application.

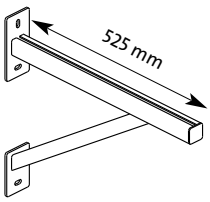
Consoles Support Brackets

EF052 – Cantilever arm



Product code	wt/kg
192329	2.0

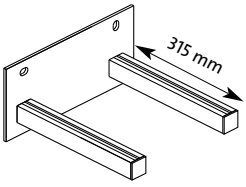
EF052 – Cantilever arm with support



For stack support pipes 200-300mm dia.

Product code	wt/kg
192330	4.3

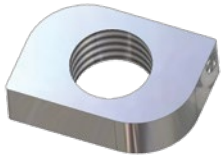
EF052 – Stack support console



To suit 100mm stack support bracket and pipe only.

Product code	wt/kg
192331	4.6

EF052 – 10mm retaining nut – to suit

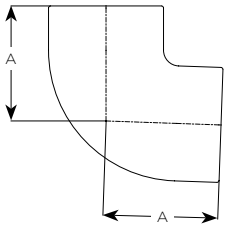


To be used with a 10mm set screw, to secure the stack support bracket to the cantilever arm.

Product code	wt/kg
192332	0.02

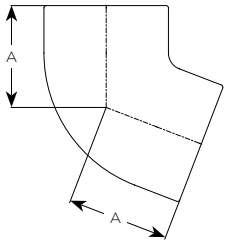
Bends Short

EF002 – 88° bend
• Short radius



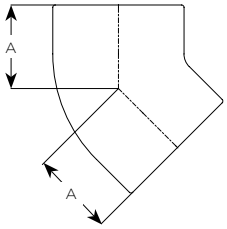
Product code	Dia	A	Nominal wt/kg
191437	50	75	0.7
191442	70	90	1.3
191447	100	110	2.2
191454	125	125	3.2
191459	150	145	3.9
191462	200	180	9.6
191463	250	220	17.3
191431	300	260	27.4

EF002 – 69° bend
• Short radius



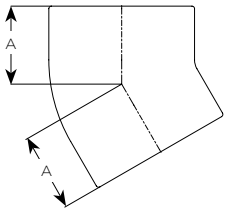
Product code	Dia	A	Nominal wt/kg
191436	50	65	0.6
191441	70	75	1.2
191446	100	90	2.1
191458	150	120	4.2
† 156968	200	145	7.8
† 157067	250	170	14.7
† 157132	300	200	20.0

EF002 – 45° bend
• Short radius



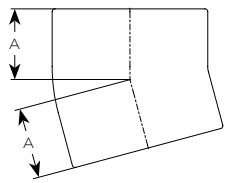
Product code	Dia	A	Nominal wt/kg
191435	50	50	0.6
191440	70	60	0.9
191445	100	70	1.6
191452	125	80	2.3
191457	150	90	3.0
191461	200	110	7.0
191464	250	130	10.9
191432	300	155	18.7
192335	400	247	35.0
† 192376	500	318	53.0
† 192377	600	350	92.0

EF002 – 30° bend
• Short radius



Product code	Dia	A	Nominal wt/kg
191434	50	45	0.5
191439	70	50	0.8
191444	100	60	1.7
191456	150	80	3.2
155933	200	95	7.0
† 155948	250	110	9.7
† 155960	300	130	15.5

EF002 – 15° bend
• Short radius

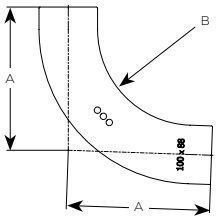


Product code	Dia	A	Nominal wt/kg
191433	50	40	0.4
191438	70	45	0.7
191443	100	50	1.3
191455	150	65	2.7
155932	200	80	4.6

† Available to order.

Bends Medium, Long Radius

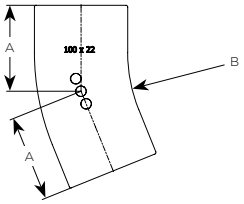
EF02L – 88° bend
• Medium and long radius



Product code	Dia	A	B	Nominal wt/kg
191549	100	269	180	4.3
191550	150	274	150	10.1

Bend with heel rest available grey only (see 48).

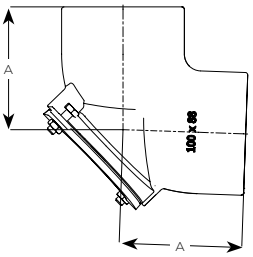
EF02L – 22° bend
• Long radius



Product code	Dia	A	B	Nominal wt/kg
191548	100	90	180	1.7

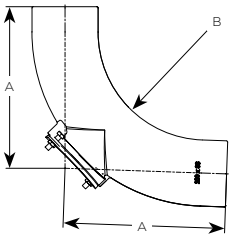
Bends Medium, Long Radius Door Back

EF005 – 88° bend
• Short radius door back



Product code	Dia	A	Nominal wt/kg
156472	70	90	1.8
156589	100	110	3.3
156845	150	145	6.1

EF05L – 88° bend
• Medium and long radius door back

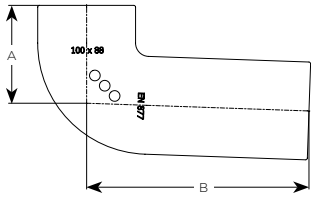


Product code	Dia	A	B	Nominal wt/kg
156607	100	269	180	5.5
192357	150	274	150	11.4

Bends Long Tail

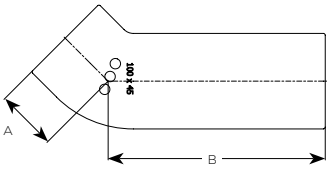
EF055 – 88° bend
• Long tail

Product code	Dia	A	B	Nominal wt/kg
191567	100	110	250	4.2



EF055 – 45° bend
• Long tail

Product code	Dia	A	B	Nominal wt/kg
191566	100	70	250	4.0

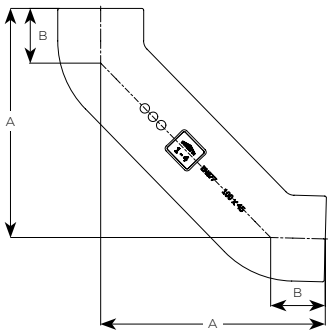


Bends Long Tail

EF054 – 88° bend
• Long tail double bend

Product code	Dia	A	B	Nominal wt/kg
191837	70	273	60	3.1
191838	100	291	70	4.4

88° – short double bend available on request.

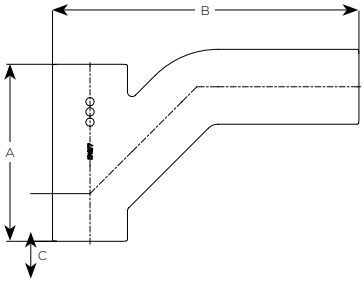


Branches Single Long Arm

EF008 – 45° branch
• Single long arm

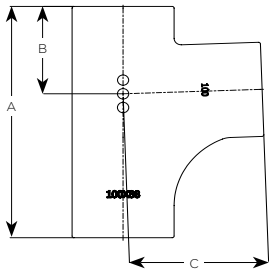
Product code	Dia	A	B	C	Nominal wt/kg
156726	100 x 100	260	450	70	6.3

Typical application (see page 81).



Branches Single Radius – Swept

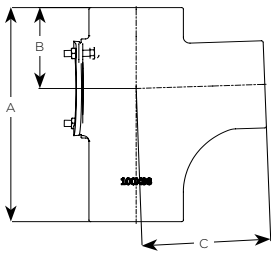
EF06R – 88° single branch
• Swept Radius curve



Product code	Dia	A	B	C	Nominal wt/kg
156539	70 x 70	210	80	130	2.2
156611	100 x 50	204	90	120	2.4
156612	100 x 70	221	90	142	2.7
156696	100 x 100	270	102	150	3.5
156869	150 x 100	300	117	202	7.6
156926	150 x 150	400	140	260	12.5
156985	200 x 150	428	157	283	13.0
157025	200 x 200	478	182	293	21.0

See design guidance in accordance with BS EN 12056-2 (see page 79).

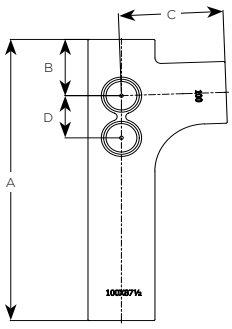
EF07R – 88° branch with access
• Swept Radius curve



Product code	Dia	A	B	C	Nominal wt/kg
156540	70 x 70	210	80	130	2.5
156614	100 x 50	204	90	120	3.0
156621	100 x 70	221	90	142	3.5
156697	100 x 100	270	102	150	4.3
156875	150 x 100	300	117	202	10.4
156927	150 x 150	400	140	260	13.9

See design guidance in accordance with BS EN 12056-2 (see page 79).

EF096 – 88° branch
• Single long tail
• Swept Radius curve

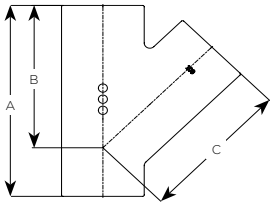


Product code	Dia	A	B	C	D	Nominal wt/kg
208644	100 x 100	500	100	172	75	9.9

4 x 50mm push-fit boss positions.
To make boss connections see page 80.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).
See design guidance in accordance with BS EN 12056-2 (see page 79).

Branches Single Equal And Unequal

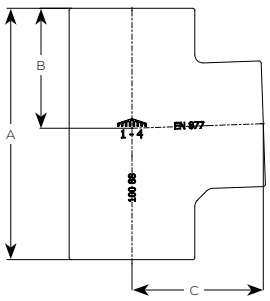
EF006 – 45° branch



Product code	Dia	A	B	C	Nominal wt/kg
191467	50 x 50	185	135	135	1.4
191470	70 x 50	170	130	130	1.8
191473	70 x 70	200	145	150	1.9
191477	100 x 50	200	165	165	2.4
191480	100 x 70	215	170	170	2.7
191483	100 x 100	275	205	205	3.8
191488	125 x 70	225	185	185	4.0
191489	125 x 100	270	210	210	5.3
191491	125 x 125	305	230	230	5.6
191494	150 x 70	235	205	205	5.1
191495	150 x 100	295	240	240	6.1
191498	150 x 125	315	245	245	7.5
191500	150 x 150	355	265	265	9.0
191502	200 x 100	300	260	260	10.3
191503	200 x 150	375	300	300	13.2
191504	200 x 200	455	340	340	17.3
† 157073	250 x 100	330	315	315	13.6
† 157075	250 x 150	405	350	350	17.3
† 157078	250 x 200	480	390	390	24.3
191507	250 x 250	560	430	430	32.2
† 157138	300 x 100	350	345	345	19.3
† 157140	300 x 150	415	380	380	23.2
† 157141	300 x 200	485	415	440	28.4
† 157142	300 x 250	580	465	465	37.2
191465	300 x 300	660	505	505	54.8
192338	400 x 300	660	555	565	55.3
192336	400 x 400	835	645	645	82.5
† 192378	500 x 500	1020	790	790	175.0
† 192379	600 x 600	1180	920	920	215.0

Additional reducing branches (large diameter) available upon request.
† Available to order.

EF006 – 88° branch tee

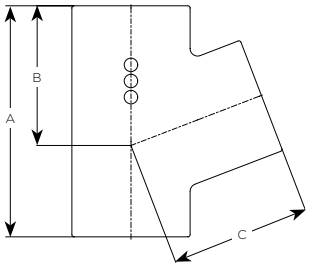


Product code	Dia	A	B	C	Nominal wt/kg
191469	50 x 50	145	66	80	1.0
191472	70 x 50	155	72	90	1.6
191475	70 x 70	180	83	95	1.5
191479	100 x 50	170	76	105	2.3
191482	100 x 70	190	88	110	2.5
191485	100 x 100	220	105	115	2.7
191490	125 x 100	235	110	130	4.0
191492	125 x 125	260	123	135	4.2
191499	150 x 125	275	128	150	5.8
191501	150 x 150	300	142	155	5.8
191505	200 x 200	380	180	200	12.8
191508	250 x 250	468	228	243	22.6
191466	300 x 300	530	265	265	35.5

See design guidance in accordance with BS EN 12056-2 (see page 79).

Branches Single Equal And Unequal

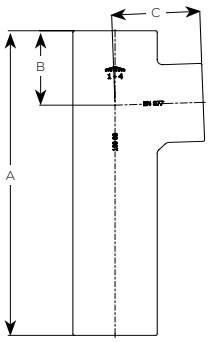
EF006 – 69° branch



Product code	Dia	A	B	C	Nominal wt/kg
191468	50 x 50	135	80	80	1.0
191471	70 x 50	145	90	90	1.4
191474	70 x 70	170	100	100	1.7
191478	100 x 50	155	100	110	2.2
191481	100 x 70	180	110	120	2.7
191484	100 x 100	215	130	130	2.7
191496	150 x 100	235	150	155	5.1

Branches Single – Tee – Long Tail

EF056 – 88° branch tee
• Long tail



88° branch • Long tail – EF056

Product code	Dia	A	B	C	Nominal wt/kg
191568	100 x 100	430	105	115	7.0

45° branch • Long tail – EF056

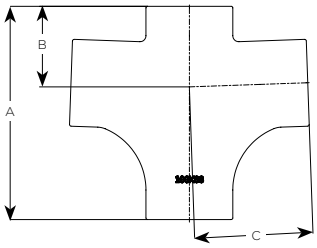
Product code	Dia	A	B	C	Nominal wt/kg
156723	100 x 100	445	205	205	5.5

Branches Double

EF010R – 88° double branch
• Swept Radius curve

Product code	Dia	A	B	C	Nominal wt/kg
157643	100 x 100	270	102	150	4.2
156862	150 x 100	300	115	200	10.9

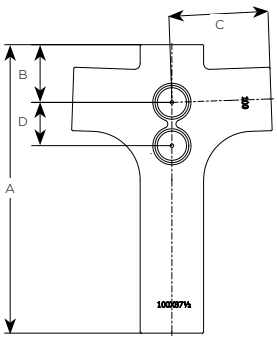
See design guidance in accordance with BS EN 12056-2 (see page 79).



EF097 – 88° branch
• Long tail
• Swept Radius curve

Product code	Dia	A	B	C	D	Nominal wt/kg
208653	100 x 100	500	100	172	75	10.2

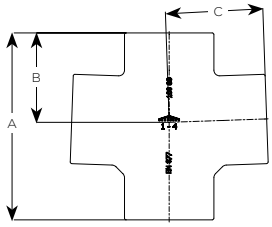
4 x 50mm push-fit boss positions.
To make boss connections see page 80.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).
See design guidance in accordance with BS EN 12056-2 (see page 79).



EF010 – 88° double branch tee

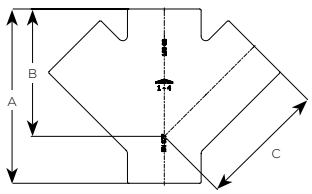
Product code	Dia	A	B	C	Nominal wt/kg
155825	100 x 50	170	76	105	2.2
† 155826	100 x 70	190	88	110	2.7
191511	100 x 100	220	105	115	3.3
155907	150 x 100	245	115	145	7.1

† Available to order.



EF010 – 45° double branch

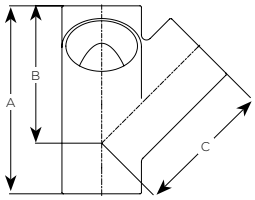
Product code	Dia	A	B	C	Nominal wt/kg
191509	100 x 100	260	190	190	4.0
191512	150 x 100	280	225	225	8.4
191513	150 x 150	355	265	265	12.6
191514	200 x 200	455	340	340	24.0



Branches Corner

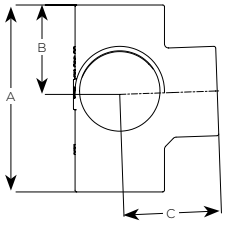
EF035 – 45° corner branch

Product code	Dia	A	B	C	Nominal wt/kg
156716	100 x 100	260	190	190	5.2



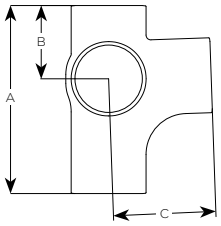
EF035 – 88° corner branch tee

Product code	Dia	A	B	C	Nominal wt/kg
191558	100 x 100	220	105	115	3.5
155919	150 x 100	245	115	145	6.7



EF035R – 88° corner branch swept radius curve

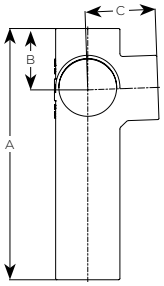
Product code	Dia	A	B	C	Nominal wt/kg
264739	100 x 100	275	107	150	4.4



EF036 – 88° corner branch tee

- Long tail

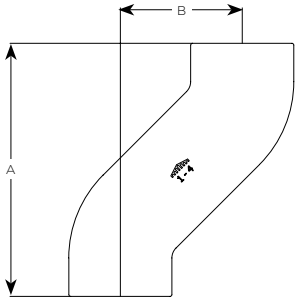
Product code	Dia	A	B	C	Nominal wt/kg
191559	100 x 100	430	110	120	6.8



Offsets

EF024 – Offsets

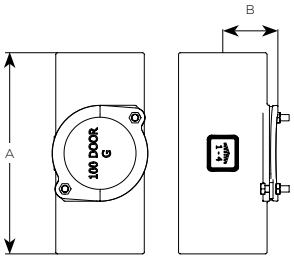
Product code	Dia	A	B	Nominal wt/kg
191526	100	75	215	2.9
191525	70	130	250	2.2
191527	100	130	270	3.1



Access Pipes

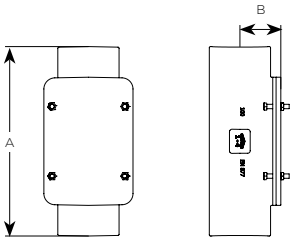
EF014 – Round door

Product code	Dia	A	B	Nominal wt/kg
191516	50	175	60	1.3
191517	70	205	65	2.0
191518	100	250	80	3.1
191519	150	280	110	6.2



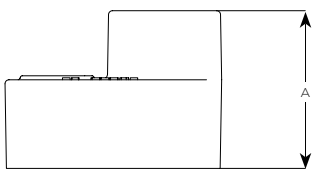
EF015 – Rectangular door

Product code	Dia	A	B	Nominal wt/kg
191840	100	320	80	6.7
191521	125	355	93	9.0
191841	150	395	105	12.2
191522	200	475	140	20.2
191523	250	540	160	38.5
191520	300	610	190	50.0



Tapered Pipes

EF028 – Tapered



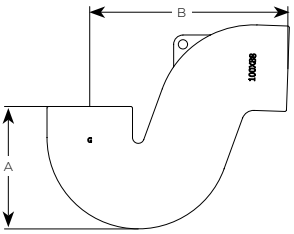
Product code	Dia	A	Nominal wt/kg
191532	70 x 50	75	0.5
191533	100 x 50	80	0.9
191534	100 x 70	85	0.9
191537	125 x 100	95	1.6
191538	150 x 50	90	1.7
191539	150 x 70	100	1.8
191540	150 x 100	105	1.9
191541	150 x 125	110	2.0
191542	200 x 100	115	3.5
191544	200 x 150	125	3.3
191545	250 x 100	122	5.5
191546	250 x 150	135	6.3
191547	250 x 200	145	6.5
191529	300 x 150	150	9.9
191530	300 x 200	160	10.1
191531	300 x 250	170	12.2
157163	400 x 300	200	20.0
157184	500 x 400	-	-
-	600 x 500	-	-

To connect 250mm and 200mm to 225 Timesaver Drain, use TD41 (see section page 148).

Traps

EF034 – Plain

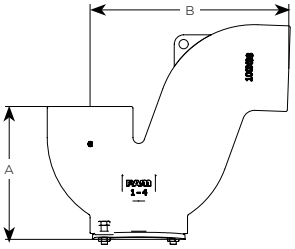
Product code	Dia	A	B	Nominal wt/kg
156666	100	255	160	4.5



EF037 – Plain with access bottom

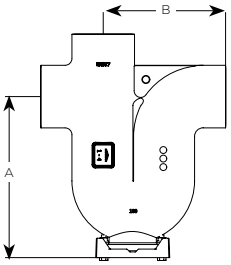
Product code	Dia	A	B	Nominal wt/kg
156419	50*	160	115	2.0
156518	70	200	138	2.7
156667	100	255	175	5.2
156911	150	350	240	12.1

*Supplied without support lug.



EF080 – Branch traps

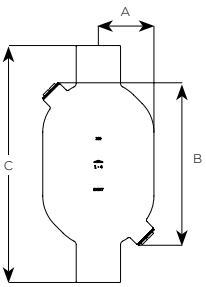
Product code	Dia	A	B	Nominal wt/kg
191587	100	215	282	10.2



EF081 – Stench trap

Product code	Dia	A	B	C	Nominal wt/kg
155841	100	138	408	588	18.5
155921	150	187	522	742	38.0

Typical application (see page 82).

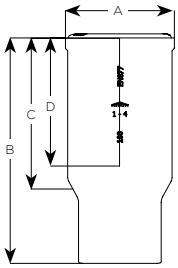


Connectors Movement

EF058 – Push-fit connectors which accommodate building settlement

Product code	Dia	A	B	C	D	Nominal wt/kg
192304	100	145	300	200	170	4.3
156235	150	202	310	200	170	8.2

Allows total 170mm movement.
See page 81 for typical design applications.

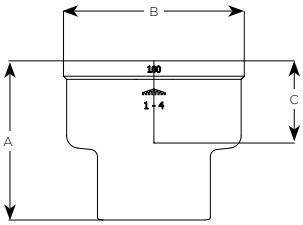


Connectors And Pipes – Transitional

EF059 – Transitional connector

Product code	Dia	A	B	C	Nominal wt/kg
156650	100	155	176	80	2.9
156902	150	155	232	80	4.8

To connect Earthware, WC, Stoneware, Traditional, Soil/Drain etc.

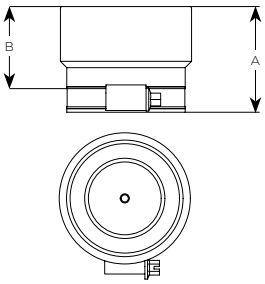


Connectors Universal

EF071R – Universal connector

Product code	Dia	A	B	Nominal wt/kg
155759	50	60	40	0.1

Accommodates 56/48/40 OD waste connections.

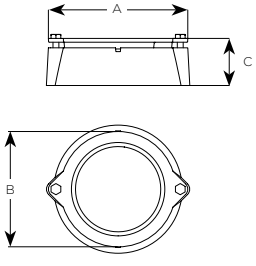


Connectors Roof

EF073 – Roof connectors for asphalts

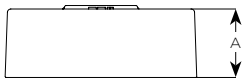
Product code	Dia	A	B	C	Nominal wt/kg
191581	100	185	170	72	2.1

See page 82 for typical design applications.



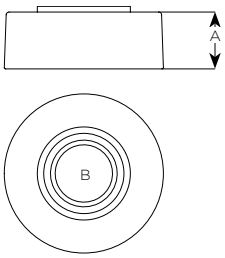
Blank Ends

EF070 – Plain



Product code	Dia	A	Nominal wt/kg
191570	50	30	0.4
191571	70	35	0.6
191572	100	40	0.8
191573	125	45	1.1
191574	150	50	2.0
191575	200	60	3.2
191576	250	70	5.7
191569	300	90	10.3

EF071 – Push-fit connection

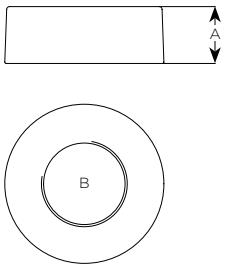


Product code	Dia	A	Nominal wt/kg
191577	70	35	0.6
191578	100	40	1.0
191580	150	50	2.0

To connect, 50mm diameter Ensign to PVC, use new Rubber Universal Connector EF071R (see page 33).

B = rubber grommet which accommodates 50mm waste UPVC or copper.

EF071T

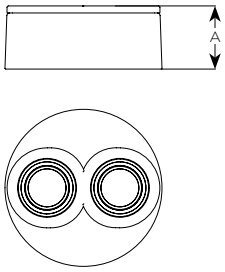


B = D/T 50mm BSPT

Product code	Dia	A	Nominal wt/kg
191579	100	40	1.0

To connect to UPVC/copper waste use 50mm/2" BSPT male iron adaptor.

EF077



Product code	Dia	A	Nominal wt/kg
191585	100	50	0.4

Two rubber plugs to accommodate 38/32mm dia waste.
Suitable for push-fit connection to plastic/copper waste.

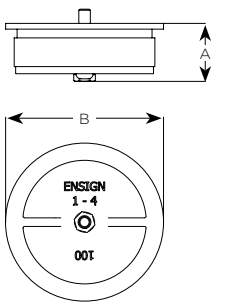
Replacement plugs can be supplied on request.

Expansion Plugs

EF074

Product code*

* 

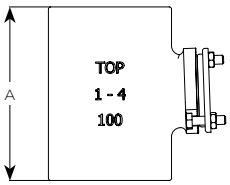


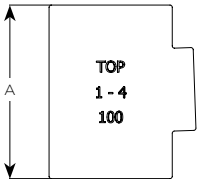
Product code	Dia	A	B	Nominal wt/kg
156374*	50	48	64	0.4
191582	70	40	78	0.4
191583	100	42	110	0.7
191584	150	42	156	1.5
156961*	200	100	218	4.1
157060*	250	93	284	6.0
157125*	300	100	336	9.1

* Depicts product design type.

Boss Pipes

EF090 – Single boss
- With boss at 88°
- Compression 50mm





Product code	Dia	A	Nominal wt/kg
156371	50	150	1.2
156460	70	146	1.6
156573	100	155	2.1
156836	150	175	3.8

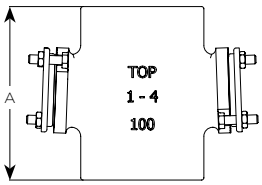
'O' Ring rubber compression fit.
Connects 50mm copper or UPVC waste. To connect 32/38mm waste pipes (see page 74).
Plastic moulded protection caps EF093, for blanking off push-fit boss connections. Size 50mm x 30mm. Order product code 192255.

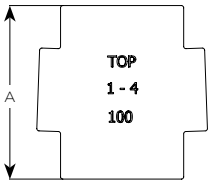
Single boss with drilled/tapped 2" BSP boss – EF090T

Product code	Dia	A	Nominal wt/kg
191847	100	155	2.1

50mm BSPT bosses.

EF091 – Double boss
- With bosses (opposed) at 88°
- Compression 50mm





Product code	Dia	A	Nominal wt/kg
156575	100	155	2.5
192359	150	175	4.4

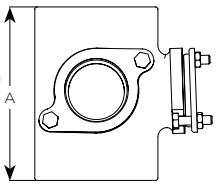
'O' Ring rubber compression fit.
Connects 50mm copper or UPVC waste. To connect 32/38mm waste pipes (see page 74).
Plastic moulded protection caps EF093, for blanking off push-fit boss connections. Size 50mm x 30mm. Order product code 192255.

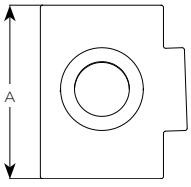
Double boss with drilled/tapped 2" BSP bosses – EF091T

Product code	Dia	A	Nominal wt/kg
191848	100	155	2.5

50mm BSPT bosses.

EF092 – Double boss
- With bosses at 90°
- Compression 50mm





50mm BSPT bosses.

Product code	Dia	A	Nominal wt/kg
191849	100	155	2.9

'O' Ring rubber compression fit.
Connects 50mm copper or UPVC waste. To connect 32/38mm waste pipes (see page 74).
Plastic moulded protection caps EF093, for blanking off push-fit boss connections. Size 50mm x 30mm. Order product code 192255.

NEW Double Boss with drilled/tapped 2" BSP bosses – EF092T

Product code	Dia	A	Nominal wt/kg
245545	70	146	1.7
191850	100	155	2.9

Plastic moulded protection caps EF093, for blanking off push-fit boss connections. Size 50mm x 30mm. Order product code 192255.

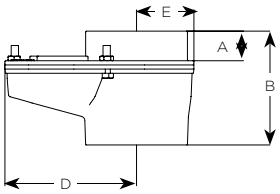
Multi-Manifold

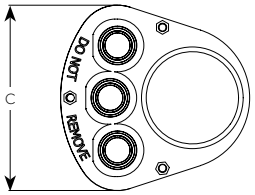
EF094 – Manifold connector

Product code	Dia	A	B	C	D	E	Nominal wt/kg
175626	100	43	125	200	142	62	3.2
175629	150	70	165	290	184	81	6.1

100mm: Three rubber plugs to accommodate 38/32mm dia waste.
150mm: Three rubber plugs to accommodate 50mm dia waste.
Suitable for push-fit connection to plastic/copper waste.
See installation instructions on page 75.

Replacement plugs can
be supplied on request.



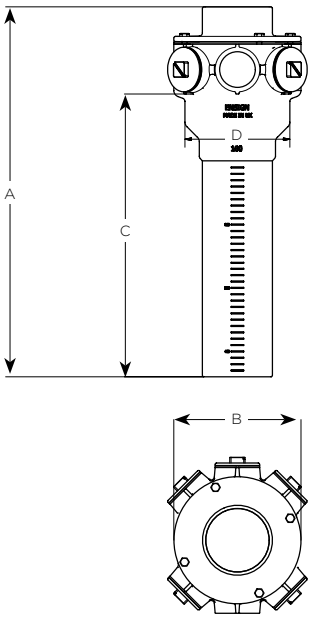


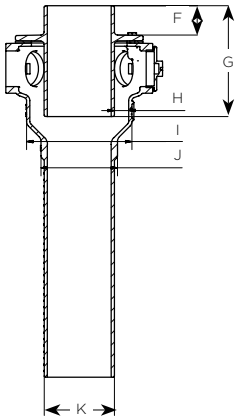
Multi-waste Manifold NEW

EF095 – Low level waste connections

Product code	Dia	A	B	C	D	E	F	G	H	I	J	K	Nominal wt/kg
261138	100	582	445	39	340	200	45	174	22.5	165	120	110	12.8
261434	150	591	445	39	345	235	55	181	25	220	170	160	17.3

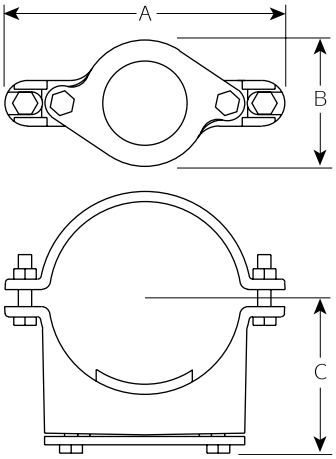
See typical installation instructions on (page 78-79).
6-2" BSP waste inlets supplied with 5 blanking plugs.





Strap-On Boss Fitting NEW

EF133 – Strap-on boss



The strap-on boss provides a simple solution for fitting a 50mm copper or waste pipe to an existing 100mm cast iron soil pipe to BS EN 877 (pipe outside diameter min/max 109/112mm).

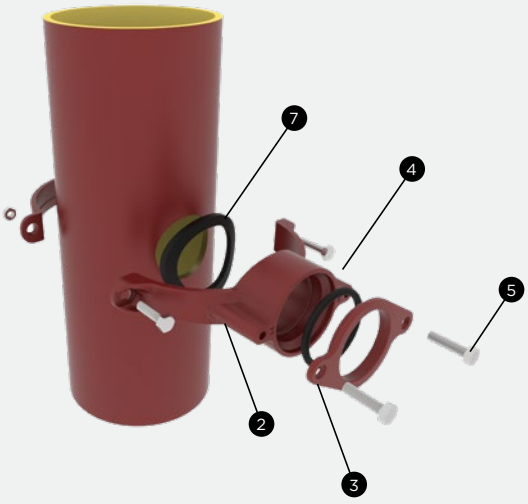
Installation

- Simply determine where the waste pipe is to be positioned
- Cut a 64mm hole into the cast iron soil pipe with a hole saw (the metal from the hole remains in the cutter – see tools below)
- Mechanically fit the boss strap in position (do not forget the rubber washer), tighten until fully secure
- Insert in the waste pipe until fully seated in the boss
- Tighten the boss plate to grip the rubber 'O' ring on the outside
  of the waste pipe

Tools required

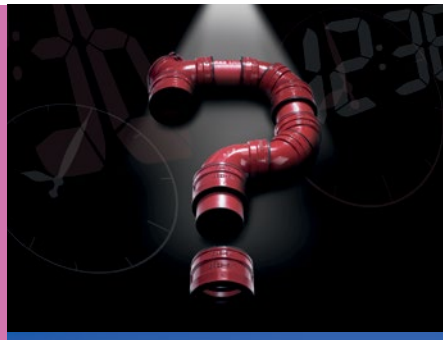
- A 64mm hole saw (Code 192326)
- Arbour (Code 192327)
- ¼" pilot drill (Code 192328)
- 13mm socket EF101 (Code 191202) or
- Ratchet spanner EF100 (Code 191201) or
- 13mm t-box spanner for mechanically fitting the boss adaptor EF098 (Code 191200)

Product code	Dia	A	B	C	Nominal wt/kg
262891	100	166	76	100	1.4
262890	150	214	77	125	1.6



Parts list

1. Bracket strap
2. Boss adaptor block strap
3. Clamping ring
4. Rubber compression 'o' ring
5. 4no. M8x30 stainless steel set screws
6. 2no. M8 stainless steel nuts
7. Rubber washer seal



New Ensign EEZI-FIT

A question of time? The answer's EEZI

Ensign EEZI-FIT is a new push-fit range of socketed fittings and couplings in 100mm and 150mm diameters, designed and Kitemark approved for above ground gravity sanitary applications, that combines all the benefits of cast iron with the simplicity of push-fit assembly.

Push-fit assembly

All the benefits of cast iron with the advantages of push-fit assembly. The system utilises a new gasket design that makes jointing simple, and completed in seconds.
(Electrical continuity can be accommodated – see page 58).

Compatibility with Ensign

EEZI-FIT connects to standard Ensign double spigot pipe and is fully compatible with all Ensign plain ended fittings. The installation of an Ensign mechanical joint positioned in the system can allow dismantling for future retrofit.

New connections to waste

The EEZI-FIT range includes many options to connect to waste pipes, providing even greater system flexibility, branches, single and double radius curve with four boss options, and short boss pipes with single option to three boss positions. New multi-waste manifold connectors are now available for connection to low-level waste pipes, with long tail spigots to avoid the need for a joint in the floor slab.

Ideal for flats and apartments

Ensign EEZI-FIT is the ideal system for flats and apartments where the main stack will unlikely change in time, and the specification will demand a high level of acoustic performance and fire safety.

Ease of installation

Ensign EEZI-FIT provides opportunities for the installer to improve installation time, and also reduce time allocated for testing the stacks after completion.

Applications

EEZI-FIT is intended for use for gravity above ground sanitary applications in accordance with BS EN 12056 (0.5 bar performance).

Acoustic performance

EEZI-FIT has been tested to BS EN 14366 criteria and recorded acoustic levels even lower than Ensign, 4dB(A) at 2 l/s and 9dB(A) at 4 l/s.
The acoustic difference between Ensign EEZI-FIT and standard HDPE and plastic is massive, and can only strengthen the case for using EEZI-FIT in flats/apartments where acoustic performance is so important (see table on page 9).

Comparing the difference

To establish what installation benefits and potential cost savings EEZI-FIT can provide SG PAM commissioned the BRE to witness the installation of specimen waste pipe layouts. The objective of the study: to compare and contrast the installation speed and subsequent time of Ensign EEZI-FIT against other systems. Carried out under strict laboratory conditions, further investigation was also undertaken on real-life sites to add practical credibility to the laboratory results.

Fire performance

Cast iron EEZI-FIT is non-combustible, and fire rated A1.

EEZI-FIT saves time and money

'Time is money' is what everyone learns early in life. And why so many now appreciate the benefits of EEZI-FIT, the quick-to-install, push-fit cast-iron drainage system incorporating a range of socketed fittings and couplings for sanitary gravity applications.

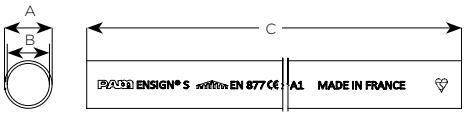
EEZI-FIT is significantly quicker to install than HDPE system fusion-welded welded systems for vertical and soil waste stacks.

EEZI-FIT needs no specialist installation tools like HDPE and stainless steel systems that, over a number of weeks generate significant additional hire costs which must be allowed for when comparing different materials.

Pipes Double Spigot

EP000

Product code	Dia	A Max O/dia	B Min I/dia	Min section	C Metre lengths available	Nominal wt/kg
156563	100	112	97.5	3	3	24.5
156827	150	162	146.25	3.5	3	41.0

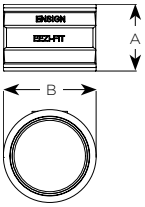


Pipes coated internally with a two part epoxy and externally with a red protective coating (see page 100).

Coupling

EZ001 – EEZI-FIT coupling

Product code	Dia	A	C	Nominal wt/kg
208191	100	85	40	1.3
216312	150	114	55	2.0

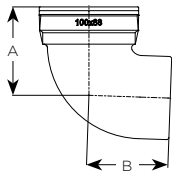


Assembly instructions (see page 63).
Gasket spare are available in bags of 10 – Product code 208204.
For electrical continuity see page 58.

Bends Short Radius

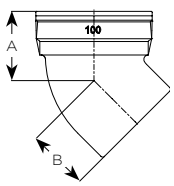
EZ002 – 88° EEZI-FIT bend

Product code	Dia	A	B	C	Nominal wt/kg
208192	100	112	108	40	2.3
216313	150	154	145	50	5.0



EZ002 – 45° EEZI-FIT bend

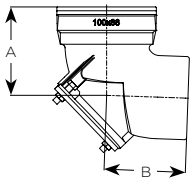
Product code	Dia	A	B	C	Nominal wt/kg
208193	100	73	69	40	1.9
216319	150	102	94	50	4.0



Bends With Access

EZ005 – 88° EEZI-FIT bend
• Short radius door back

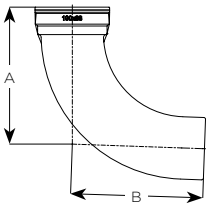
Product code	Dia	A	B	C	Nominal wt/kg
208194	100	112	108	40	3.4
216315	150	154	145	50	5.7



Bends Long Radius

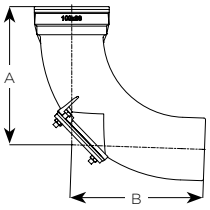
EZ02L – 88° EEZI-FIT bend
• Long radius

Product code	Dia	A	B	C	Nominal wt/kg
215953	100	243	233	40	4.5



EZ05L – 88° EEZI-FIT bend
• Long radius door back

Product code	Dia	A	B	C	Nominal wt/kg
215952	100	243	233	40	5.6

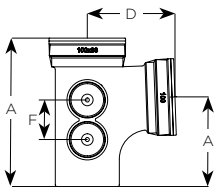


Single Branches

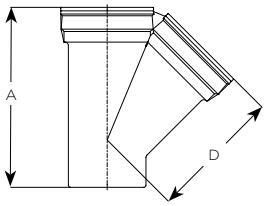
EZ06R – Single branch 88°
• Swept radius curve

Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
208195	100 x 100	250	210	40	145	105	68	148	5.6
216342	150 x 100	292	237	50	185	130	68	185	70

To make boss connections see page 80.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).
See design guidance in accordance with BSEN12056 part 2 (see page 79).

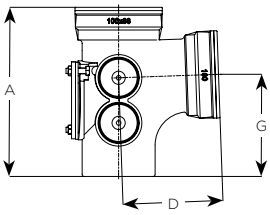


EZ006 – Single branch 45°



Product code	Dia	A	B	C	D	Nominal wt/kg
208196	100 x 100	250	210	40	183	4.1
216320	150 x 100	270	215	50	227	6.5
216341	150 x 150	353	298	50	265	8.9

EZ07R – Single branch 88° with access
• Swept radius curve



Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
208197	100 x 100	250	210	40	145	105	68	148	6.7
216314	150 x 100	292	237	50	185	130	68	185	8.0

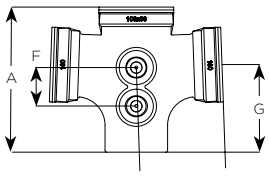
To make boss connections see page 80.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).
See design guidance in accordance with BSEN12056 part 2 (see page 79).

Double Branch

EZ010R – Double branch 88°
• Swept radius curve

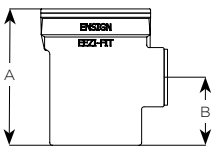
Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
208198	100 x 100	250	210	40	145	105	68	148	6.0

If 45° double branch is required, use ENSIGN EF010 code 191509 with EEZI-FIT couplings.
To make boss connections see page 80.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).



Boss Pipes

EZ090 – Single boss pipe 1 x 50mm push-fit



Product code	Dia	A	B	Nominal wt/kg
208199	100	158	82	2.1

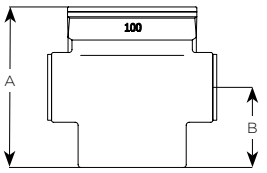
Supplied with rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste.
For connections to 38/32 waste – see page 76.

Boss Pipes

EZ092 – Double boss pipe 2 x 50mm push-fit

Product code	Dia	A	B	Nominal wt/kg
208200	100	158	82	2.3

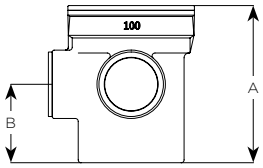
Supplied with rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste.
For connections to 38/32 waste – see page 76.



EZ092 – Double boss pipe
EZ093 – Triple boss pipe 50mm push-fit

Product code	Dia	A	B	Nominal wt/kg
208201	100	158	82	2.3
208202*	100	158	82	2.5

Supplied with rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste.
For connections to 38/32 waste – see page 76.
*Triple boss pipe

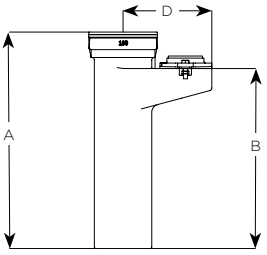


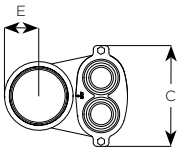
Manifold Connector

EZ094 – Manifold connector

Product code	Dia	A	B	C	D	E	Nominal wt/kg
208203	100	410	345	190	170	66	6.6

Supplied with rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste.
For typical applications – see page 76.



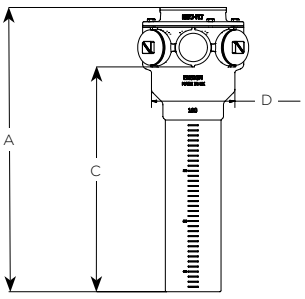


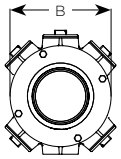
Multi-Waste Manifold NEW

EZ095 – For low level waste connections

Product code	Dia	A	B	C	D	E	F	G	H	I	J	K	Nominal wt/kg
261139	100	582	445	39	340	200	45	174	23	165	120	100	12.6
261435	150	566	445	39	345	235	55	155	25	220	170	160	16.8

6x2" BSP waste inlets.
Supplied with 5 blanking plugs.
See installation instructions on page 77.





Section 2

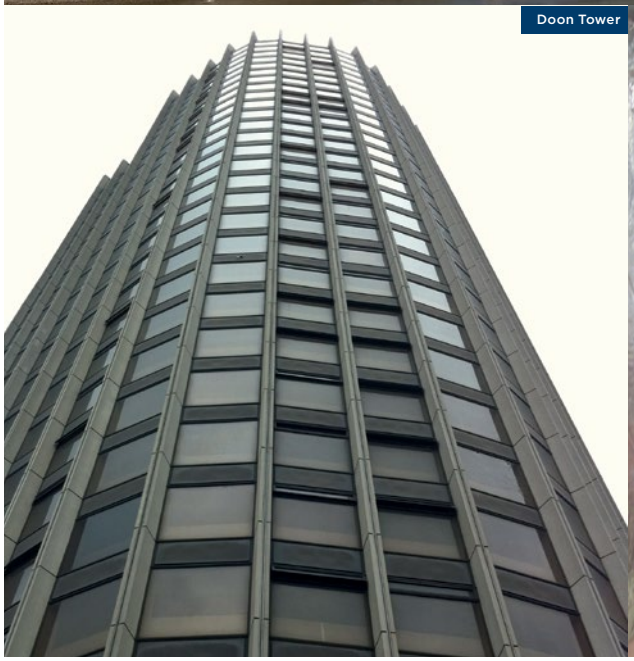
Pipes and Fittings Below Ground

Ensign cast iron drainage – 1st choice for tall buildings

Cast iron has the superior strength performance required to give specifier's peace of mind on tall buildings.

- Ensign has the ability to withstand significantly higher pressures than other materials
- Ensign will not contribute to a fire, will not collapse and will not emit smoke
  - No risk of fire spread up or downwards – particularly important on multi-storey buildings (Burning Question)
  - No danger to fire fighters in terms of collapsing or generating smoke
- Under building drainage – only cast iron has the superior crush strength – fit and forget peace of mind to perform under tall buildings
- PAM cast iron is providing drainage systems for 8 of the top 10 tallest buildings in the UK

The Shard



Doon Tower

Ensign pipework on The Shard

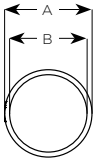
Section 2
Contents

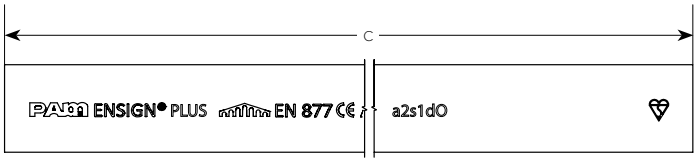
Pipes Double Spigot

ED000 – Pipe

Product code	Dia	A Max O/ dia	B Min I/dia	Min Section	C Metre Lengths Available	Nominal wt/kg
155349	100	112	97.5	3	3	24.5
155414	150	162	146.25	3.5	3	41
155448	200	212	195	4	3	67.4
155476	250	276.5	243.75	4.5	3	97.3
155493	300	328.5	292.50	5	3	126.8
155508	400	431	390	5	3	177.7
155511	500	534	487.5	5.2	3	230.0
175630	600	637	585	5.8	3	302.0

Pipes coated internally with a two part epoxy and externally with a zinc rich base coat, then the standard grey acrylic protective coating (see page 100).





Couplings

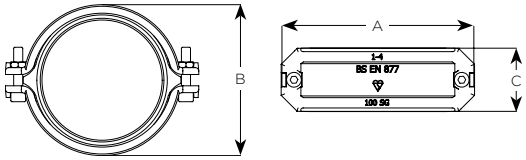
ED001 – Two-piece ductile iron coupling

Product code	Dia	A	B	C	Nominal wt/kg
155369	100	170	137	58	0.8
155433	150*	217	183	80	1.7
155462	200*	278	243	82	3.5
175591	250*	343	308	82	4.4
175592	300*	395	360	82	5.4

For 400, 500, 600 diameter couplings see EC002HP High Performance Stainless Steel Couplings below.

*150-300mm incorporates four socket bolts. Patent No. 2 305 481.

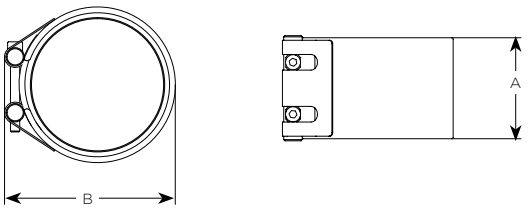
Nitrile gaskets will be considered on request, on a quotational basis.



EC002HP – High performance stainless steel coupling

Product code with grip	Product code no grip	Dia	A	B	Nominal wt/kg
227344	228623	100	94	154	1.3
227346	228625	150	95	211	2.1
227347	228626	200	140	270	5.3
227348	228627	250	140	330	8.7
227349	228628	300	140	470	9.9
227350	228629	400	139	449	7.1
227361	228630	500	139	551	6.7
227362	228631	600	139	653	7.6

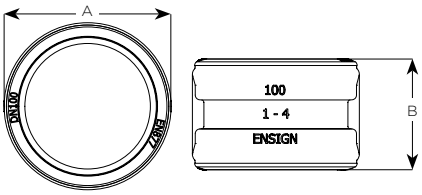
All stainless steel.
Capable of withstanding high pressure (>5 bar).



Couplings

ED004 – Push-fit socket cast iron

Product code	Dia	A	B	Nominal wt/kg
175622	100	140	90	1.2
175623	150	195	95	2.2



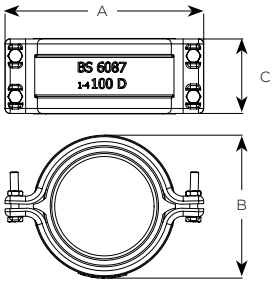
BS 437 – Ductile iron transitional coupling – TD02. Transitional coupling Ensign to Timesaver

Product code	Dia	A	B	C	Nominal wt/kg
191297	100	75	140	203	2.8
191298	150	75	195	252	3.6

Timesaver drain coupling assembly. Black coated, incorporating four set screws and nuts, and transitional elastomer seal. For jointing Ensign system to Timesaver drain BS 437.

Black gasket with identity markings.

To connect Ensign drain to Timesaver 416, use standard Timesaver coupling GT01 (black coated).

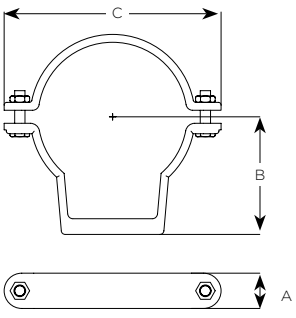


Brackets

ED048 – Ductile iron bracket

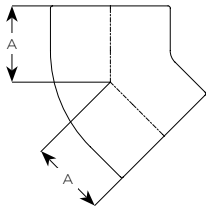
Product code	Dia	A	B	C	Nominal wt/kg
175593	100	27	90	166	0.6
175594	150	30	115	214	0.8
177743	200	35	150	266	1.6

Elongated slot at fixing point (D) to ease fixing.



Bends – Short Radius

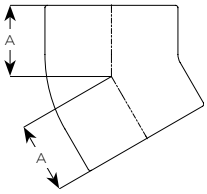
ED002 – 45° bend
• Short radius



Product code	Dia	A	Nominal wt/kg
191765	100	70	1.6
191766	150	90	3.0
191767	200	110	7.0
191879	250	130	10.9
191880	300	155	18.7
192370	400	247	35.0
† 192382	500	318	53.0
† 192383	600	350	92.0

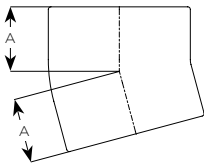
† Available to order.

ED002 – 30° bend
• Short radius



Product code	Dia	A	Nominal wt/kg
191768	100	60	1.7
191769	150	80	3.2

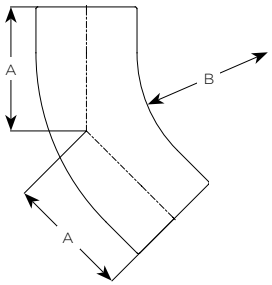
ED002 – 15° bend
• Short radius



Product code	Dia	A	Nominal wt/kg
191770	100	50	1.3
191771	150	65	2.7

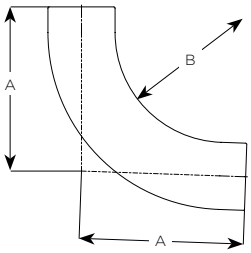
Bends – Medium, Long Radius Door Back

ED02M – 45° bend
• Medium radius



Product code	Dia	A	B	Nominal wt/kg
191772	100	135	150	3.5
191773	150	145	150	6.2

ED02L – 88° Bend
• Medium & long radius

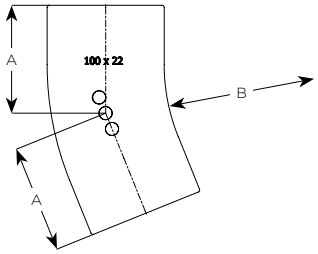


Product code	Dia	A	B	Nominal wt/kg
191774	100	269	180	4.3
191775	150	274	150	10.1

Bends – Medium, Long Radius

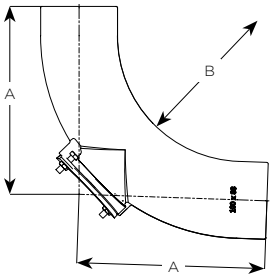
ED02L – 22° bend
• Long radius

Product code	Dia	A	B	Nominal wt/kg
191776	100	90	180	1.7



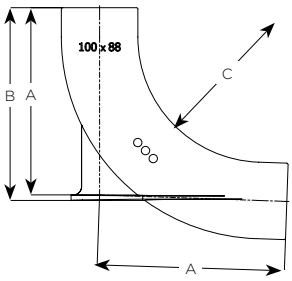
ED05L – 88° bend
• Long radius door back

Product code	Dia	A	B	Nominal wt/kg
191777	100	269	180	5.5
192358	150	274	150	11.4



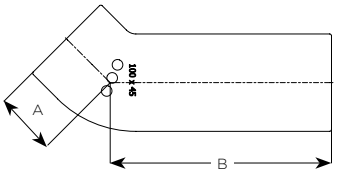
ED007 – 88° bend
• Medium & long radius with heel rest

Product code	Dia	A	B	C	Nominal wt/kg
192289	100	269	277	180	5.5
192290	150	274	282	150	11.4



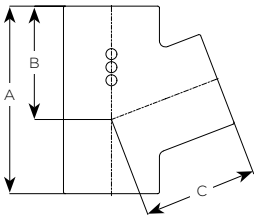
ED055 – 45° bend
• Long tail

Product code	Dia	A	B	Nominal wt/kg
191778	100	70	250	4.0



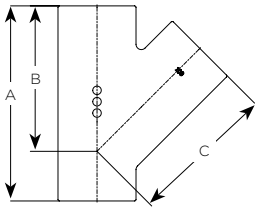
Branches Single

ED006 – 69° branch
• Equal and unequal



Product code	Dia	A	B	C	Nominal wt/kg
191781	100 x 100	215	130	130	2.7
191851	150 x 100	235	150	155	5.1

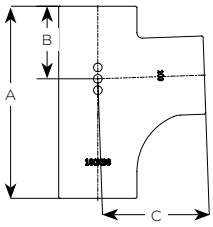
ED006 – 45° branch
• Equal and unequal



Product code	Dia	A	B	C	Nominal wt/kg
191782	100 x 100	275	205	205	3.8
191783	150 x 100	295	240	240	6.1
191784	150 x 150	355	265	265	9.0
191785	200 x 100	300	260	260	10.3
191786	200 x 150	375	300	300	13.2
191787	200 x 200	455	340	340	17.3
191881	250 x 250	560	430	430	32.2
191882	300 x 300	660	505	505	54.8
192384	400 x 300	660	555	565	55.3
192373	400 x 400	835	645	645	82.5
† 192385	500 x 500	1020	790	790	175.0
† 192386	600 x 600	1180	920	920	215.0

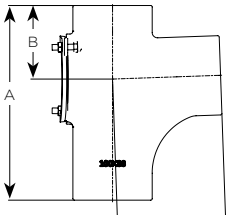
† Available to order.

ED06R – 88° Single branch
• Swept radius curve



Product code	Dia	A	B	C	Nominal wt/kg
191788	100 x 100	270	102	150	3.5
191789	150 x 100	300	117	202	7.6
191790	150 x 150	400	140	260	12.5
191791	200 x 150	428	157	283	13.0

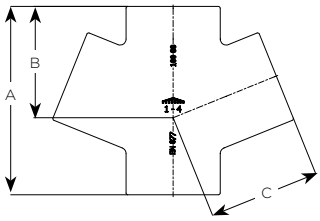
ED07R – 88° Branch with access
• Swept radius curve



Product code	Dia	A	B	C	Nominal wt/kg
191793	100 x 100	270	102	150	4.3
191794	150 x 100	300	117	202	10.4
191795	150 x 150	400	140	260	13.9

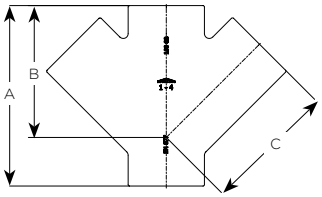
Branches Double

ED010 – 69° Double branch



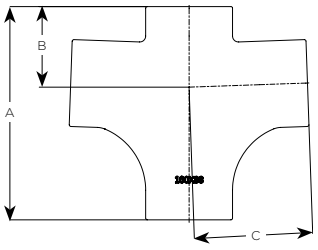
Product code	Dia	A	B	C	Nominal wt/kg
191796	100 x 100	215	130	130	3.4

ED010 – 45° Double branch



Product code	Dia	A	B	C	Nominal wt/kg
191798	100 x 100	260	190	190	4.0
191799	150 x 100	280	225	225	8.4
191800	150 x 150	355	265	265	12.6
191801	200 x 200	455	340	340	24.0

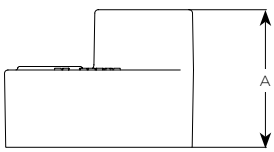
ED010R – 88° Double branch
• Swept radius curve



Product code	Dia	A	B	C	Nominal wt/kg
185373	100 x 100	270	102	150	4.2
191803	150 x 100	300	115	200	10.9

Tapered Pipes

ED028



Product code	Dia	A	Nominal wt/kg
191810	150 x 100	105	1.9
191811	200 x 100	115	3.5
191812	200 x 150	125	3.3
191889	250 x 100	122	5.5
191886	250 x 150	135	6.3
191892	250 x 200	145	6.5
191890	300 x 150	150	9.9
191891	300 x 200	160	10.1
191885	300 x 250	170	12.2
155504	400 x 300	200	20.0
199843	500 x 300	200	28.9
199869	500 x 400	200	28.0
	600 x 500		

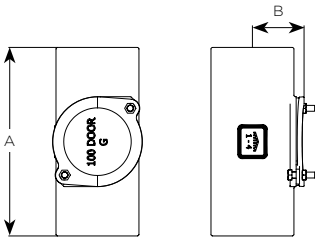
500 and 600 tapers will be considered on request.

To connect 250 and 200 Ensign to 225 Timesaver Drain, use TD41 (see Timesaver section page 148).

Access Pipes

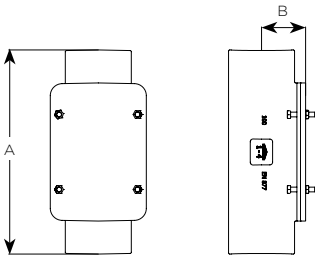
ED014 – Round door

Product code	Dia	A	B	Nominal wt/kg
191805	100	250	80	3.1
191806	150	280	110	6.2



ED015 – Rectangular door

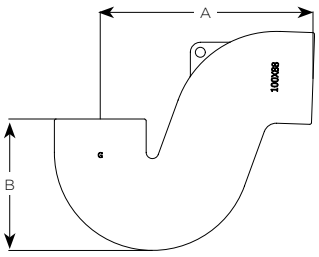
Product code	Dia	A	B	Nominal wt/kg
191807	100	320	80	6.7
191808	150	395	105	12.2
191809	200	475	140	20.2
191883	250	540	160	38.5
191884	300	610	190	50.0



Traps

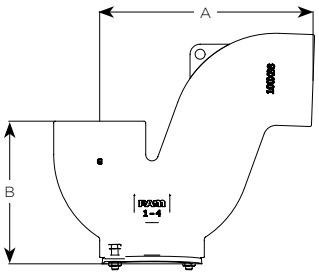
ED034 – Plain

Product code	Dia	A	B	Nominal wt/kg
191815	100	255	160	4.5



ED037 – Plain with access bottom

Product code	Dia	A	B	Nominal wt/kg
182482	100	255	175	5.2
182483	150	350	240	12.1

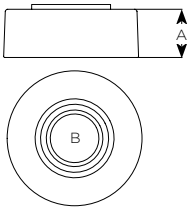


Blank Ends

ED070 – Plain

Product code	Dia	A	Nominal wt/kg
191818	100	40	0.8
191819	150	50	2.0
191820	200	60	3.2
191887	250	70	5.7
191888	300	90	10.3

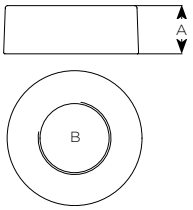
ED071 – Push-fit connection



Product code	Dia	A	Nominal wt/kg
191821	100	40	1.0
191822	150	50	2.0

B = rubber grommet which accommodates 50mm waste UPVC or copper.

EF071T – Drilled and taped

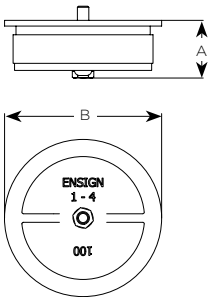


Product code	Dia	A	Nominal wt/kg
191579	100	40	1.0

Red coated.
To connect to UPVC/copper waste use 50mm/2" BSPT male iron adaptor.
B = D/T 50mm BSPT.

Expansion Plugs

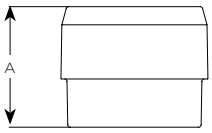
ED074 – Expansion plug



Product code	Dia	A	B	Nominal wt/kg
191823	100	110	42	0.7
191824	150	156	42	1.5

Connectors

ED076 – Transitional connector



Product code	Dia	A	Nominal wt/kg
191813	100	100	1.8
191814	150	125	4.2

Adaptor from Ensign to Supersleve.

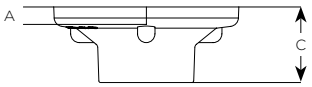
Gully Inlets

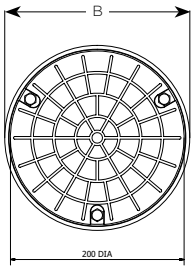
ED060 – Gully inlet

Product code	Dia	A	B	C	Nominal wt/kg
191825	100	20	215	87	2.4

Shown with flat grating ED065 – supplied separately.
Can be supplied fitted with solid cover order ED066 (Product Code 191852).

ED066



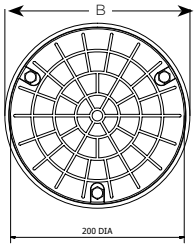


ED060 – Bellmouth

Product code	Dia	A	B	C	Nominal wt/kg
191826	150	20	215	95	2.9

Shown with flat grating ED065 – supplied separately.
Can be supplied fitted with solid cover order ED066 (Product Code 191852).

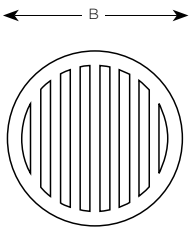
ED066



ED065 – Grating plain

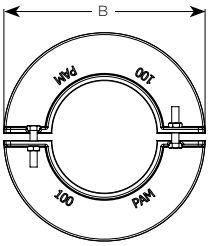
Product code	Dia	Nominal wt/kg
191828	200	1.8

Loose grating for ED060. Maximum load 2.0 tonnes.



Puddle Flanges

ED078 – Flange



Product code	Dia	A	B	C	Nominal wt/kg
191829	100	50	220	12	4.6
191830	150	65	275	12	6.6
192318*	250	70	405	12	57.9
192319*	300	75	460	12	71.2

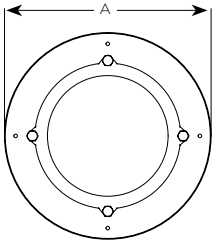
*Black only.

This collar is in two halves which can be bolted around the pipe even when pipe is in position. Can also be used as a firestop.

Due to manufacturing tolerances it is recommended that the puddle flange is bedded on Denso tape or similar.

ED078 – Multi-clamp
• Puddle flange

Product code	Dia	A	B	Nominal wt/kg
191831	200	370	35	6.3

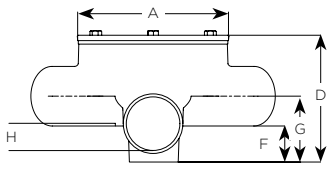


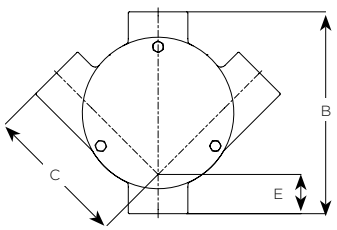
Inspection Chambers

ED012

Product Code	Dia	A	B	C	D	E	F	G	H	Nominal wt/kg
191832	100 x 100	275	373	265	224	73	70	122	50	15.9
191833	150 x 100	274	393	265	243	83	95	147	75	17.2
191834	150 x 150	274	393	254	295	118	95	175	75	19.4

Supplied with 250mm diameter removable cover for ease of maintenance.
See pages 90-91 for typical appreciations.





*Rectangular Chambers. Single & Double see Timesaver below ground ranger page 158-159

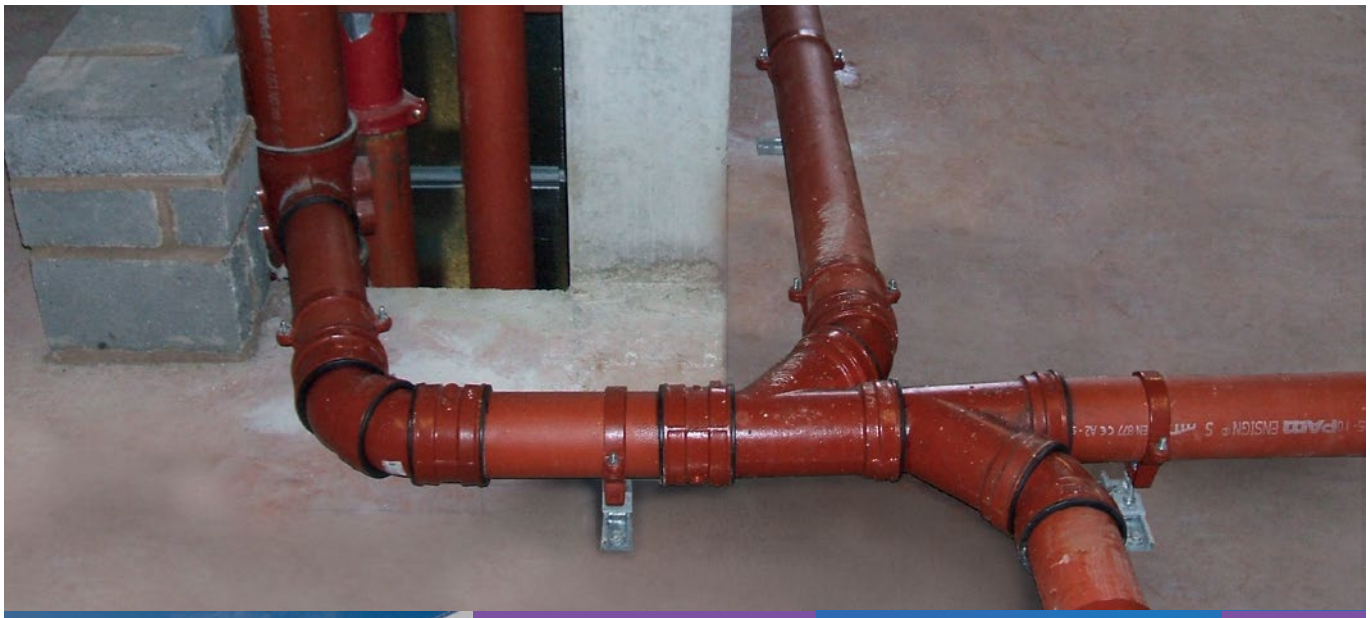
Section 3

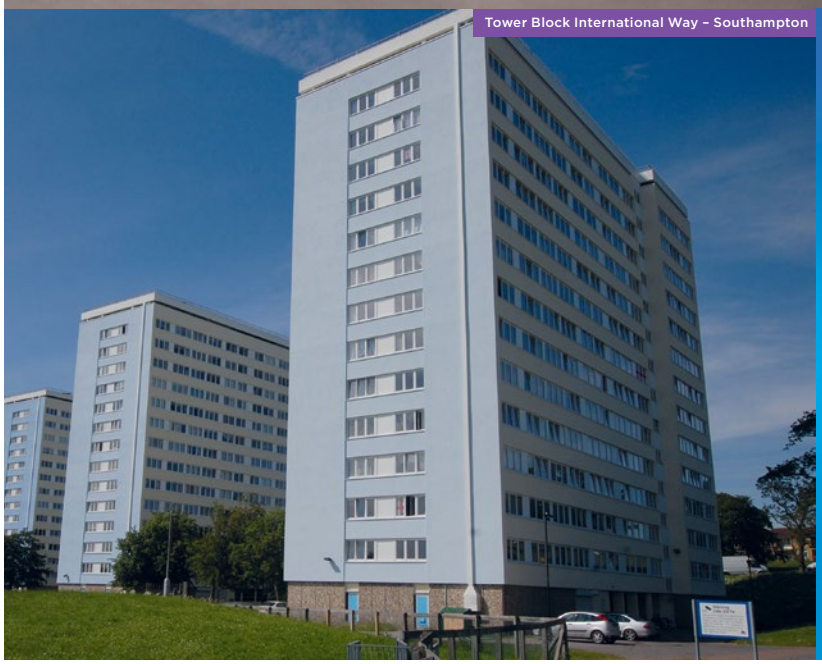
Couplings – Technical

Ensign and EEZI-FIT the informed choice for residential and hotels

Ensign EEZI-FIT provides the installer the flexibility required for robust drainage solutions.

- Flexible range of fittings allowing connections to waste
  - Boss branches single and double
  - Boss pipes with up to 3 connections
  - Manifold with extended spigot
- Speed and simplicity of push-fit assembly:
  - 13 storey tower blocks in Hastings – installed by United House
  - Successfully installed and tested new sanitary EEZI-FIT soil stacks on 13 storeys in one day
- Acoustically the quietest solution on the market
  - 8-10 dB(a) quieter than acoustic plastic systems





Tower Block International Way – Southampton

EEZI-FIT jointing

Section 3
Contents

Coupling Specification

Above ground

50mm to 125mm two-piece couplings EC002 utilise two socket cap set screws and nuts (M12). 150mm to 300mm couplings utilise four socket cap set screws and nuts (M12), all driven by 6mm Allen key drive.

The couplings incorporate four iron nibs on each half piece which provide electrical continuity satisfying the requirements of IEE regulations (see page 58). The couplings are manufactured in ductile iron and incorporate an EPDM elastomer seal. The above ground couplings are coated in a red epoxy coating (see P100 for specification)

Nitrile gaskets are available on request POA.

Alternatively, for push-fit solution see EEZI-FIT range available in 100mm and 150mm diameters.

For 400-600mm above and below ground ranges (see high performance couplings pages 19 and 45).

Below ground

100, 150-300mm ductile iron couplings ED001 utilise stainless steel socket cap set screws and nuts (M8), are grey epoxy coated and do not feature the continuity nibs.

Alternatively, for push-fit solution in 100mm and 150mm diameters (see page 46)

Pressure capability:

The Ensign mechanically jointed system is designed for various gravity applications:

- Foul soil, waste and vent
- Rainwater

These can be installed in various sections of the building:

- Vertical risers
- Horizontal/suspended (ie. basements)
- Buried in concrete under the building.
- In the ground to the main sewer network.

The system generally operates at gravity pressure levels ie. 0.5 bar, but is capable of withstanding much higher “accidental” static pressure in the event of a blockage – the level depending on:

1) The diameter of pipework
2) The coupling type used
3) If the system is restrained or unrestrained.

See Table below

System	Coupling	Material	Type	Diameter	Accidental static water pressure (bar)	
					Unrestrained	Restrained*
Ensign Soil	EC002	Ductile Iron	Mechanical	50mm to 100mm	Up to 1 bar	Up to 5 bar
Ensign Soil	EC002	Ductile Iron	Mechanical	125mm to 150mm	Up to 0.5 bar	Up to 5 bar
Ensign Soil	EC002	Ductile Iron	Mechanical	200mm to 300mm	Up to 0.3 bar	Up to 3 bar
Ensign Soil	EC002/ EC002GC	Ductile Iron + Grip	Mechanical	100mm, 150mm + 200mm	Up to 5 bar	Up to 5 bar
Ensign Soil	EC002HP	S/Steel	Mechanical	100mm to 300mm	Up to 5 bar	Up to 10 bar
Ensign Soil	EC002HP	S/Steel	Mechanical	400mm to 600mm	Up to 1 bar	Up to 5 bar
Ensign EEZI-FIT	EZ001	Cast Iron	Push-fit	100mm + 150mm	Up to 0.1 bar	Up to 0.5 bar
Ensign Drain	ED001	Ductile Iron	Mechanical	100mm	Up to 1 bar	Up to 5 bar
Ensign Drain	ED001	Ductile Iron	Mechanical	150mm	Up to 0.5 bar	Up to 5 bar
Ensign Drain	ED001	Ductile Iron	Mechanical	200mm to 300mm	Up to 0.3 bar	Up to 3 bar
Ensign Drain	EC002HP	S/Steel	Mechanical	100mm to 300mm	Up to 5 bar	Up to 10 bar
Ensign Drain	EC002HP	S/Steel	Mechanical	400mm to 600mm	Up to 1 bar	Up to 5 bar
Ensign Drain	ED04	Cast Iron	Push-fit	100mm + 150mm	Up to 0.1 bar	Up to 5 bar

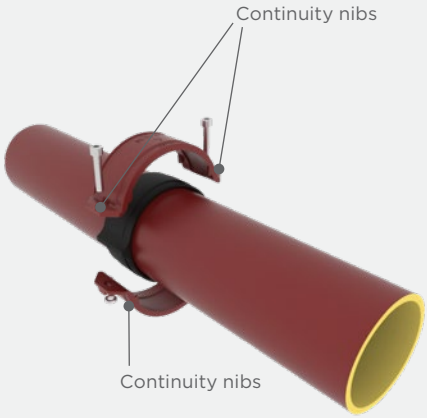
Note – 'Accidental' static water pressure *Bracketed to prevent movement

Ensign/Timesaver connecting couplings

To connect Ensign to Timesaver drain systems use Timesaver transitional couplings which are coated in a black water base primer coating. (See table below identifying the coupling required).

Size dia	Ensign pipe dia		Timesaver pipe dia Drain TD00		Coupling required	Product code
	Max	Min	Max	Min		
100	112	109	119	116	TD02	191297
150	162	158	173	170	TD02	191298

Ensign Electrical Continuity



The Ensign two-piece couplings are supplied with four iron nibs to each half-piece, providing electrical continuity (equipotential bonding) automatically when tightened to the recommended torque.

The installation should be tested in accordance with BS EN 12056-2 for gravity drainage, and BS EN 12056-3 for rainwater, and to IEE regulations on equipotential bonding (earthing).

Provided that the Ensign electrical continuity coupling is assembled and installed as recommended in our instructions (see page 70) and the pipework is bonded to the electrical earth or similar earth, it is considered that the Ensign electrical continuity coupling will satisfy the IEE regulations.

It is recommended that the installation is regularly checked for equipotential bonding (earthing) in case of accidental damage, unauthorised pipework, modifications etc.

If an Ensign electrical continuity installation is to be modified for any reason, electrical continuity couplings must be used and the installation re-tested for equipotential bonding (earthing).

The test for electrical continuity on-site should be in accordance with BS 6087 amendment 2.

If provision is made for electrical continuity the electrical resistance of the coupling shall not exceed 0.3 ohms when tested in accordance with BS EN 877. Apply a steadily increasing voltage not exceeding 50V ac, 50 Hz, across the junction until a steady current of 25± 1A flows through the coupling. Allow the current to flow for 30s, maintaining it as necessary by adjusting the voltage. Calculate the resistance of the coupling by dividing the observed voltage by the current.

Ensign EEZI-FIT Electrical Continuity

In situations where equipotential bonding (earthing) has been specified electrical continuity clips can be fitted to the Ensign EEZI-FIT system, with two continuity clips per joint diametrically opposed.

Fitting instructions – after the joint has been completed

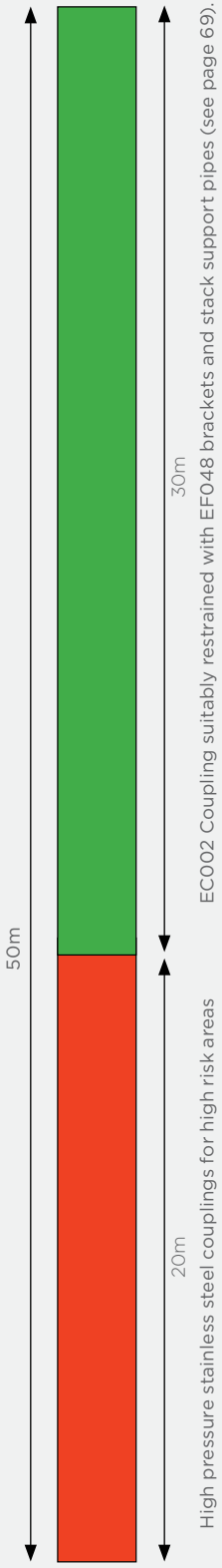
1. Locate clips by inserting the protruding tongue in between the edge of the coupling and the rubber seal.
2. Lightly tap each clip (in line with the pipe/fitting) until resistance is established.

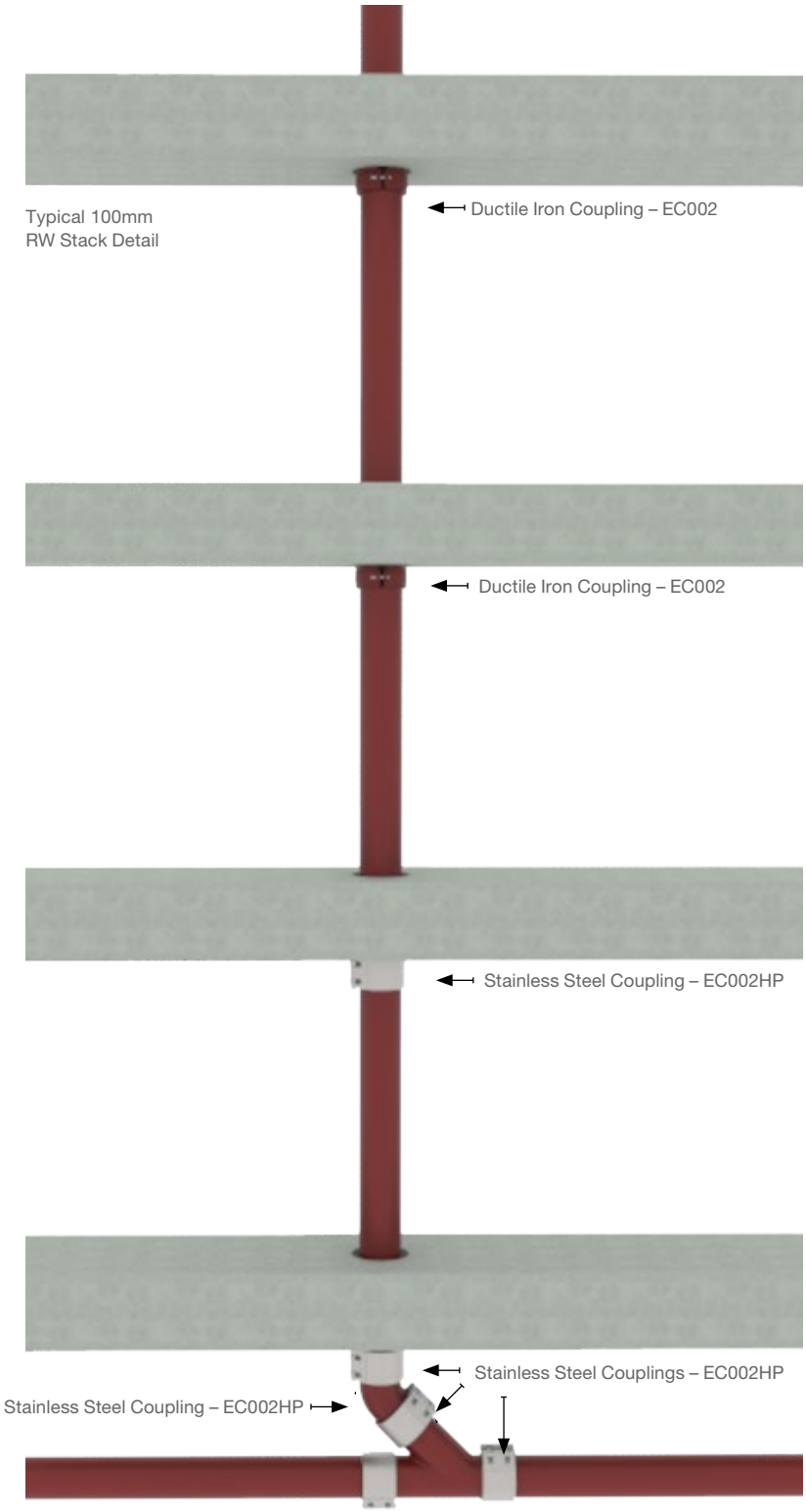
The electrical continuity clips are supplied separately in bags of 30. Product Code 208462. Testing should be carried out in accordance with BS 6087 Amendment 2.

High Performance Installation

Typical installation for high performance stainless steel couplings (EC002HP).

Alternatively use new grip collars EC002GC (see page 64).





NOTE: If access is required at lower level – telephone Technical Helpline: 01952 262529.

Jointing Method

Couplings are supplied pre-assembled. The 100mm and 150mm Ensign couplings have been designed to allow assembly without dismantling the coupling.

1. Slacken bolts on coupling to fullest extent to ease assembly.

2. Push coupling over the end of the pipe or fitting ensuring the central register is abutted against the spigot edge.

3. Push the second pipe or fitting into the coupling again ensuring that the spigot is abutted against the central register.

4. Check alignment of assembly before tightening the bolts. Coupling bolts on all sizes are M8 and require special Allen socket adaptor (6mm) EF102, together with a ratchet spanner EF100. Alternatively use a time saving power tool.

Note: Bolts should be tightened until a suitable resistance is achieved if using a torque wrench if using a power drill or ratchet spanner 20Nm.

The couplings **do not need** to be completely tightened until both halves are touching. Guidelines: 2-3mm gap.

Over-tightening the couplings can apply excessive stress to the coupling bolts.

Tools

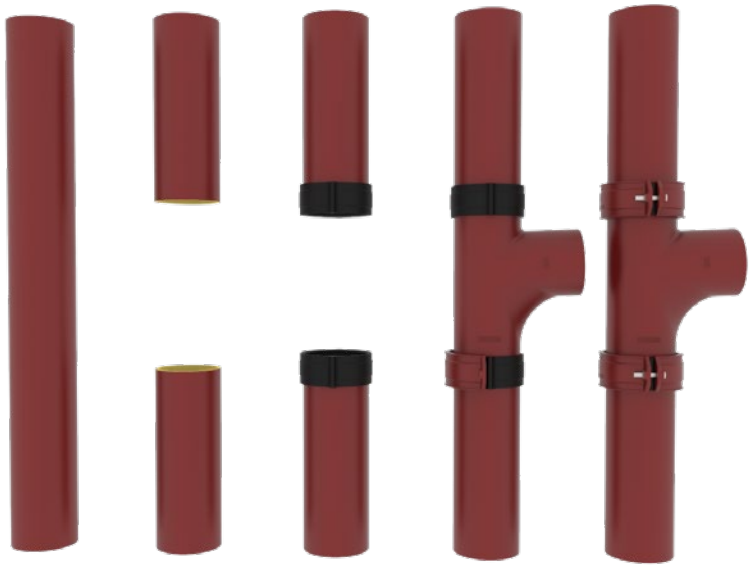
	Product code
A – Lubricant for EEZI-FIT push-fit assembly joints (0.5 litre tub)	**199037**
B – 13mm A/F 'T' Box Spanner EF098 For use with nuts on fixing brackets and on access door fittings	**191200**
C – 13mm A/F ½" Square-drive EF101 Deep Socket (use with ratchet B) For use with nuts on fixing brackets and on access door fittings	**191202**
D – 6mm Allen Socket Adaptor (use with ratchet B) EF102 For use with bolts on all ductile iron couplings	**191753**
E – ½" Square-drive EF100 Ratchet Spanner (use with C and E) For use with nuts on fixing brackets and on access door fittings and also with new two-piece coupling	**191201**

Installation Modifications

Modifications to an existing Ensign installation

Typical example

1. Measure length of branch, adding a further 15mm in total to allow for coupling's central register top and bottom.
2. Make sure existing pipework is adequately supported from above.
3. Mark pipe position for cutting.
4. Cut pipe using powered disc cutter or wheel cutter.
5. Coat cut ends with appropriate touch-up (epoxy coating).
6. Lubricate cut spigot end of pipe and the coupling gasket with a silicon lubricant.
7. Push the rubber gaskets onto the spigot cut ends top and bottom, ensuring the central registers are abutted against each spigot edge.
8. Position fitting in the stack within each rubber gasket abutting against the central registers.
9. Loosely assemble the coupling around each gasket.
10. Check alignment of assembly before tightening the bolts, to recommended level (minimum 20Nm).
11. Test new stack for successful joints.



Typical example
X = fitting + 15mm

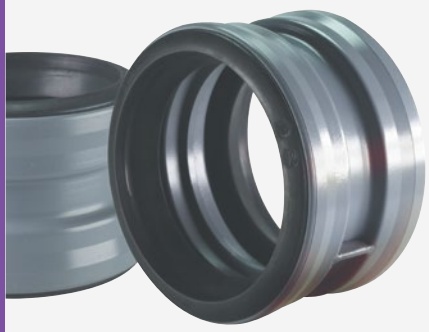
Building Regulations – Drainage and waste disposal – Approved Document H 2010

Testing of Sanitary pipework (Approved Doc H)

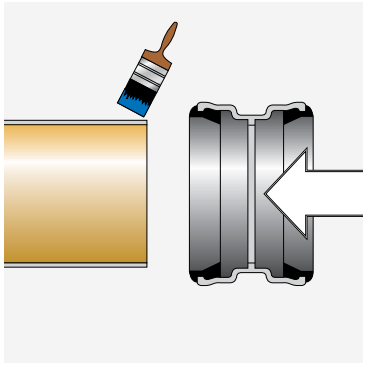
1.38 The pipes, fittings and joints should be capable of withstanding an air test of positive pressure of at least 38mm water gauge for at least 3 minutes. Every trap should maintain a water seal of at least 25mm. Smoke testing may be used to identify defects where a water test has failed.

Testing of Foul drainage pipework

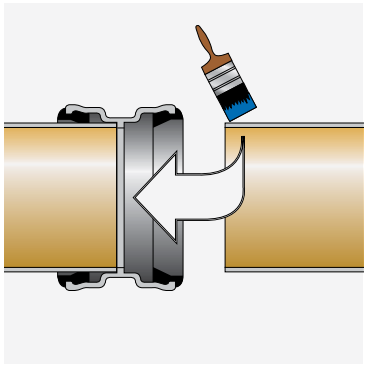
Pipes up to 300mm diameter the pipe should be pressurised up to a pressure of 110mm water gauge and held for approximately 5 minutes prior to testing. Following this the pipe should be able to hold an initial 100mm pressure with max loss of head on a manometer of 25mm in a period of 7 minutes.



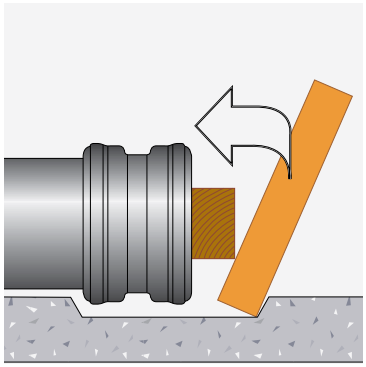
Installation PFJ Drain Coupling ED004



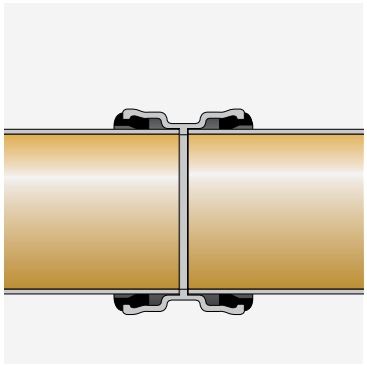
1. Apply lubricant (ie. silicone) to spigot end of drain pipe (remove any burrs etc. if previously cut).



2. Place in position and apply force easing coupling into end of pipe until abuts to the central register.



3. Apply lubricant to second pipe align with coupling and push pipe until abuts to central register.



4. Completed joint.

Ensign EEZI-FIT Jointing Method

1. Apply a small amount of jointing lubricant on the lip of the rubber gaskets at both ends to ease insertion of pipe/fittings.

2. Push joint over the end of pipe, ensuring the central register is abutted against the spigot edge evenly.

3. Apply a small amount of lubricant. Push the second pipe or fitting into the gasket again ensuring that the spigot is abutted against the central register.

4. Installation complete.

When jointing to pipe which has been cut, please remove any sharp edges (chamfering is not necessary). Saint-Gobain PAM UK recommend the use of its own jointing lubricant available in 0.5kg tubs. Product Code of the lubricant: 199037. (Please read health and safety instructions when using this product).

Ensign Push-Fit Couplings Performance

Accidental static water pressure (bar)

Coupling	Material	Type	Diameter	Restrained
EZ001	Cast iron	Push-fit	100 to 150mm	Up to 0.5 bar
ED004	Cast iron	Push-fit	100 to 150mm	Up to 5 bar

Note: Ensign EEZI-FIT is designed to meet gravity 0.5 bar performance BS EN 877 although has been successfully tested to 2 bar.

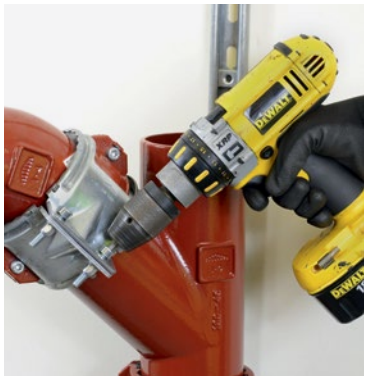
PAM Ensign Grip Collars

Internal pressure resistance

Excessive internal pressure in drainage networks is always accidental. However, in specific areas – changes of direction, gradient or some components like branches and plugs – the junctions are exposed to end thrust forces that have to be addressed.

The grip collar is an added device used in these specific areas to lock the coupling and ensure both water tightness and mechanical stability of the pipework.

1. Position the two half parts of the PAM Ensign grip collar so to encircle the coupling uniformly. The grip collars must be positioned so that the apertures fit over the fixing bolts of the coupling and the teeth are directly located onto the pipe.



2. Insert the four screws to fix the two parts together loosely.

3. Tighten the screws crosswise alternatively so that the two plates are put in parallel with the same spacing.

Tightening torques

The PAM Ensign grip collar is designed to be fully tightened, so there is no need checking the torques. To ease the torque programming of power tools, the following values are given for indication:

Indicative torques:

DN50-125: 20Nm

DN150-200: 30Nm

The PAM Ensign grip collar is designed to withstand four assembly cycles.

Note: The PAM Ensign grip collar has been designed to be compatible with ductile iron couplings (100 to 200mm diameter).

Installation recommendations

In certain fitting arrangements care needs to be given to the positioning of the grip collars when installing over the Ensign ductile iron couplings. This calls for a special installation procedure to avoid any on-site difficulty. Contact technical department 01952 262529.

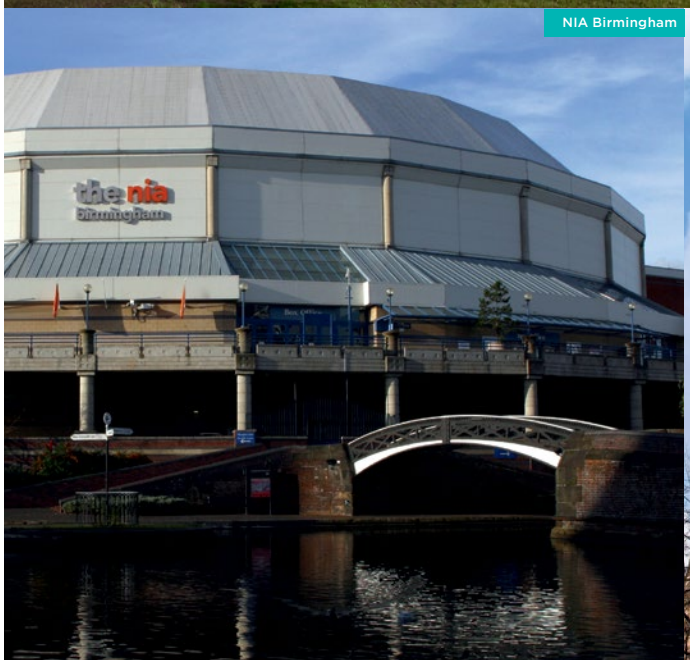
Section 4
Brackets – Technical

Ensign cast iron drainage – 1st choice for public buildings

Ensign offers the safest and quietest solution for public buildings like libraries, and prisons.

- Fire resistance – its non-combustibility negates the threat of fire damage from combustible materials being placed down the system intentionally
- Acoustically the quietest material on the market
- Longevity – public buildings are built to last, and cast iron has the proven long life track record
- Public buildings need to be using sustainable materials to support Government targets. Cast iron is a natural material with a continual recycling system

Gartcosh Crime Campus

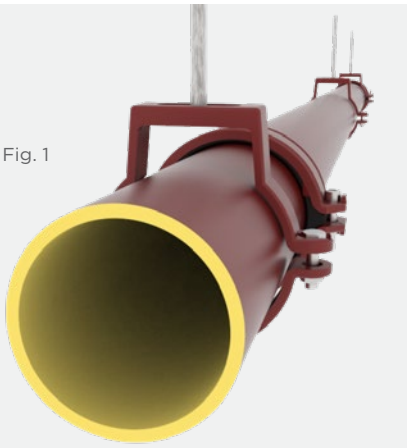


NIA Birmingham

Manchester Town Hall

Section 4
Contents

Fig. 1

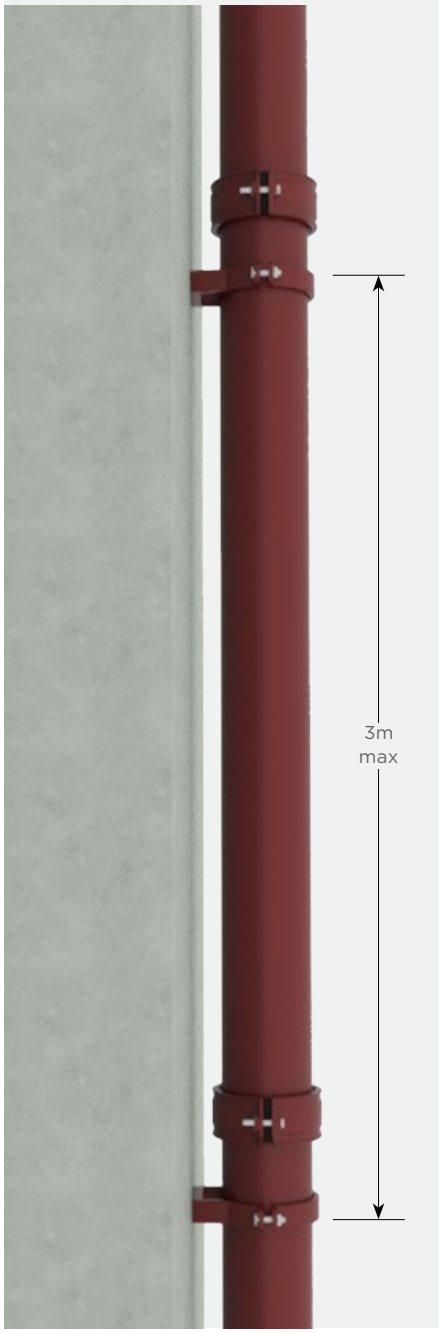


Pipe Support Brackets

The unique, all-purpose, lightweight, ductile iron bracket incorporates an elongated slot at the fixing point (see Fig. 1).

This allows both vertical and lateral adjustment without dismantling the pipe system.

Fig. 2



Support For Vertical Pipework

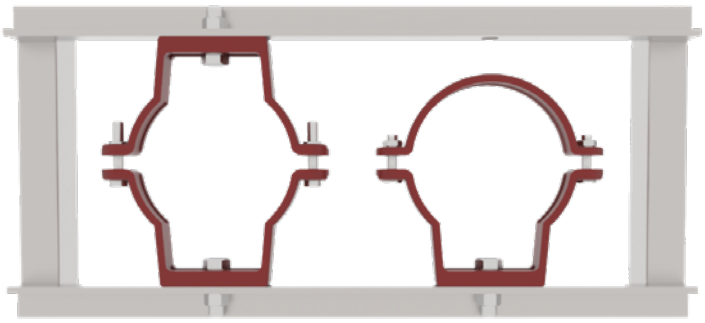
For vertical waste or rainwater stacks, it is recommended that a load-bearing bracket be fitted to each floor level, to carry the weight of the pipe and its contents. This is of particular importance on multi-storey applications.

These brackets should be tightened as the stack is built up, so that each floor height is self-supporting and undue pressure is not imposed upon the base of the stack.

Where rainwater and soil stacks (as Fig. 2) are located at standard distances from wall or column (see table below), one bracket EF048 per length of pipe will be adequate within 600mm of the joint.

Ensign pipe diameters	50, 70	100, 150, 200
Stand distances from back of pipe wall face	32mm	38mm

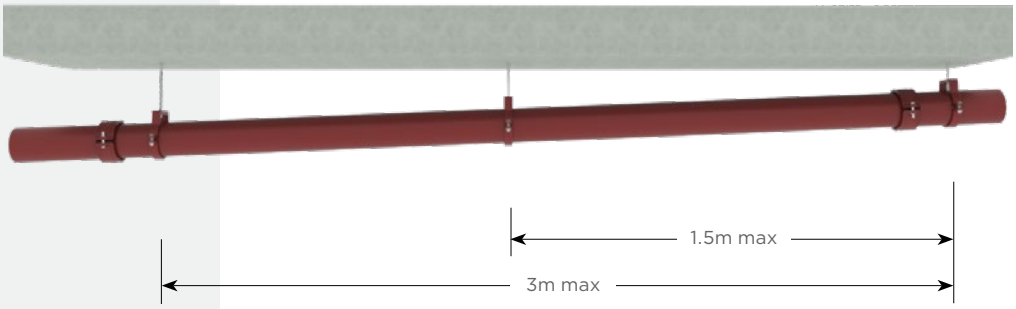
Additional brackets may be required where fittings are installed within the vertical stack, at the discretion of the designer.



Typical support arrangement for vertical pipework.

Support For Low Gradient Pipework

Fig. 3



Typical support arrangement for horizontal pipework

EF048

EF049

The distance between pipe supports should not exceed 3m, as advised in BS EN 12056-2 Code of Practice for Sanitary Pipework.

However, as shown in Fig. 3, to ease installation it is recommended that suspended Ensign pipework should have two bracket supports per 3m length.

Positioning of brackets as follows:

One bracket maximum of 300mm from joint. Second bracket positioned approximately centre of 3m length pipe, or as further guidance, 1.5m approximately from first bracket (see diagram).

Pipe weights kg per metre

Size (mm)	Empty	Full
50	4.4	6.5
70	6.0	10.0
100	85	17.8
125	11.9	24.6
150	14.3	32.5
200	23.3	54.8
250	33.5	87.9
300	43.6	121.3
400	59.3	176
500	81.6	278
600	107.3	391

Note: Design details within the catalogue are for gravity systems only or accidental pressure up to 1 bar (for pipe diameters 50-150mm).
For systems which require higher accidental pressure (for pipe diameters >150) please telephone: Technical Helpline 01952 262562.

Brackets – components

Bracket diameter (mm)	50	70	100	125	150	200	250	300
Threaded rods (recommended)	M10	M10	M10	M10	M12	M12	M12 (x 2)	M12 (x 2)

Maximum recommended length of threaded rod is 1m for single drop EF048, two drops recommended over 1m EF049 type bracket. Lateral movement brace may be required for horizontal pipework at 6m spacing.

Stack Support Pipe

The stack support pipe offers extra support to fittings and brackets.

When to use stack support pipe/brackets	
If using standard ductile iron proprietary brackets EF048/EF049	NO
If using rubber lined steel brackets If using new acoustic brackets EF048AD If using mild steel fixing brackets	YES YES YES

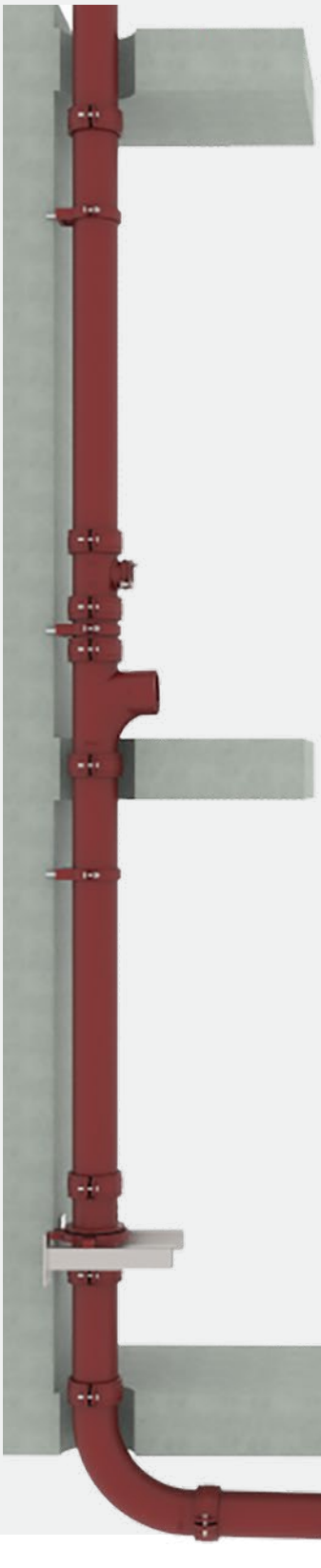
When stack support pipes/brackets are required, use on any building with an average of 2.5m between floors, positioning stack support pipe at the base of the first floor, and every subsequent fifth floor.

This should be typically fixed to a wall or column, as Fig. 4. The use of the new cantilever arm/console range EF052 is ideal for support and fixing of bracket.

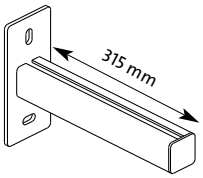
IMPORTANT! A stack support pipe is not an alternative to bracketing, but an additional support bracket.

Wall bracketing system in mild steel, for use with stack support pipe and brackets are available.

Fig. 4

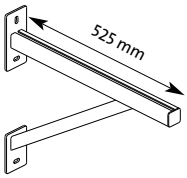


Cantilever Arm EF052



Product Code 192329

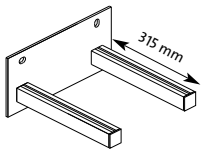
Cantilever Arm with support EF052



For stack support pipes 200-300mm dia.

Product Code 192330

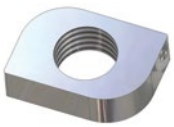
Stack support console EF052



To suit 100mm stack support bracket and pipe only.

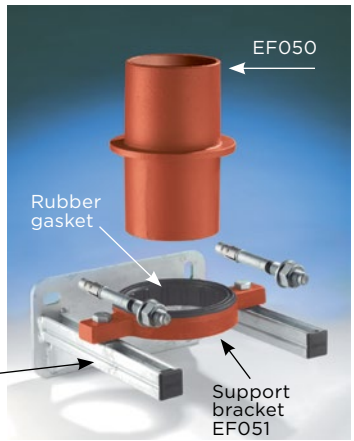
Product Code 192331

10mm Retaining Nut
To suit 192329/192331



Sits in the cantilever arm or console to retain the 10mm set screw, securing the bracket.

Product Code 192332



10mm retaining nut Product Code 192332
Sits in the cantilever arm or console to retain the 10mm set screw, securing the bracket.

Markings
40-150
ww-yy
DEP

Acoustic Bracket Features

Developed to meet the increasing demand for buildings which require a high level of acoustic performance over and above the guidelines of BS 8233:1999 (UK Code of Practice for governing acoustics within buildings). Tested to BS EN 14366:2004 – see pages 5-6. Laboratory measurements of noise from waste water installations.

The EF048 ductile iron bracket fitted with the new acoustic dampener achieved an exceptionally low level of noise transmission.

Material

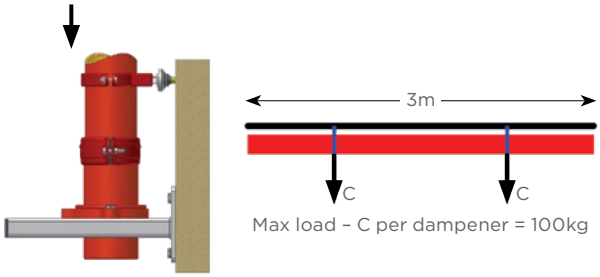
1. Dampener – elastomer EPDM
2. M8-M10 nut – galvanised-bichromated steel (will accept both threaded options)
3. Retainer cup – AISI 304 stainless steel
4. Small dish – AISI 304 stainless steel
5. M8-M10 tapped base – galvanised-bichromated steel

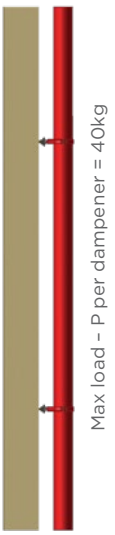
Size	50mm	70mm	100mm	150mm
Product Code	199881	199882	199883	199884

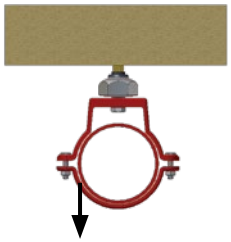
- Supplied fitted to EF048 bracket 50mm to 150mm
- EF048 bracket is manufactured in high strength ductile iron and red epoxy coated
- Dampener is connected to EF048 using M10 x 25 zinc and clear coated steel set screw with 2 x 25mm washers

Acoustic Bracket Installation

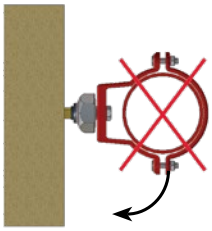
Vertical pipe stack – one acoustic bracket minimum per 3m. It is also recommended that the EF050/ EF051 stack support is used every fifth floor.







Horizontal suspended pipework – two acoustic brackets minimum per 3m.



Horizontal pipework – fixing brackets on side as per diagram is not recommended, this will lead to product failure.

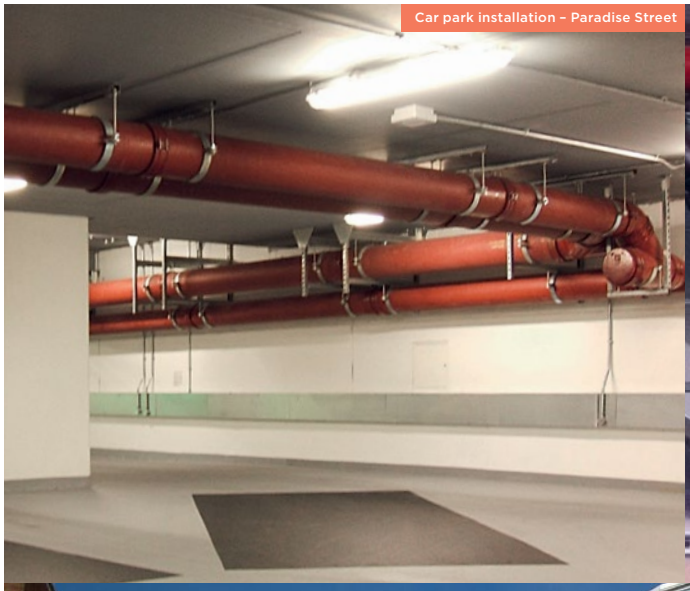
In every case of fixing – to obtain the best noise reduction, the elastomeric dampener must not be deformed or compressed!

Section 5

Connections – Technical

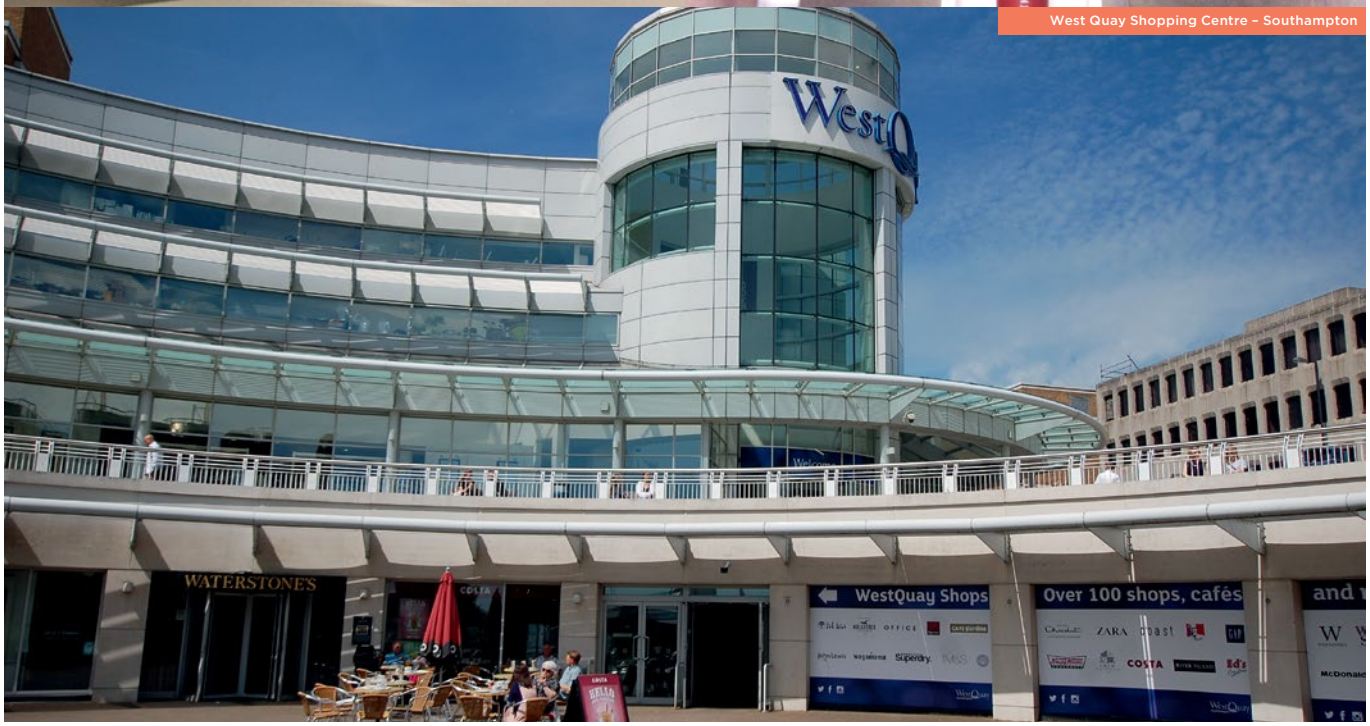
Ensign has the strength and the versatility for the ever changing dynamics of retail and shopping centres

- Mechanically jointed Ensign has the flexibility of being de-mounted and the stack designs changed to meet new requirements
- Strength and crush resistance for under building drainage performance to minimise failure risk and any expensive disruption to store activity
- Strong and robust for car parks



Car park installation – Paradise Street

Sainsbury's – Longbridge



West Quay Shopping Centre – Southampton

Section 5
Contents

Connection To Other Systems

Fig. 5

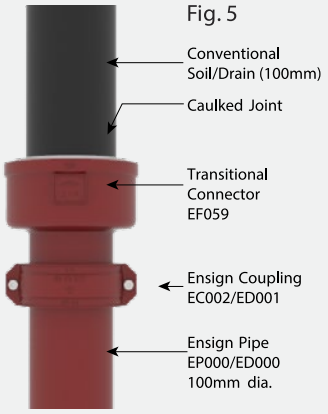


Fig. 6

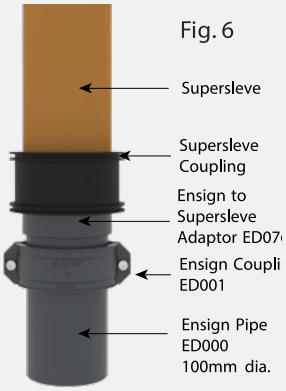
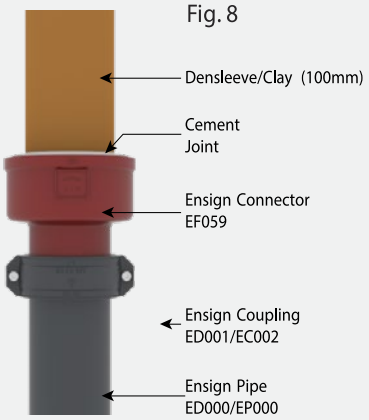


Fig. 8



WC connection

The Ensign range will accommodate 'push-fit' type, flexible connectors (ie. Multikwiks or similar), or using the transitional connector EF059.

Conventional soil/drain

To connect Ensign into a conventional soil/drain socket, use a traditional caulked joint. If connecting to a conventional soil/drain spigot, use an EF059 connector with a caulked joint and an EC002/ED001 coupling to the pipe (see Fig. 5).

Hepworth clayware

100 and 150 Supersleve can be connected to Ensign by using an ED076 adaptor and an ED001 coupling (see Fig. 6).

100 and 150 Hepsleve can be connected to Ensign by using an ED076 adaptor and an ED001 coupling in conjunction with Supersleve/ Hepsleve transitional coupling manufactured by Hepworth (see Fig. 7).

Earthenware/clayware

Ensign can be connected to an earthenware socket using a traditional cement joint.

If connecting to an earthenware spigot use an EF059 and an ED001 coupling with a traditional cement joint at the socket of the EF059. (See Fig. 8).

Ensign system dimensions

Other materials can be connected to Ensign by using an EC002 coupling, if their dimensions conform to the following table:

Ensign Nom Dia	Min OD	Max OD
50	57	60
70	77	80
100	109	112
125	133	137
150	158	162
200	208	212
250	271.5	276.5
300	323.5	328.5
400	426	431
500	528.6	534
600	631	637

Interconnections

Product	Copper 54 OD	Galvanised Steel 60 OD	muPVC 54 OD	PVC 110 OD	PVC 160 OD	Supersleve
Ensign Soil						
50	EF071R	EC002	EF071R			
70	EF071	EF028	EF071R			
100	EF071	EF028	EF071R	EC002		ED076
150	EF071	EF028	EF071R		EC002	ED076
Ensign Drain						
100	ED071		ED071	ED001		ED076
150	ED071		ED071		ED001	ED076
200						

Connection To Other Systems

Waste pipes (copper, plastics etc.)

The Ensign range offers a number of methods to connect to waste pipes:

'Push-fit' blank end EF077

Suitable for push-fit connection to copper/plastic waste, incorporating two rubber plugs accommodating 32/38mm diameter waste (see Fig. 9). Rubber plugs cut to size on site.

Fig. 9

Boss pipes

Ensign now offers the choice of boss pipes using either the compression fit method in 50-150 diameter (see below) or the traditional drilled and tapped method at 50mm BSPT available in 100mm diameter (see page 35).

PVC to Ensign PFJ

40-56mm PVC can connect directly to 100mm Ensign PFJ system, using a new push-fit gasket which accommodates three inlets.

Blank ends – push-fit EF071 or drilled/tapped EF071T

A blank end drilled and tapped 50mm BSPT EF071, using a 50mm BSPT male iron adaptor (supplied by waste manufacturer) (see Fig. 10). Or alternatively using blank ends with push-fit rubber grommets (see page 34).

Fig. 10

PVC above ground systems

100/150mm Ensign to PVC use standard Ensign coupling EC002. Please note: Remove the continuity nibs on the standard EC002 coupling before connecting to PVC.

50mm Ensign to 40-56mm PVC use new rubber universal connector EF071R (see page 33).

PVC below ground systems

100/150mm Ensign to PVC use standard Ensign coupling ED001.

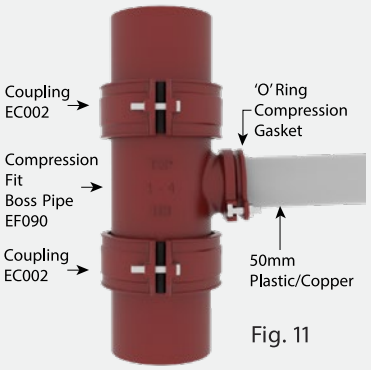


Fig. 11

Boss Pipes Compression Fit

The boss pipes incorporate 'O' ring compression gaskets that will accept 54-56mm O/D pipe, and is supplied assembled with the following for each boss (see Fig. 11).

1. 6mm 'O' ring rubber (EPDM).
2. M8 x 30 zinc and clear coated steel screw x 2.
3. M8 coated steel nuts x 2.

To connect 32mm and 38mm waste pipes fit the appropriate reducing adaptors onto the pipe before inserting through the clamp flange (see Fig. 12).

The 'compression fit' boss pipes have been introduced to reduce the cost of connecting to waste pipes, eliminating the need for expensive conventional threaded male adaptors, and subsequently reducing the overall installation costs.

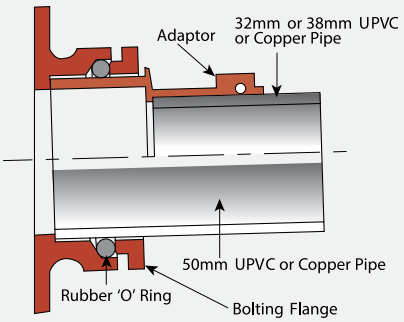
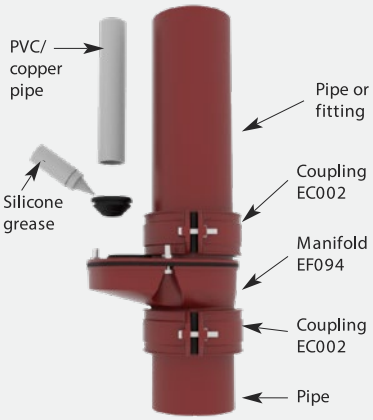
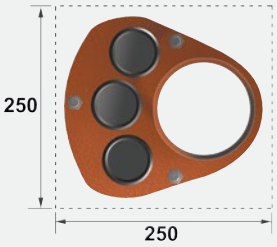
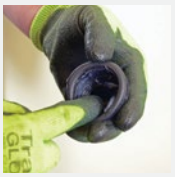
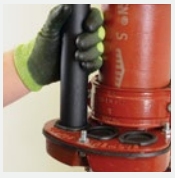


Fig. 12









Multi-Waste Manifold Connector

The multi-waste manifold simplifies waste plumbing by grouping all associated pipework from various sources such as sinks, basins, bidets, urinals and showers to one internal point above the finished floor level.

The manifold will permit the connection of three 32/38mm copper/ plastic waste inlets to any new or existing 100mm diameter Ensign pipe stack and three 50mm copper/plastic waste inlets to 150mm diameter pipe stack.

The manifold main body is connected to the stack using standard coupling EC002.

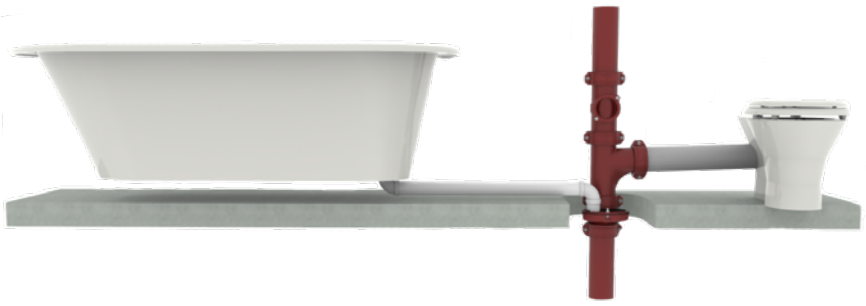
On the 100mm manifold to achieve a 32mm waste connection, remove the inner rubber ring, 38mm utilising the outer ring (for waste pipe maximum lengths see BS EN 12056-2).

Pipework connecting discharge appliances to SVP manifold, should be designed not to cause self-siphonage.

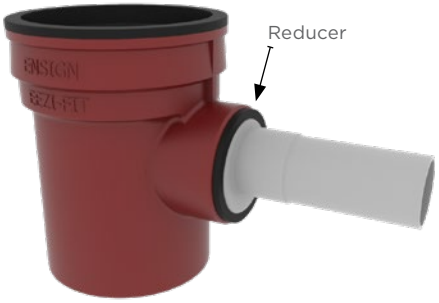
Fixing instructions

1. Cut the appropriate groove for 32mm or 38mm waste connections (100mm manifold only), remove the grommet and tear out the centre disk where required".
2. Apply an appropriate silicone grease (not provided) to the outside of the grommet and re-fit into manifold ensuring that the retaining groove of the grommet is located correctly in the casing.
3. Lubricate pipe ends and insert into grommet with a rotational movement. Pipe ends may be chamfered for ease of insertion.
4. Any grommet not fitted with a waste pipe must also follow instruction 2 above.

Typical Manifold Application



EEZI-FIT Manifold Application



EEZI-FIT Boss Pipe Connections

Boss pipes and manifold are supplied with rubber grommets for connection to 54mm OD copper and 56mm OD UPVC waste.

To connect to 38/32mm waste simply use a reducer as shown (supplied by waste manufacturers).

EEZI-Fit Manifold

New Multi-waste Manifold

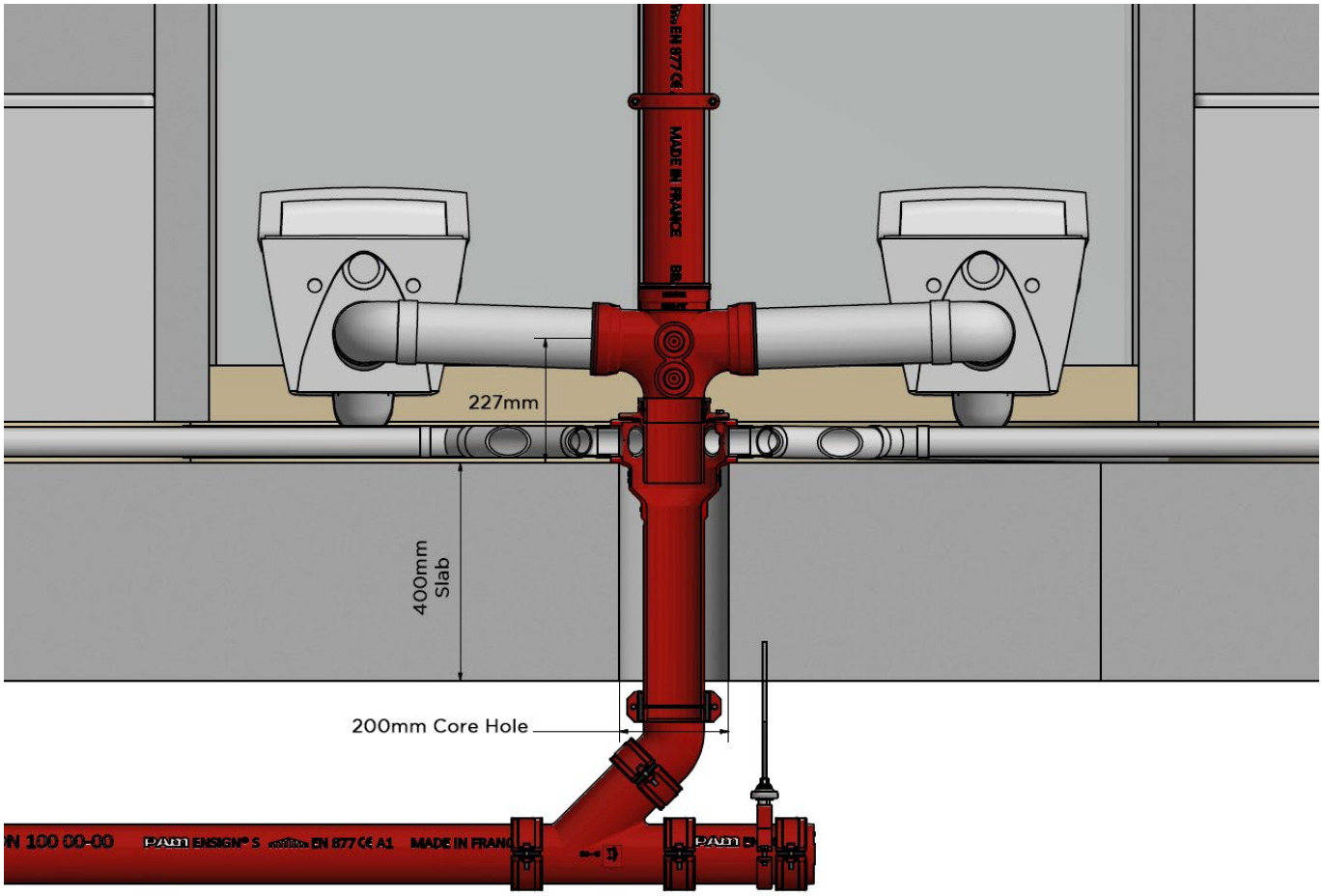
Developed to meet the requirements for low waste connections such as walk in showers or when space is limited.

Features

- Available in 100mm and 150mm diameters
- 6x2" BSP waste inlets
- Supplied with 5 blanking plugs
- Internal baffle to eliminate cross flow
- Long tail spigots to penetrate the floor slab
  - 100mm up to 400mm floor slab
  - 150mm up to 250mm floor slab
  - 10mm increment markers to assist cutting for smaller floor slab depths

Benefits

- Available for both PAM BS EN877 systems:
  - Ensign mechanically jointed system EF095
  - EEZI-FIT push-fit sanitary system EZ095
- All 6 inlets can be utilised at the same time
- Minimal core holes required saving cost
  - 100mm fits within a 200mm core hole
  - 150mm fits within a 225mm core hole
  - Self-supporting when installed in these core holes
- Long tail spigots that can eliminate having a joint in the slab



Ensign Manifold

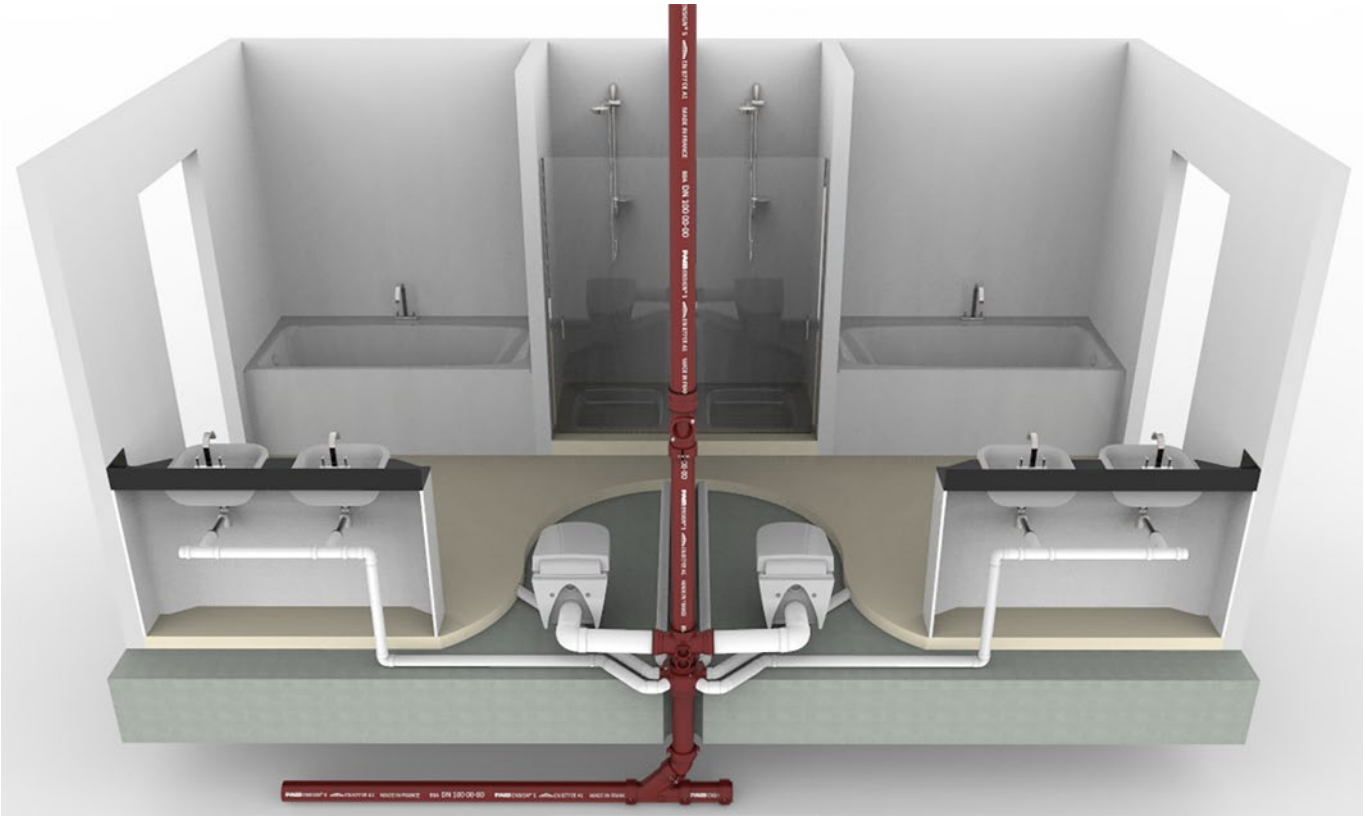
Flow Tested

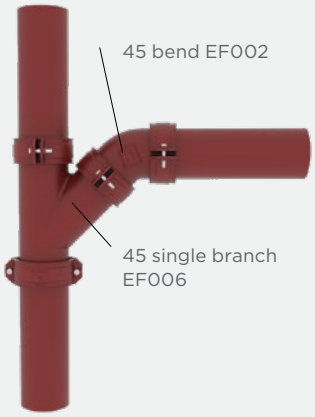
The manifold incorporates an internal baffle to allow all waste inlets to be connected to appliances and used at the same time. To ensure the baffle eliminates the possibility of cross flow both the 100 and 150mm designs have been flow tested by CRM Rainwater Drainage Consultancy.

- The 100mm unit was successfully tested at:
  - Vertical flow of 1.8l/s consistent with a 6l/s WC flush and all 6x2" waste inlets flowing at 1l/s.
- The 150mm unit was successfully tested at:
  - Vertical flow 6.4l/s from above with all 6x2" waste inlets flowing at 1l/s.

Underground tests at CRM

Example how all 6x2" BSP waste inlets being utilised





Legend:
L > 450mm (for single houses up to three storeys high)
or L > 740mm (for multi-storey systems up to five storeys high)
or L > one storey height (for multi-storey systems higher than five storeys) ie. no connections on ground floor level.
R is as large as possible [twice internal diameter (IDx2)]

Design Guidance in accordance with BS EN12056-2:2000

Use of Swept radius branches
ND.3.2.4 Branch pipe bends and junctions

Bends in branch discharge pipes should be avoided, especially for single and ranges of wash basins, as they can cause blockages and increase self-siphonage effects. When they are unavoidable, they should be of a large radius.

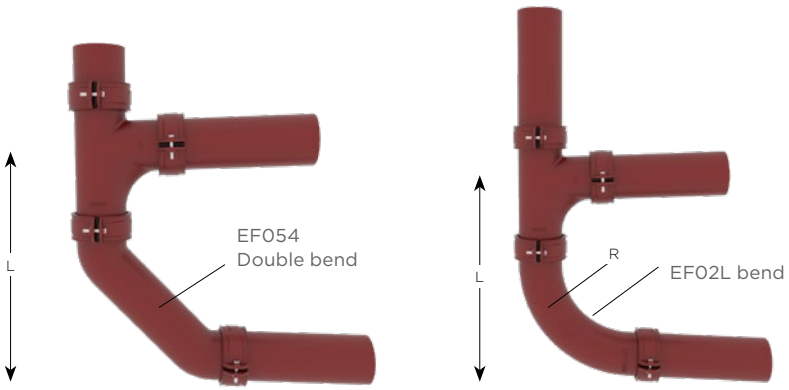
Junctions between branch discharge pipes of about the same diameter should be swept in the direction flow using swept entry branches, otherwise 45 deg branches should be used.

For branch discharge pipes 75mm to 150mm diameters (connected to stacks of up to 150mm diameter).

Whilst BS EN12056 allows tee branches if unequal (ie. 100x50), PAM still recommends the use of swept branches EF06R for all sanitary discharge junctions.

ND.3.5.2 Bends at the base of stacks

Bends at the base of a discharge stack should be of a large radius (minimum centre line radius 200mm) or two 45 degree radius bends may be used. Increasing the diameter of the bend at the base of a stack is an alternative but this may oversize the drain and be uneconomic.



ND.3.5.3 Branches at the base of stacks (primary ventilated stack system)

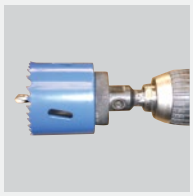
Generally, for systems up to five storeys, the distance between the lowest branch connections and the invert of the drain should be at least 750mm, but 450mm is adequate for low rise single dwellings. For multi-storey systems, it is better to connect the ground floor appliances to their own stack or the horizontal drain and not directly to the main stack. For buildings over 20 storeys high, it may be necessary to connect both ground and first floor appliances in the same manner.

ND.3.5.4 Offsets

Offsets in wet portions of a discharge stack should be avoided. When they have to be fitted, large radius bends should be used as described in ND.3.5.2.

EEZI-FIT boss branch

1. Firstly decide on which boss or bosses are to be used. If possible cut these out before installation of the branch. Fit the drill, arbour and hold cutter (51mm) as shown left.
2. Set the drill on fast speed, and drill a pilot hole locating the drill in the dimple provided. When the drill breaks through, set the drill to a slow speed and continue to cut the hole with the hole saw. Ensure that the drill is cutting square to the boss and only apply moderate even pressure on the drill. When the drill breaks through, the waste metal will remain in the hole saw.
3. Use a file to remove any sharp burrs around the cut edge, and touch up with a two part epoxy repair kit or similar to bring back the protection to the original specification.
4. Fit the rubber grommet into the boss, apply lubricant (Code 199037) to the inside of the grommet and to the outside of the waste pipe, rotate the waste pipe and push firmly until full located.



STEP 1

STEP 2

STEP 3

STEP 4

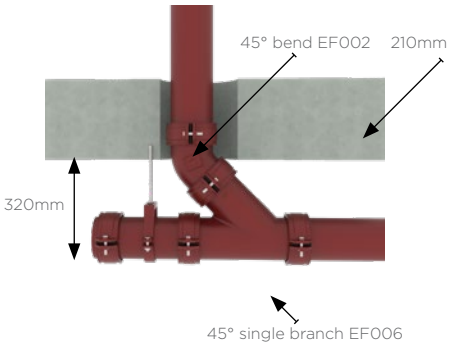
Ensign Long-Tail Branches

Same procedure applies to the Ensign long tail branches EF096/EF097.

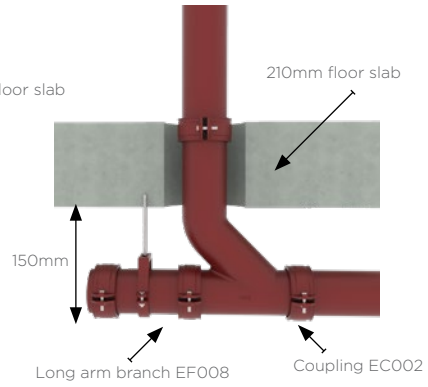
Typical Applications – Long Arm Branch

The Ensign long arm branch fitting EF008 is ideal to use if space under the floor slab is limited as shown in the diagrams. The space required by the long arm branch is virtually half that, when using a single branch and bend at 45 degrees.

Standard method
100mm diameter



Method using
long arm branch



Typical Applications – Movement Connector

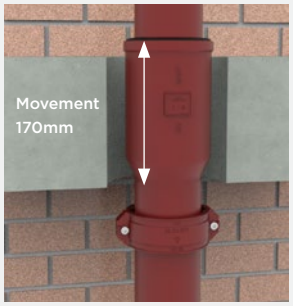
This allows for pipe movement without buckling during limited building settlement or pipework settlement.

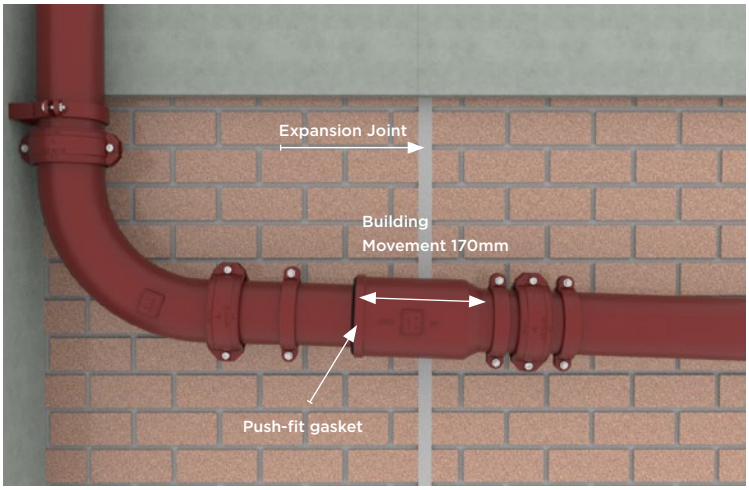
Pipe movements of approximately 170mm are allowed for within the EF058.

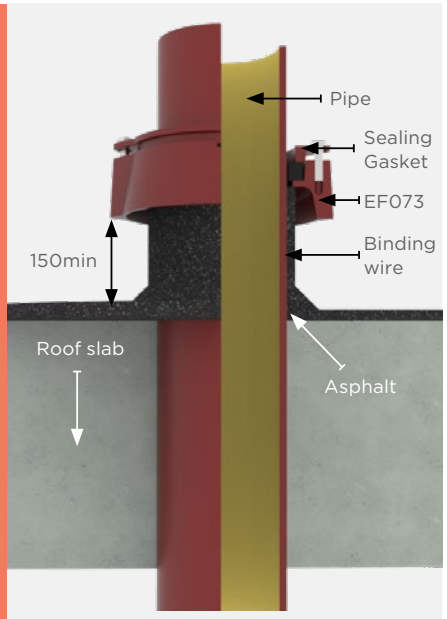
The gasket within the connector must be lubricated with silicone grease (or similar).

Available in 100mm and 150mm diameter.

Note: When used horizontally on rainwater installations, it is recommended that an access pipe be positioned adjacent to allow rodding access, should any build-up of silt occur in the movement area.





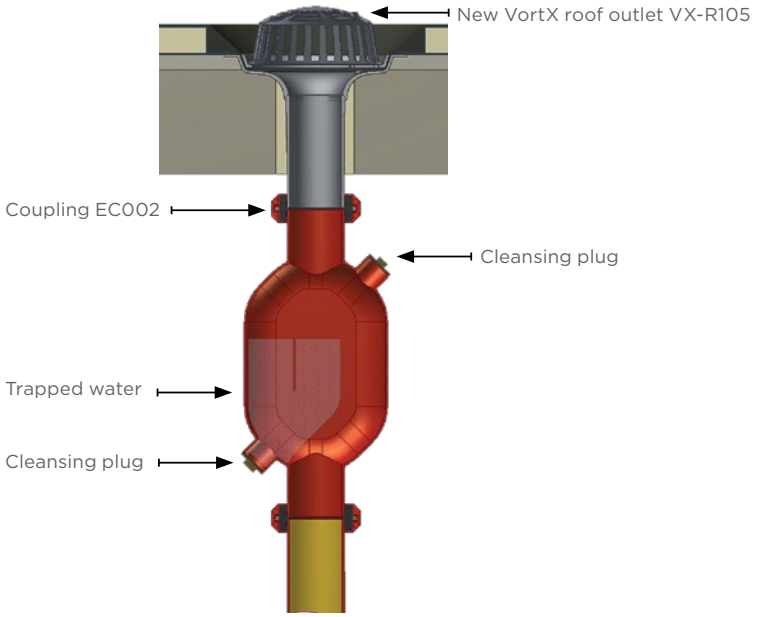


Typical Applications – Asphalt Roof Adaptor

For use where soil pipes pass through a roof with an asphalt covering without the use of a sleeve.

1. Slide the EF073 over the pipe onto the upraised asphalt (support asphalt with a binding wire mesh).
2. Tap gently to seat.
3. Tighten the stainless steel screws.

Applications – Stench Trap



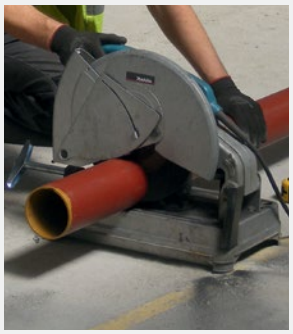
- Installed in a 100mm or 150mm diameter rainwater system
- Prevents odours emanating on to balconies and flat roofs

Installation Best Practice Guide

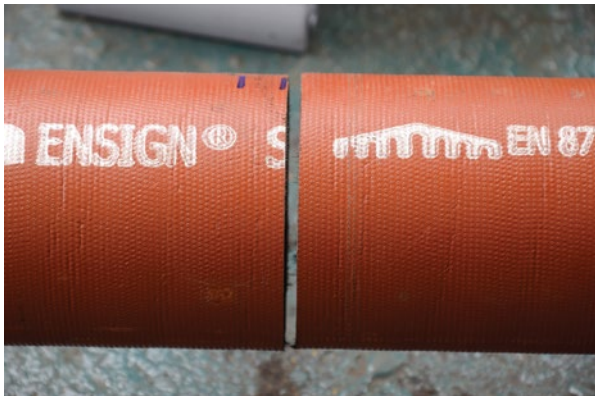
Pipe cutting

Scorp 220 cutter

- The ultimate and fast solution for cutting of cast iron 50-200mm
- Easy, secure and effortless cutting during use on construction sites
- Wide range of applications and dimensions
- No rework necessary – accurate cutting
- Suitable for clamping joints
- Reduction of tool costs
- Reduction in sparks – may not require hot works permit



Alternatively, use a chop saw



Demonstrating accuracy of cut.

Coupling and assembly

Hand-held cordless impact driver

Saint-Gobain PAM UK has conducted a number of field trials on handheld cordless drills, with experienced installers of cast iron drainage systems. The purpose was to identify tools which reduce the time taken to install cast iron mechanical couplings, but are also practical and easy to use in site conditions where space can be limited.

Field trials – research findings

- Using a cordless drill reduced the time taken to assemble a ductile iron coupling by up to 50%
- Plumbing installers found time savings significantly increased on larger diameter couplings which incorporate four fixing bolts (150-300mm)
- Experienced plumbing installers who trialled the hand-held drills reported significant savings in time, and improved productivity on site

A number of cordless drills were trialled on many sites.
The best all round performer being:

Cordless impact wrench Bosch GD14.4v (shown)

- High torque and high impact force ensure optimum performance
- New battery technology extends the service life of the batteries by 50%
- ½ hour charger (standard equipment) enables fastest recharging
- High level of comfort
- Compact and ergonomic shape
- Very good power/weight ratio ensures fatigue-free working
- Gear housing made of metal form maximum precision and long service life
- Safe working without recoil
- Three-fold adjustable light ensures optimum visibility, even in dark areas

NOTE: These devices are not manufactured or supplied by Saint-Gobain PAM UK but are available via reputable dealers.

Ratchet spanner
½" Samare drive EF100 – Sap code 191201

Check alignment of assembly before tightening the bolts. Coupling bolts on all sizes are M8 and require special Allen socket adaptor (6mm) EF102, together with a ratchet spanner EF100. Alternatively use a time saving power tool.

Note: Bolts should be tightened until a suitable resistance is achieved if using a torque wrench minimum setting 20Nm.

The couplings do not need to be completely tightened until both halves are touching. Guidelines: 2-3mm gap.

Cricket pipe carrier
To assist on site with transporting larger diameter pipes and fittings there is the Cricket pipe carrier:

- Transport 20ft (6.1m) pipe lengths up to 1,000lb (450kg)
- Comes with ratchet hold-down strap and 16" tubed tyres
- Weighs only 80lb (36.0kg)
- Quick handle disconnect for compact storage

Easy use:

Step 1. Use ratchet hold-down strap to secure Cricket to pipe.

Step 2. Use handle to flip Cricket and pipe.

Step 3. Reposition handle. Great for carrying flanges, fittings and valves.

Section 6

Buried Drainage – Technical

Ensign cast iron drainage – 1st choice for rail

Ensign is robust and offers durability and non-combustibility, particularly essential for underground stations.

- The tensile and crush strength of Ensign is superior to all materials and is the best performing cast iron system (pipes manufactured using De Lavaud process) far exceeding the standard requirements
- Fire resistance – will not feed the fire and emit dangerous smoke
- Ensign is LUL approved
- Fit and forget peace of mind

Waterloo Station

Section 6
Contents

Buried Pipe Systems

Ensign drain pipes and fittings are an ideal choice for below ground applications.
Buried pipes are subject to mechanical strain due to the weight of the ground structure and possibly wheel loading when they are laid under roads or areas with vehicular traffic.

The mechanical performance of a buried pipework is to be considered as a pipe/soil system: the interaction of the pipes with the surrounding soils depends on their stiffness or flexibility, and the selected type of laying condition.

The choice of bedding and backfilling depends on the depth at which the pipes have to be laid, the size and the strength of the pipes. The standard EN 1610 "Construction and testing of drains and sewers" applies to drains normally buried in the ground and normally operating under gravity.

You will find below the hypothesis for rigid pipes retained for the calculation of allowable depth of cover.

	DN100 to DN300
Modulus of Young:	110000
Poisson's ratio:	0.25
Max stress:	350
Strain coefficient:	1.5
Buckling coefficient:	2.5
Geometrical defect:	1,2 + DN/2000

Installation parameters are laid down according to:

- Soil type (see groups below)
- Quality of compaction of the embedment
- Behaviour of the pipe (rigid for cast iron)
- Presence of wheel loads or not
- Particular conditions (eg. groundwater table)

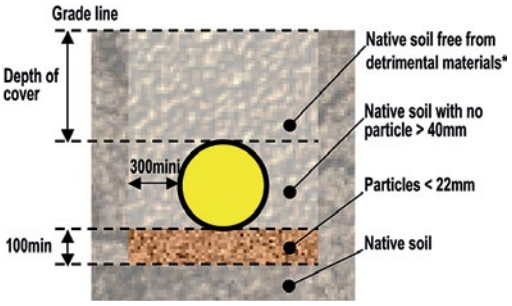
Backfilling recommendations

From DN100 to DN300, with or without traffic loads (according to EN1610).

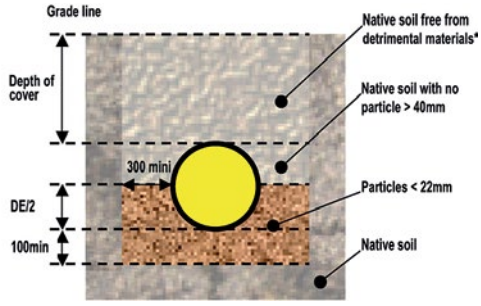
Two main solutions have been retained out of the EN 1610 recommendations: taking into account both ease of installation and knowledge from experience of rigid pipe systems. For compaction, the more adverse hypothesis was retained.

These solutions maximise the advantage from cast iron's mechanical properties: depth of cover they can withstand, possible backfilling with native soil removed, thereby limiting the damage to the environment.

Solution 1



Solution 2



Dimensions are in mm

*Detrimental materials = stones, tree roots, rubbish, organic material, clay lumps (>75mm), snow and ice.

The table below gives values for depths of covers according to the Fascicule 70 calculation, considering rigid pipes.

Depth of cover values (m)		Without traffic loads	With traffic loads
Solution 1	Mini**	0.3(1)	1
	Maxi	3.20	2.4
Solution 2	Mini**	0.3(1)	0,3
	Maxi	6 (or 9.5)	6 (or 9.3)

** Does not take into account the frost free arrangements
(1) The calculation allows shallower depth of cover, but this figure includes safety margin/ground surface proximity and related hazards.

Other precautions:

- Clearance at each joint between the couplings and the granular bed to allow sufficient space and to prevent the pipe from resting on the joints. (see EN1610 Section 8.5.4)
- Testing for pipe system leak-tightness according to EN1610 Section 13.

Systems embedded in concrete

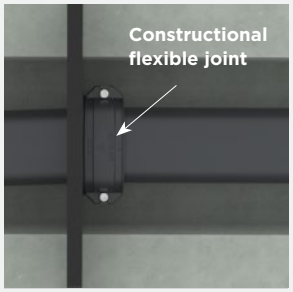
Where Ensign pipe systems are to be set in concrete, a minimum 2.5cm width of concrete on every side has to be respected because during its curing and after, the concrete will be subject to shrinkage and carbonation.

To reduce the natural rigidity of the concrete and its strain, a suitable flexible joint can be installed at intervals. This could be made of a compressible material (eg. expanded polystyrene) to be placed next to a pipe joint, and conform to the full cross section of the concrete. Refer to local good practice.

Furthermore, the pipe system should not be in contact with the metallic reinforcements of the concrete.

Surround should not be carried out until the pipework has been tested and inspected.

Fig. 13



Design Recommendations

Trench preparation

Ensign may be laid directly into a naturally trimmed trench allowing 50mm clearance at each joint between coupling and trench bottom. The trench bottom should be flat to give continuous support to the pipework.

If the subsoil cannot be accurately trimmed with a spade, the trench should be excavated to a depth of 100mm below the pipe invert and a granular bed laid. This also should allow 50mm clearance at each joint between the coupling and the granular bed. Where Ensign is to be set in concrete, the trench should be prepared as above to allow a minimum of 100mm of concrete under the pipe.

The pipe should be supported on a compressible material (eg. expanded polystyrene), either side of each joint. The concrete should have a suitable flexible joint at intervals not greater than 5 metres in order to reduce the natural rigidity of the concrete. This should be made of a compressible material (eg. expanded polystyrene) which should be placed next to a pipe joint, and conform to the full cross section of the concrete (see Fig. 13).

Haunching and surround should not be carried out until the pipework has been tested and inspected.

Testing

Water test – Gravity drains should be tested to an internal pressure of 1.5m head above the invert of the pipe, at the high end of the drain, but not more than 4 metre head at the lower end. If necessary, pipe lines, may be tested in sections.

Air test – Pipework should withstand a pressure of 100mm water gauge and this should not fall by more than 25mm in a 5 minute period. However where traps or gullies are connected they should withstand a pressure of 50mm water gauge and this should not fall by more than 12mm in a 5 minute period.

It is recommended that pipework installations are tested in sections rather than waiting to complete in one operation.

Minimum depth of pipework

Ensign can be installed under most buildings without further protection. Where Ensign is installed under roads and yards subject to normal usage, it is advisable for additional protection to be considered if the cover is less than 1.2m. However, in areas that are subject to special loadings or abuse, extra protection should be considered.

Falls

Pipework gradients should be chosen to obtain a self-cleaning action under normal discharge conditions. For flows of less than 1 litre/second a gradient of 1:40 for 100mm pipe and 1:60 for 150mm pipe are usually sufficient and for practical purposes, the gradients should not be less than 1:80 for 100mm pipe and 1:150 for 150mm pipe.

Note: See BS EN 752-1 and relevant building regulations for further information.

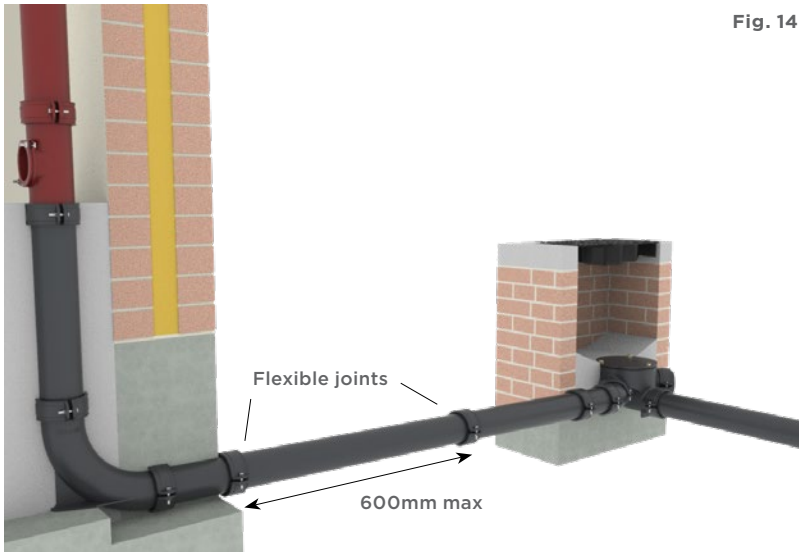
Design Recommendations

Differential movement

Ensign couplings allow up to 3° deflection at each joint.

Pipelines leaving buildings, manholes or other structures which are likely to be subject to settlement, should have a minimum of two joints, a maximum of 600mm apart, thereby allowing a short length of pipe to act as a 'rocker pipe'.

Fig. 14



The joint nearest the structure should be as close to it as possible and, in areas where large settlement is expected, more than one 'rocker pipe' may be required (see Fig. 14).

Access

Access is required on all pipelines to facilitate the rodding and clearing of debris and can be provided by manholes, chambers, access fitting or rodding eye – the latter allowing downstream access only.

Generally, no part of a drain should be further from a manhole than 45m and the distance between manholes should not exceed 90m (see Fig. 15).

Where a drain connects with another drain without the provision of an inspection chamber or manhole, access should be provided on the branch drain within 12m of the junction (see Fig. 16 and Fig. 17).

Below is a table of maximum spacing of drainage access points (in metres). For pipes up to and including 300mm dia.

From	Access-fitting		Junction	Inspection chamber	Manhole
	To small	Large			
Start of external drain	12	12	-	22	45
Rodding eye	22	22	22	45	45
Access fitting					
Small 150Ø					
Small 150 x 100			12	22	22
Large 225 x 100			22	45	45
Inspection chamber	22	45	22	45	45
Manhole	22	45	45	45	90

Reference the building regulation 1985 (2000) drainage and waste disposal document H. H1 – sanitary pipework and drainage-table 10.

Fig.15

Fig.16

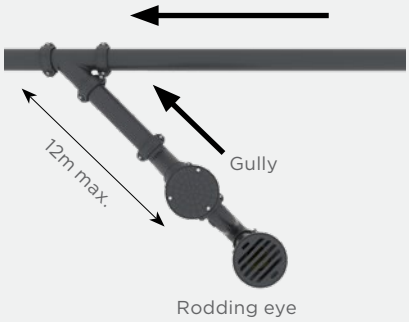


Fig.17

Fig.18

Design Recommendations

It is recommended that access to the pipework is installed each time the drain changes direction either horizontally or vertically by the inclusion of an access fitting (see Fig. 18 and Fig. 19).

Inspection chambers

Inspection chamber branch arm entries are all at 45° to conform with BS EN 12056/4.

Where other angles of entry are necessary these can be achieved by the use of standard bends (see Fig. 20).

Use of bends/branches

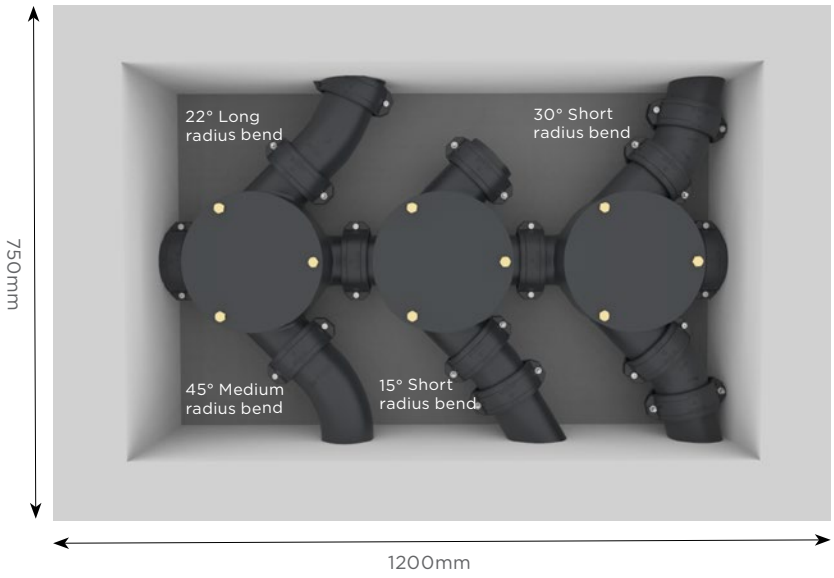
Bends in drains should be kept to a minimum. Wherever possible bends should be at or near to manholes or in a position which allow ease of rodding (see Fig. 20).

At the base of soil and rainwater stacks, it is recommended that long radius bends be used (see Fig. 19).

Branches or junctions on drains should be, where possible, at access points, such as manholes, to facilitate rodding.

Fig.19

Fig.20

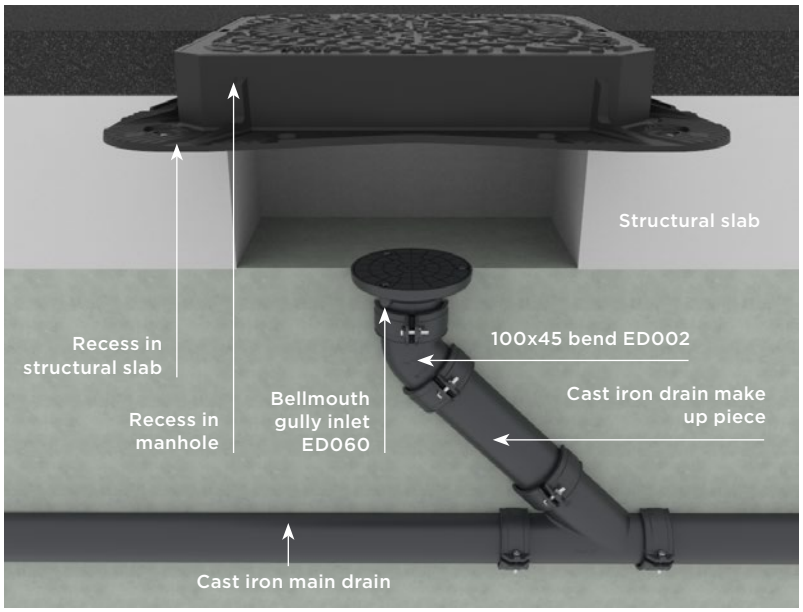


Design Recommendations

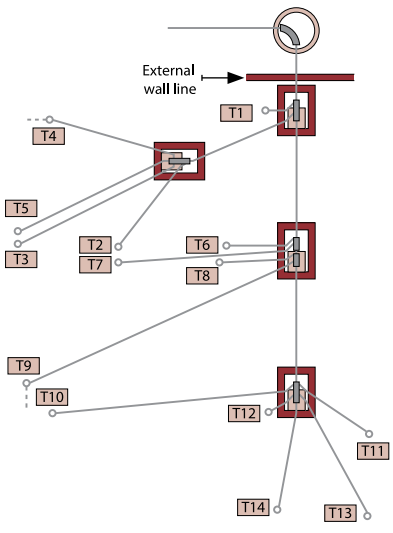
Benefits of rodding point system

- Rodding blockages to an external manhole for removal is more hygienic
- Quicker to install reducing installation costs
- Construction of manhole brick chambers no longer required
- Allows sectional testing to be carried out during installation
- Removes the problem of running a branch drain between two fixing points reducing the need for many small bends
- Fulfils the requirements of BS EN 12056/4
- Designed to accommodate CCTV surveying

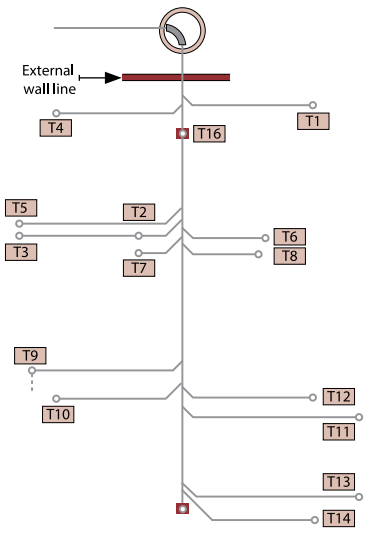
Rodding point with floor cover



Traditional British drainage system



Rodding point system



Puddle Flanges Installation Details

Where pipes pass through external walls, in basement areas, a puddle flange may be required. Locations which may be below the water table or in areas liable to flooding or in areas which may need to be sealed against methane gas coming from made up ground etc.

The puddle flange reduces the risk of water entering the building by capillary action when installed in a water retaining structure. In Figure 21 a typical build in detail is shown. The two-piece loose puddle flange is bolted onto the pipe once it has been bedded on Denso tape or similar.

Figure 22 shows a pipe passing through a sleeve. This would be used where pipework is installed after walls have been constructed. The areas between the pipe and sleeve is sealed using a mastic type sealant.

In Figure 23 we see how the puddle flange is fixed and sealed onto the pipe. With Ensign this type of puddle flange is available as ED078 in 100mm, 150mm, 250mm and 300mm diameters.

Figure 24 shows the build in type again, this time one piece (four set screws) for use with a 200mm pipe. The ED078 is a compression puddle flange which needs to be slipped over the end of the pipe and put into position. Then it can be tightened up with the ratchet wrench. The gasket within the unit is compressed on to the pipe, therefore no Denso tape is required.

Figure 25 you can see that four bolts need to be tightened up equally.

Fig. 21

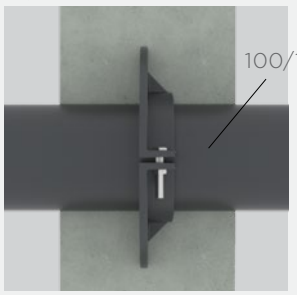


Fig. 22

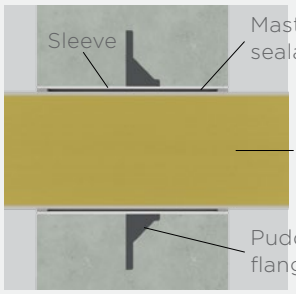


Fig. 23

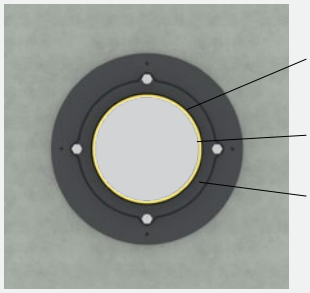


Fig. 24

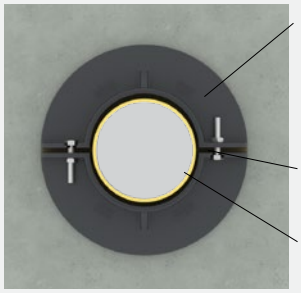
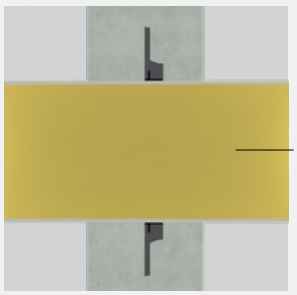


Fig. 25



Timesaver British Standard Fittings

The Timesaver drain range to BS 437 contains many British Standard design fittings – please consult latest Timesaver catalogue for full range:

- Garage gullies
- Bellmouth gully inlets
- Raising pieces
- Running traps

These fittings can be connected to the Ensign drain system using a transitional coupling TD02 (see page 46).

Transitional coupling TD02

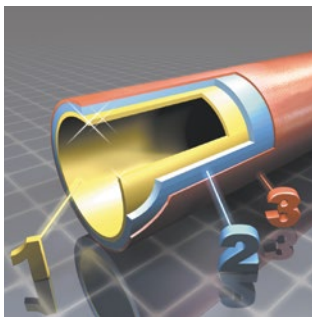
BS 437 Anti-Flooding Traps

Saint-Gobain PAM UK manufacture a range of traditional BS 437 fittings – please see Timesaver Section 11 for the full range:

- Anti-flooding trunks and valves (150mm shown below)
- Horizontal running traps (see left)
- Anti-flooding ball valves
- Fresh-air inlets
- Intercepting traps
- Petrol interceptive traps
- Large diameter inspection chambers (see left)

These fittings can be connected to the Ensign systems using a transitional coupling TD02 (for 150mm eureka anti-flooding trunk valves), or by using a transitional pipe TD47 and with a transitional coupling TD02.

Anti-flooding trap

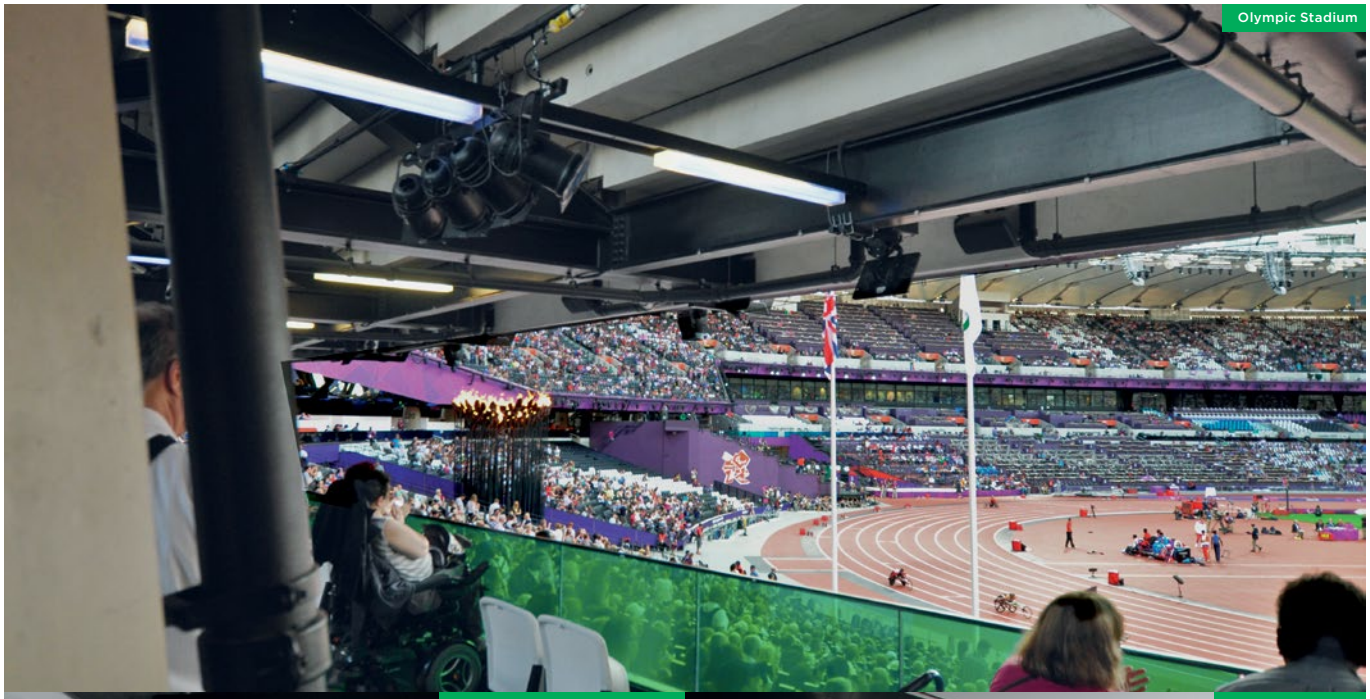


Section 7
Technical Specifications

Ensign cast iron drainage – 1st choice for stadia

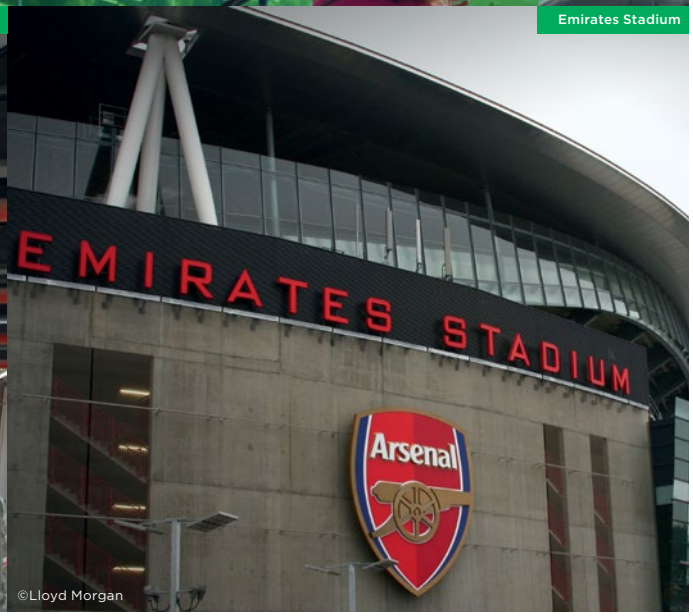
Ensign has the strength, and rigidity required
for the tough stadium environment.

- The tensile strength to withstand the robust nature of visiting people
- Rigidity required to withstand weather conditions
- Ability to be de-mounted
- Its strength remains and will not weaken over time



Olympic Stadium

Ensign on the Olympic Stadium



Emirates Stadium

Section 8
Contents

Technical Specifications

Flow capacities of Ensign pipework

Maximum flow capacity of Ensign pipes, flowing in a vertical installation, and at various gradients. (litres/second).

	Falls for RW Main Drain		Falls for RW Branch Drain		Falls for Foul Main Drain		Falls for Foul Branch Drain	
Ensign Soil Products								
50	1 in 50	1.3	1 in 25	1.8	1 in 40	1.5	1 in 20	2.1
70	1 in 70	3.1	1 in 35	4.6	1 in 56	3.6	1 in 28	5.1
100	1 in 100	5.9	1 in 50	8.3	1 in 80	6.5	1 in 40	9.2
125	1 in 125	15	1 in 62.5	13	1 in 100	11	1 in 50	15
150	1 in 150	19	1 in 75	20	1 in 120	16	1 in 60	22
200	1 in 200	26	1 in 100	37	1 in 160	29	1 in 80	42
250	1 in 250	43	1 in 125	60	1 in 200	38	1 in 100	67
300	1 in 300	63	1 in 150	89	1 in 240	71	1 in 120	100
400	1 in 400	118	1 in 200	167	1 in 320	132	1 in 160	186
500	1 in 500	191	1 in 250	270	1 in 400	214	1 in 200	302
600	1 in 600	284	1 in 300	401	1 in 480	317	1 in 240	449
Ensign Drain Products								
100	1 in 100	5.9	1 in 50	8.3	1 in 80	6.5	1 in 40	9.2
150	1 in 150	19	1 in 75	20	1 in 120	16	1 in 60	22
200	1 in 200	26	1 in 100	37	1 in 160	29	1 in 80	42
250	1 in 250	43	1 in 125	60	1 in 200	48	1 in 100	67
300	1 in 300	63	1 in 150	89	1 in 240	71	1 in 120	100
400	1 in 400	118	1 in 200	167	1 in 320	132	1 in 160	186
500	1 in 500	191	1 in 250	270	1 in 400	214	1 in 200	302
600	1 in 600	284	1 in 300	401	1 in 480	317	1 in 240	449

It is normally recommended that 100mm pipes have a minimum fall of 1:40 and 150mm pipes have a minimum fall of 1:60.

Material

Pipes and fittings are manufactured in grey iron which exceeds the requirements of BS EN 1561 Grade EN-JL 1020, ISO 185 Grade 15.

The ductile iron couplings and brackets are manufactured in accordance with BS EN 1563 and ISO 1083 with minimum tensile strength of 420N/mm^2.

Weights/masses

European Standard BS EN 877 stipulates: “The nominal masses of finished products (pipes, fittings and accessories) shall be given in the manufacturer’s catalogues.

When measured in accordance with Table 5.3 of the Standard, the mass shall be within a tolerance of –15% of the nominal mass.”

The masses of the finished products shall be checked by weighing to an accuracy within:

0.01kg	**for**			**masses**	**≤**	**1kg**
0.1kg	**for**	**1kg**	**<**	**masses**	**≤**	**20kg**
0.5kg	**for**	**20kg**	**<**	**masses**	**≤**	**100kg**
1.0kg	**for**			**masses**	**>**	**100kg**

Euroclasses		
A1	-	-
A2	s1	d0
A2	s1	d1
A2	s2 s3	
B	s1 s2 s3	d0 d1
C	s1 s2 s3	d0 d1
D	s1 s2 s3	d0 d1
Classes other than E-d2 and F		

ENSIGN SOIL EEZI-FIT

A1

Ensign Drain
A2, s1, d0

Sub-Class SMOKE production
s1 : Low smoke production
s2 : Medium smoke production
s3 : High smoke production

FLAMING DROPLETS sub-classification
d0: No flaming droplets
d1 : Flaming droplets that persist for less than 10 seconds
d2: Flaming droplets

The date/period of manufacture is also defined on the casting (see example below).

Technical Specifications

Cast iron remains one of the best materials when it comes to fire safety. The Euroclasses are based on test methods and establish a reaction to fire classification that are harmonised throughout Europe. This means that they can be used to compare materials and product performances.

Saint-Gobain PAM UK cast iron systems are among the safest materials on the market in terms of reaction to fire and all its drainage systems have been tested independently at Exova Fire Research Centre Warrington to the testing criteria stipulated.

Safety

The Euroclass classification ranges from A1 to F, with A1 and A2 being reserved for products that are not, or only slightly, combustible. The indices s and d refer respectively to smoke emission and the production of burning droplets. Saint-Gobain PAM UK Ensign and EEZI-FIT ranges achieved the highest possible score: A1 with Ensign Drain Categorised A2, s1, d0.

Scope

The CE marking for cast iron waste water systems is based on the harmonised standard EN 877, which applies to a system including pipes, fittings, couplings and accessories – and is used to test all of the components of the ranges.

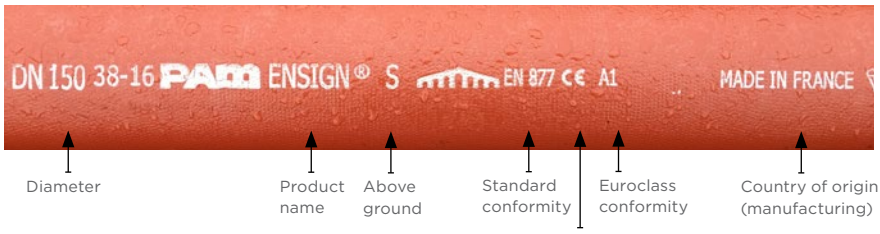
The classification obtained by Saint-Gobain PAM UK covers complete ranges – pipes, fittings, couplings and accessories, components of a waste water pipe system.

The tests carried out to determine the ranking for 'burning droplets' and 'smokes' included in the assembly elastomer gaskets and coatings.

Check the reaction to fire classification of the products you specify, and be sure that the tests were undertaken by an accredited testing centre.

Product Identification

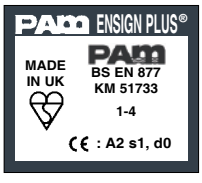
Ensign above ground



Fittings

The identification marking for Ensign fittings is a label.

Other markings identifying Ensign product is the site of manufacture depicted as G or 1-4.



CE Mark DoP

CE Marking applying to cast iron waste water systems

BS EN 877 cast iron products Ensign and EEZI-FIT from Saint-Gobain PAM UK bear the CE marking as required to conform to Construction Products Regulation (CPR).

CE A1

This new marking became mandatory on cast iron products complying with EN 877 from 1st July 2013 when leaving the factory.

CE Marking: why is it required?

Made compulsory by the European Directive for Construction products, marking is a minimum precondition to place the product on the market.

- to allow for free circulation of industrial products within the European Union and the European Economic Space
- to guarantee that these products are not dangerous for the European consumers and users
- to have the same safety criteria shared all over Europe

Fire safety has been selected as the only essential requirement for the CE marking on waste water products that must be supported by laboratory tests conducted at recognised independent facilities. This has led to a classification in the Euroclass system of 'Reaction to fire'.

Saint-Gobain PAM UK has obtained the excellent ranking for its complete ranges – pipes, fittings, couplings and accessories, components of a waste water pipe system in tests conducted by Erova Fire Research Centre Warrington.

CE marking is not a Quality mark or label – it is something very different

The CE Mark is NOT a quality mark but a self declaration of product performance (DoP) in reference to its product standard (with the exception of Reaction to Fire which requires independent testing at a recognised fire testing centre). They add value to the product in terms of customer-supplier relationships. Their scope mainly aims at fitness for purpose.

CE marking: It is intended mainly for the authorities in charge of market control. Its scope is limited to health and operation safety.

The CE marking on a product certifies that said product complies with the harmonised part of the reference Standards and is a minimum precondition to be able to place the product on the market.

Applicable SG PAM products:

- Ensign soil system
- Ensign EEZI-FIT sanitary system
- Ensign drain system

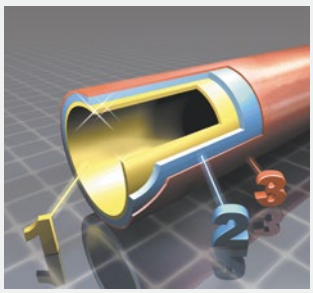
Each DoP is available to download from our website: www.saint-gobain-pam.co.uk

Scope	EN 877 harmonised	
Tests	CE marking	Kitemark
Reaction to fire (Range)	A1	●
Internal pressure strength	●	●
Dimension tolerances	●	●
Mechanical resistance	●	●
Tightness	●	●
Durability (internal coating)	●	●
Durability (external coating)	●	●

● Third party certification not made compulsory by EN 877
● Third party certified

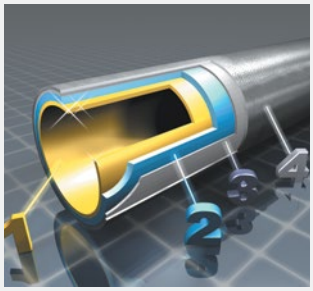
Kitemark Certification

Making a choice of a complete and consistent range of cast iron products, whose assembly has been performance tested against regulatory requirements, provides you with a peace of mind that few other materials can guarantee.



Above ground pipe

1 2 part epoxy
2 Cast iron
3 Anti-rust primer



Below ground pipe

1 2 part epoxy
2 Cast iron
3 Metallic zinc
4 Grey primer

Coating Specification

Above ground soil, vent and rainwater pipework

Externally – acrylic, anti-corrosive primer coating, red-brown colour, average dry thickness 40 microns.

Internally – two-part epoxy coating, ochre colour, with an average thickness of 130 microns.

Fittings – shall be protected internally with a red powder epoxy resin electrostatically applied to a average thickness of 150 microns. Externally coated to an average thickness of 70 microns.

Couplings/brackets

Protected with a red powder epoxy resin to an average thickness of 70 microns.

Below ground drain pipework

Externally – initial flame applied anti-corrosive zinc coating at 130gr/m^2, then painted using a grey acrylic primer with an average dry thickness of 40 microns.

Internally – two-part epoxy coating, ochre colour, with an average thickness of 250 microns.

Fittings/couplings/brackets shall normally be protected internally and externally with a single coat of grey powder epoxy resin electrostatically applied, giving an average thickness of 150 microns.

Ensign touch-up paint

Where pipes are cut on site, ends shall be cut clean and square with burrs removed. In most cases it is not necessary to re-coat the pipe ends with touch-up paint. However, where there may be more aggressive materials passing through the iron drainage system (ie. Coca Cola; acid rain; acids or strong alkaline or similar substances), it is necessary to protect the cut ends of pipework to the same standard as the internal coating of the pipe.

Extrem 1K Touch-up Paint
SAP Code: 226962

To ensure time is not wasted on site, a new quick drying touch up paint has been introduced – supplied in 0.5kg tins. The touch-up paint is for both above and below ground systems that air dries within 15 minutes (depending on atmosphere/temperature). The paint is an acrylic resin with solvent. Gloves should be worn during appreciation (full data sheet available on request).

For larger surface areas particularly on pipe-use spray touch-up.

Ensign red epoxy touch-up spray paint	Product Code
0.4 litre spray tin two part epoxy	216317
Ensign grey epoxy touch-up	**Product Code**
0.4 litre spray tin two part epoxy	216318

Overpainting – external rainwater, soil and vent systems

The coating for Ensign is regarded as a primer, therefore for exposed, external installations should be overpainted. The system should be gently rubbed down with suitable abrasive paper, in order to provide a good adhesion key for the finish coating.

We recommend the application of a quality undercoat, and final top coat suitable for the requirements of the local environment.

Aggressive soil conditions

According to Annex C of BS EN 877, pipes buried in contact with soils with a lower pH than 6 it is recommended be additionally protected with polythene sleeving or other type of external coating as appropriate.

Chemical Resistance

Chemical resistance of the ochre pipe coating

The new generation of Ensign pipes, internally lined with a two-part epoxy (ochre in colour) provide greater chemical resistance which exceed the requirements stipulated in the new European standard BS EN 877 which includes pH2 – pH12 (with exception of some organic acids).

The epoxy coating on the fittings – match the performance of the pipes.

✔ conform
✖ not conform
▲ no use

		pH	20°C	60°C	80°C
Mineral acid	Sulphuric acid	0.4	✖	✖	✖
Mineral acid	Hydrochloric acid	0.7	✖	✖	✖
Mineral acid	Sulphuric acid	1.0	✔	✖	✖
Mineral acid	Hydrochloric acid	1.0	✔	✖	✖
Organic acid	Lactic acid	1.1	✔	✖	✖
Descaler	Commercial brand	1.2	✔	✔	✔
Mineral acid	Phosphoric acid	1.3	✔	✖	✖
Soft drink	Coca Cola	1.6	✔	✔	✔
Mineral acid	Phosphoric acid	1.8	✔	✔	✖
Mineral acid	Phosphoric acid	2.0	✔	✔	✔
Mineral acid	Chlorhydric acid	2.0	✔	✔	✔
Mineral acid	Sulphuric acid	2.0	✔	✔	✔
Mineral acid	Nitric acid	2.0	✔	✔	✔
Organic acid	Citric acid	2.0	✔	✔	✔
Descaler	Commercial brand	2.0	✔	✔	✖
Organic acid	Lactic acid	2.2	✔	✖	✖
Organic acid	Lactic acid	2.3	✔	✖	✖
Organic acid	Acetic acid	2.3	✖	✖	✖
Soft drink	Coca Cola	1.6	✔	✔	▲
Organic acid	Acetic acid	2.9	✔	✖	✖
Disinfectant product	Commercial brand	3.1	✔	✔	✔
Organic acid	Acetic acid	3.2	✔	✖	✖
Softener	Commercial brand	3.5	✔	✔	✔
Salts	Potassium chloride	4.2	✔	✔	✔
Salts	Natrium phosphate	4.2	✔	✔	✔
Stain remover	Commercial brand	4.2	✔	✔	✔
Salt	Natrium chloride	5.6	✔	✔	✔
Detergent	Commercial brand (dish)	5.8	✔	✔	✔
Descaler	Commercial brand (dish machine)	6.4	✔	✔	✔
Water	Demineralised water	6.6	✔	✔	✔
Salt	Natrium hydrogenated sulphate	6.7	✔	✔	✔
Detergent	Commercial brand (bath)	6.9	✔	✔	✔
Water	Waste water (EN877)	6.9	✔	✔	✔
Detergent	Commercial brand (floor wash)	7.4	✔	✔	✔
Detergent	Commercial brand (wool wash)	7.7	✔	✔	✔
Detergent	Commercial brand	7.9	✔	✔	✔
Descaler	Commercial brand	8.9	✔	✔	✔
Detergent	Commercial brand	9.0	✔	✔	✔
Stain remover	Commercial brand	9.3	✔	✔	✔
Detergent	Commercial brand	9.5	✔	✔	✔
Detergent	Commercial brand	10.0	✔	✔	✔
Stain remover	Commercial brand	10.3	✔	✔	✔
Detergent	Commercial brand	10.3	✔	✔	✔
Detergent	Commercial brand	10.8	✔	✔	✔
Cleaning product	Commercial brand	11.8	✔	✔	✔
Base	Natrium hydroxide	12.0	✔	✔	✔
Miscellaneous	Natrium hypochloride (bleach)	12.0	✔	✔	✔
Base	Ammonia	12.1	✔	✔	✔
Miscellaneous	Natrium hypochloride (bleach)	12.5	✔	✔	✔
Detergent	Commercial brand (industrial kitchen)	12.9	✔	✔	✔
Base	Potassium hydroxide	13.6	✔	✔	✔
Base	Natrium hydroxide	13.6	✔	✖	✖
Water	Oxygenated water		✔	▲	▲
Solvent	Ethanol		✔	▲	▲
Solvent	Xylène		✔	▲	▲
Solvent	Motor oil		✔	▲	▲
Solvent	Turpentine		✔	▲	▲
Solvent	White spirit		✔	▲	▲
Solvent	Petrol		✔	▲	▲
Solvent	Cyclohexanone		✔	▲	▲

Pipe Dimensions

Products	Min ID	Min OD	Max OD	Section
		Ensign Soil & EPAMS		
50	47.5	58	60	3 (+3.25/-0.5)
70	68.25	77	80	3.5 (+2.375/-0.5)
75	79	82	85	3.5 (+2.375/-0.5)
100	97.5	109	112	3.5 (+3.75/-0.5)
125	121.25	133	137	4 (+3.875/-0.5)
150	146.25	158	162	4 (+3.875/-0.5)
200	195	208	212	5 (+3.5/-1)
250	243.75	271.5	276.5	5.5 (+10.875/-1)
300	292.5	323.5	328.5	5 (+12/-1)
400	390		431	6.3 (+14.2/-3)
500	487.5		534	7 (+16.25/-1.8)
600	585		637	7.7 (+18.3/-1.9)
		Ensign Drain		
100	97.5	109	112	3.5 (+3.75/-0.5)
150	146.3	158	162	4 (+3.875/-0.5)
200	195	208	212.5	5 (+3.5/-1)
250	243.8	271.5	276.5	5.5 (+10.875/-1)
300	292.8	323.5	328.5	5 (+12/-1)
400	390	-	431	6.3 (+14.2/-3)
500	487	-	534	7 (+15.25/-1.8)
600	585	-	637	7.7 (+18.3/-1.9)
		Timesaver Soil		
50	48	58	68	5 (+2.5/-0.5)
75	74	85	89	5 (+2.5/-0.5)
100	99	109	114	5 (+2.5/-0.5)
150	150	160	165	5 (+2.5/-0.5)
		Timesaver Drain		
100	99	116	119	8 (+2/-1.3)
150	150	170	173	9 (+2.5/-1.3)
225	225	252	255	12 (+3.5/-1.8)

		VortX		
56				
60	47.5	58	60	3 (+3.25/-0.5)
80	68.25	77	80	3.5 (+2.375/-0.5)
110	97.5	109	112	3.5 (+3.75/-0.5)

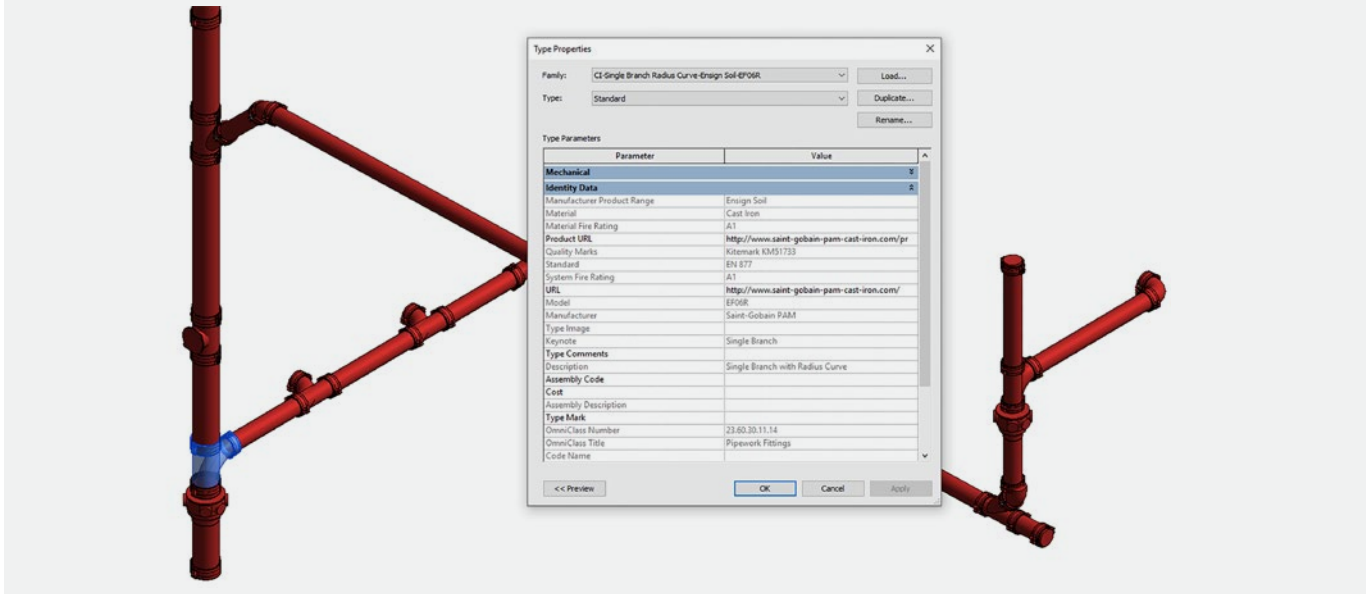
Section 8
CAD & BIM

Ensign cast iron drainage the learned choice for education

Ensign offers the strength, safety and durability for buildings where young people work and play.

- Fire resistance – ensures maximum safety to the building occupants
- Acoustic comfort – without the need of expensive insulation supporting a noise free environment for learning
- Minimal maintenance – will not be a drain on maintenance budgets
- Under building drainage strength – fit and forget, minimising possibility of disruption
- Longevity – durable and long lasting saving long term financial resources
- Sustainable material – made from up 97% recycled content and virtually 100% recyclable – not adding to the ever growing landfill issue

New Boldrewood University Campus



Section 9
Contents

Computer Aided Design

FastrackCAD Architect
www.fastrackcad.com
The FastrackCAD Database allows instant access to Building Components at the touch of a button. The FastrackCAD Database gives architects and specifiers using Computer Aided Design the ability to produce accurate, detailed and quality drawings with the minimum time and effort.

FastTrackCAD Database User helpline:
Tel: 020 8668 4646 Email: info@korumedia.co.uk

For Web users
The AutoCAD DWG drawing files can be downloaded directly from the Saint-Gobain PAM UK website **www.saint-gobain-pam.co.uk**

BIM Library

Saint-Gobain PAM has been developing its BIM libraries for the past 3 years collaborating with Public Health Engineers to gain a deep understanding of how drainage is being designed in BIM and to deliver a BIM library that is quick and light to use at early design stage and then full data rich files for use at final design stage 4 to contractor stage.

Riba Stages 1 and 2

PAM has therefore developed a "generic" BS EN877 library which cover the following ranges:

Product	Applications
1. Ensign Soil	Above ground soil, waste, vent and rainwater applications
2. Ensign EEZI-FIT	Above ground soil, waste, vent and rainwater applications
3. Ensign Drain	Below ground buried, bridges

All the BIM components in this library are under 500kb in size ensuring its use is lightweight and quick – Ideal for design consultants working at RIBA stage 1 and 2 in the building programme.

Access to download this library is available on the PAM website: www.saint-gobain-pam.co.uk. If assistance is needed please contact the PAM BIM technical consultant: Matthew Hassall 01952 262561

Riba Stages 4

Saint-Gobain PAM also has BIM libraries for the above ranges that are fully data rich libraries which incorporate COBIE data, providing all the necessary product data required to comply with UK standards. The Saint-Gobain BIM Library of components have been designed up to LOD specification level 350, compatibility;

- From 2016 Autodesk Revit (.rvt)

Automatic "Plug-In"

By using the PAM "Generic" BS EN 877 library the Ensign or EEZI-FIT library can be updated automatically to generate the Ensign component layout and bill of materials, using our Saint-Gobain PAM automatic conversion "plug-in". Access to the Plugin will be available again through the website (address above)

Ensign Above Ground Specification

1.1 Above ground soil,waste, vent and rainwater pipework.

1.2 Cast iron pipes and fittings

a) The systems shall be designed and installed in accordance with BS EN 12056 code of practice for gravity drainage systems inside buildings and the relevant sections of the Building Regulations.

b) Soil, vent and rainwater pipework of nominal diameters, 50mm to 600mm shall be installed using lightweight cast iron socketless pipe and fittings which fully comply with all requirements of product standard BS EN 877:1999 with Kitemark third party approval.

c) Soil, vent and rainwater pipework shall have been tested to BS EN 14366:2004 (laboratory measurement of noise of waste water installations) by a recognised certified laboratory. The results to be made available for review if required.

d) Soil, vent and rainwater pipework shall have a fire rating **A1.****

e) Pipes and fittings manufactured to BS EN877 shall be CE marked in compliance with the European Directive for Construction products.

Brackets

f) Pipework shall be supported true to line by methods strictly in accordance with the manufacturer's recommendations. Proprietary adjustable ductile iron hanging brackets such as EF048 or EF049 or EF048AD shall be used or brackets as recommended by the manufacturer's standard guidelines.

g) Soil, vent and rainwater pipework shall be supported by acoustic brackets that ensure the pipework will not exceed 47dB (A) airborne noise and 11dB (A) structure-borne noise at 4 l/s (litres per second), without insulation as recommended by the manufacturer's standard guidelines.

Jointing

Standard Couplings

h) Pipes and fittings up to 150mm diameter shall be jointed by couplings capable of withstanding up to 5 bar (accidental static water pressure) when suitably restrained with support brackets. Pipes and fittings 200mm to 300mm diameter jointed by couplings capable of withstanding up to 3 bar (accidental static water pressure)when suitably restrained with support brackets. Couplings shall have integral electrical continuity nibs. Coupling colour shall match the pipes and fittings.

High Pressure Couplings with Integral Grip

i) Unrestrained pipes and fittings shall be jointed by couplings capable of withstanding 5 bar (accidental static water pressure) as supplied by the manufacturer (these do not require restraining brackets).

Fittings

j) Where required to connect to low level soil pipework passing through the floor slab, use long tail radius curve branches at 88 degrees (conforming to BS EN 12056-2:2000) to connect to 100mm soil and waste pipes where applicable, thereby avoiding a joint in the floor slab.

k) Where possible all 88 degree branches shall be 'swept' radius curve entry (conforming to BS EN 12056-2:2000).

l) Small diameter waste pipes in plastic or copper to be connected to the main soil pipework using either mechanical compression-fit or BSP threaded boss pipes, or push-fit manifolds with grommets or blank ends.

m) Low level waste pipes shall connect to the main stack by means of a multi-waste manifold connector. The manifold will have 2" (50mm) inlets, will ensure no cross flow can occur and have a spigot that will penetrate the floor slab without the need for a joint in the slab.

Cutting Pipes

n) Where pipes are cut on site, ends shall be cut clean and square with all burrs removed. In most cases it is not necessary to re-coat the pipe ends with touch-up paint. However, where it is anticipated there may be aggressive fluids passing through the drainage system (ie. Coca-Cola) or similar substances), it is necessary to protect the cut ends of the pipework to the same standard as the internal coating of the pipe (as recommended by the manufacturer).

Coating

o) Pipes shall be externally coated with an acrylic, anti-corrosion primer coating, red-brown in colour, average dry thickness of 40 microns. Internally coated with a two-part epoxy coating, ochre colour, with an average thickness of 130 microns.

p) Fittings shall be protected internally with a red powder epoxy resin electrostatically applied to an average thickness of 150 microns. Externally coated to an average thickness of 70 microns.

q) Couplings/brackets shall be protected with a red powder epoxy resin applied to an average thickness of 70 microns.

References:
**EN 13501-1 November 2002 Fire classification of construction products and building elements.

Ensign Below Ground Specification

1.1 Below ground buried foul and stormwater pipework.

1.2 Cast iron pipes and fittings

a) The systems shall be designed and installed in accordance with BS EN 12056 code of practice for gravity drainage systems inside buildings, BS EN 752-1 for drain and sewer systems outside buildings and the relevant sections of the Building Regulations.

b) Foul and stormwater pipework of nominal diameters, 100, 150 to 600mm shall be installed using lightweight cast iron socketless pipe and fittings which fully comply with all relevant requirements of product standard BS EN 877:1999 with Kitemark third party approval.

Brackets

c) Pipework shall be supported true to line by methods strictly in accordance with the manufacturer's recommendations. Proprietary adjustable ductile iron hanging brackets as ED048 shall be used or brackets as recommended by the manufacturer's standard guidelines.

Jointing

Standard Couplings

d) Pipes and fittings up to 150mm diameter shall be jointed by couplings capable of withstanding up to 5 bar (accidental static water pressure) when suitably restrained with support brackets. Pipes and fittings 200mm to 300mm diameter jointed by couplings capable of withstanding up to 3 bar (accidental static water pressure) when suitably restrained with support brackets. Coupling colour shall match the pipes and fittings, and incorporate stainless steel socket cap screws and nutswax coated.

Push-fit Couplings

e) Pipes and fittings 100 and 150mm diameter shall be jointed by push-fit couplings incorporating 2 EPDM gaskets. Meeting requirements of BS EN 877:1999. Coupling colour shall match the pipes and fittings.

High Pressure Couplings with Integral Grip

f) Unrestrained pipes and fittings shall be jointed by couplings capable of withstanding 5 bar (accidental static water pressure) as supplied by the manufacturer (these do not require restraining brackets).

Fittings

g) Connection to small diameter waste and ventilating pipework or other materials shall be made using blank ends using push-fit connection or proprietary fittings.

h) Junctions between pipes should use the proprietary cast iron chamber, or standard branch type fittings as recommended by the manufacturer

Cutting Pipes

i) Where pipes are cut on site, ends shall be cut clean and square with all burrs removed. In most cases it is not necessary to re-coat the pipe ends with touch-up paint. However, where there may be aggressive materials passing through the drainage system (ie. Coca-Cola) or similar substances, it is necessary to protect the cut ends of the pipework to the same standard as the internal coating of the pipe (as recommended by the manufacturer).

Coating

j) Pipes shall be externally coated with an initial flame applied anti-corrosive zinc coating at 130gr/m^2 then painted using a grey acrylic primer with an average thickness of 40 microns. Internally coated with a two-part epoxy coating, ochre in colour, with an average thickness of 250 microns.

k) Fittings/couplings/brackets shall be protected internally and externally with a single coat of grey powder epoxy resin electrostatically applied to an average thickness of 150 microns.

Ensign EEZI-FIT Specification

1.1 Above ground soil and vent pipework.

1.2 Cast iron pipes and fittings

a) The systems shall be designed and installed in accordance with BS EN 12056 code of practice for gravity drainage systems inside buildings and the relevant sections of the Building Regulations.

b) Soil and vent pipework of nominal diameters, 100mm to 150mm shall be installed using lightweight cast iron socketless pipe and fittings which fully comply with all requirements of product standard BS EN 877:1999 with Kitemark third party approval.

c) Soil and vent pipework shall have been tested to BS EN 14366:2004 (Laboratory measurement of noise of waste water installations) by a recognised certified laboratory.

d) Soil and vent pipework shall have a fire rating **A1.****

Brackets

e) Soil and vent pipework shall be supported by acoustic brackets that ensure the pipework will not exceed 47dB (A) airborne noise and 11dB (A) structure-borne noise at 4 l/s (litres per second), without insulation as recommended by the manufacturer's standard guidelines.

f) Pipework shall be supported true to line by methods strictly in accordance with the manufacturer's recommendations. Proprietary adjustable ductile iron hanging brackets such as EF048 or EF049 or EF048AD shall be used or brackets as recommended by the manufacturer's standard guidelines.

Jointing

Push-fit Couplings

g) Pipes and fittings shall be jointed by EEZI-FIT couplings incorporating 2 EPDM push-fit gaskets using suitable lubricant as recommended by the manufacturer. The couplings shall meet with the requirements of BS EN 877:1999. Coupling colour shall match the pipes and fittings.

Mechanical Couplings

h) Pipes and fittings up to 100mm diameter shall be jointed by couplings capable of withstanding up to 1.0 bar when suitably supported. Couplings shall have integral electrical continuity nibs. Coupling colour shall match the pipes and fittings (these couplings can be used in areas where future dismantling may be required).

Fittings

i) EEZI-FIT soil pipework shall be installed using fittings that incorporate the jointing socket with integral EPDM push-fit gasket using suitable lubricant as recommended by the manufacturer.

j) All 88 degree branches shall be swept radius curve entry.

k) Small diameter waste pipes in plastic or copper to be connected to the main soil pipework using fittings which have integral bosses that can be cut out to suit the installation (with 51mm hole saw), push-fit boss pipes, or push-fit manifolds with grommets or blank ends.

l) Low level waste pipes shall connect to the main stack by means of a multi-waste manifold connector. The manifold will have 2" (50mm) inlets, will ensure no cross flow can occur and have a spigot that will penetrate the floor slab without the need for a joint in the slab.

Electrical Continuity

m) On pipework installations where electrical conductivity (equipotential bonding) is required, continuity clips shall be installed.

Cutting Pipes

n) Where pipes are cut on site, ends shall be cut clean and square with all burrs removed. In most cases it is not necessary to re-coat the pipe ends with touch-up paint. However, where there may be aggressive materials passing through the drainage system (ie. Coca-Cola) or similar substances, it is necessary to protect the cut ends of the pipework to the same standard as the internal coating of the pipe (as recommended by the manufacturer).

Coating

o) Pipes shall be externally coated with an acrylic, anti-corrosion primer coating, red-brown in colour, average dry thickness of 40 microns. Internally coated with a two-part epoxy coating, ochre colour, with an average thickness of 130 microns.

p) Fittings shall be protected internally with a red powder epoxy resin electrostatically applied to an average thickness of 150 microns. Externally coated to an average thickness of 70 microns.

q) Couplings/brackets shall be protected with a red powder epoxy resin applied to an average thickness of 70 microns.

References:
**EN 13501-1 November 2002 Fire classification of construction products and building elements.

Section 9

VortX – Floor, Shower and Roof Drains

VortX – Floor, Shower and Roof Drains

A simple range of cast iron floor gullies, shower gullies, and roof outlets that connect to cast iron drainage systems and pipework of any other material through a range of adaptors.

- Innovative P and S trapped gully designs
- Unique removable bottle trap
- Full range of accessories
  - Funnels
  - Raising pieces
  - Reducers and adaptors
- Gratings and rodding eyes in nickel bronze and stainless steel for typical use with tiles, marble, terrazzo, concrete, vinyl and resin floor finishes

Ensign & VortX Grating – 'Streatham Hub'

Shower Drain options

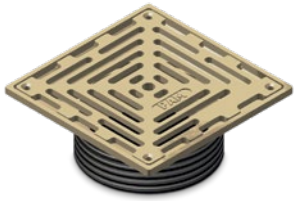
Innovative 'P' Trap

Vertical Roof Outlet

Section 10
Contents

THE NEXT GENERATION VORTX OF DRAINAGE SOLUTIONS

General design considerations



Building Regulations/Standards

Local regulations take priority in relation to all sanitary and drainage pipework i.e BS EN12056 parts 1-3 for the UK market

Drains should be considered in areas where water is supplied and any surface drainage required.

A trapped gully may be used to prevent foul air entering the building. The VortX range offers innovative new P and S trap designs that are lighter in weight and require less installation space (can be installed in a 180mm core) than more traditional designs on the market

Non-trapped gullies can be used with pipework incorporating a P trap within the drainage system.

Load Rating

It is important that the grating assemblies selected are able to withstand the anticipated load requirements for the application. All VortX gratings and rodding eyes have been tested in accordance with BS EN1253.

Loading Class K3: – Areas without vehicular traffic, such as dwellings, commercial and some public buildings.

Pedestrian areas and wet room applications such as shower areas, bathrooms, swimming baths, leisure centres, balconies, retail areas, hotels, offices, schools, public buildings, hospitals, prisons, terraces and roof gardens.

Loading Class L15: – Areas with light vehicular traffic such as in commercially used premises and public areas.

Loading Class M125: – Areas with Vehicular traffic such as car parks, factories and workshops
Not including light commercial vehicles or heavy wheel loads.

Flow rate

The flow rate is the maximum amount of water (litres/second) which a gully will drain. This is dependent on a number of factors:

- Grating free area
- Sump capacity
- Body free area
- Gully design
- Outlet size

Also if the gully is to be trapped or include a filter bucket.

General Principles

At low heads of water the flow rate of the gully is mainly determined by the grating free area

Flow rates for floor drains depicted against gratings pages 65-68 are taken at 20mm water depth in line with BS EN1253-1:2015 – without traps. Shower drain flow rates pages 124-125 assume the gullies are trapped.

Flow rates for roof outlets pages 131-134 at taken at 35mm water depth up to 110mm and 45mm water depth at 150mm in line with BS EN1253-2:2015.

Pipework – Compatibility

The VortX range of gullies being manufactured in cast iron and coated consistent to BS EN877 are the perfect solution to connect to the Ensign above and below ground drainage systems kitemark approved to BS EN877 by standard ductile iron couplings.

However, the VortX range can be connected to most pipework on the market with 110OD and 160OD or through a range of spigot adaptors and stepped couplings. Contact the technical hotline for assistance 01952 262529.

Floor and Flooring

The type of gratings chosen will depend on the floor finishes such as ceramic tiles, concrete or sheet covering such as vinyl. Also those fitted in a finished floor area tend to be made from the more attractive material such as nickel bronze or stainless steel which can be supplied polished for that extra aesthetic appeal.

The depth of structural slab and available space will dictate the selection of gullies, and the necessity for raising pieces and extension products. Installations with a damp proof membrane will require additional clamping collars.

For the full range and technical information download the VortX brochure from www.pam-vortx.co.uk or www.saint-gobain-pam.co.uk

Gratings

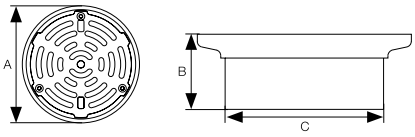
Height Adjustable

Grating bodies are threaded NPSM supplied in both nickel bronze and stainless steel for typical use with tiles, marble, terrazzo, vinyl and resin floor finishes. Supplied with standard screw fixings – security screws are available which can be ordered separately.

All gratings and rodding eyes are K3 loading class and may be supplied in a polished finish (to order) and can be installed with a removable bottle trap® where required (see page 123).

Direct Fit

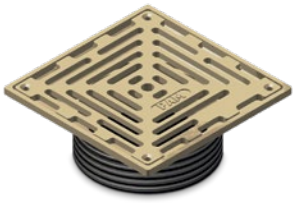
All VortX gratings and rodding eyes in both nickel bronze and stainless steel are available for direct fit connection to pipework when a gully body is not required. Ideal for connection to Ensign cast iron pipework to BS EN 877, however, the direct fit VortX gratings will connect to all pipe materials 110 OD. For other OD pipework stepped couplings or adaptors may be required (check with Technical 01952 262529).

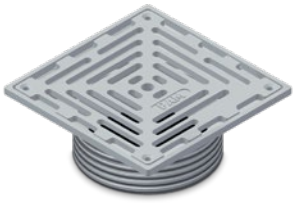


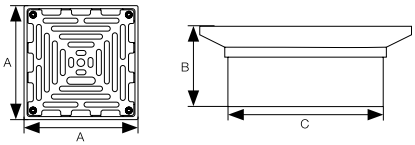
150mm Circular Grating (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F010	Nickel Bronze	NPSM	Standard 227049	Polished 234170	150	53	110	1.7	72	K3
VX-F010	Nickel Bronze	Direct Fit	Standard 233415	Polished 234171	150	53	110	1.5	72	K3
VX-F020	Stainless Steel	NPSM	Standard 227050	Polished 234172	150	53	110	1.5	72	K3
VX-F020	Stainless Steel	Direct Fit	Standard 233407	Polished 234173	150	53	110	1.5	72	K3

If bottle trap® required, see page 123.



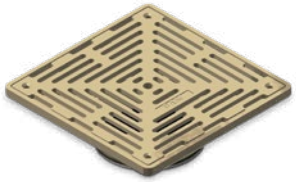


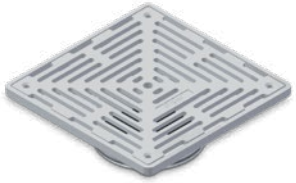


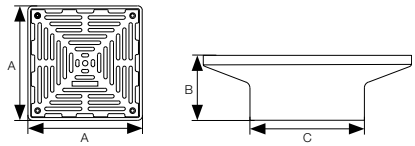
150 x 150mm Square Grating (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F030	Nickel Bronze	NPSM	Standard 227101	Polished 234174	150	57	110	1.3	119	K3
VX-F030	Nickel Bronze	Direct Fit	Standard 233408	Polished 234175	150	57	110	1.3	119	K3
VX-F040	Stainless Steel	NPSM	Standard 227102	Polished 234176	150	57	110	1.2	119	K3
VX-F040	Stainless Steel	Direct Fit	Standard 233421	Polished 234177	150	57	110	1.2	119	K3

If bottle trap® required, see page 123.





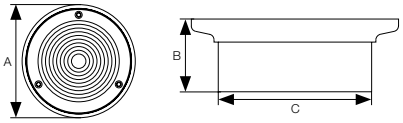


200 x 200mm Square Grating (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F050	Nickel Bronze	NPSM	Standard 227103	Polished 234178	200	62	110	3.1	148	K3
VX-F050	Nickel Bronze	Direct Fit	Standard 233423	Polished 234179	200	62	110	3.1	148	K3
VX-F060	Stainless Steel	NPSM	Standard 227104	Polished 234180	200	62	110	2.8	148	K3
VX-F060	Stainless Steel	Direct Fit	Standard 233424	Polished 234181	200	62	110	2.8	148	K3

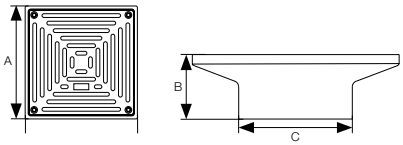
If bottle trap® required, see page 123.

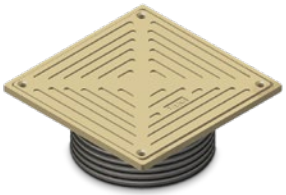
Rodding Eyes

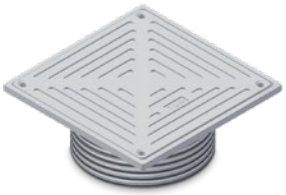


150mm Circular Rodding Eyes (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Load class
VX-F015	Nickel Bronze	NPSM	Standard 227105	Polished 234182	150	53	110	1.8	K3
VX-F015	Nickel Bronze	Direct Fit	Standard 233426	Polished 234183	150	53	110	1.8	K3
VX-F025	Stainless Steel	NPSM	Standard 227106	Polished 234184	150	53	110	1.6	K3
VX-F025	Stainless Steel	Direct Fit	Standard 233427	Polished 234185	150	53	110	1.6	K3

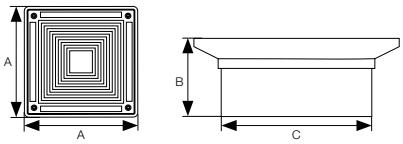


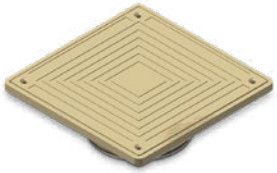


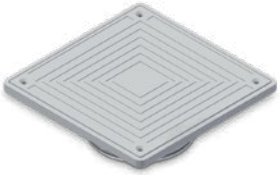


150 x 150mm Square Rodding Eyes (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Load class
VX-F035	Nickel Bronze	NPSM	Standard 227107	Polished 234187	150	57	110	1.4	K3
VX-F035	Nickel Bronze	Direct Fit	Standard 233428	Polished 234188	150	57	110	1.4	K3
VX-F045	Stainless Steel	NPSM	Standard 227108	Polished 234189	150	57	110	1.3	K3
VX-F045	Stainless Steel	Direct Fit	Standard 233430	Polished 234190	150	57	110	1.3	K3



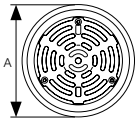




200 x 200mm Square Rodding Eyes (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Load class
VX-F055	Nickel Bronze	NPSM	Standard 227109	Polished 234191	200	62	110	3.4	K3
VX-F055	Nickel Bronze	Direct Fit	Standard 233431	Polished 234192	200	62	110	3.4	K3
VX-F065	Stainless Steel	NPSM	Standard 227110	Polished 234193	200	62	110	3.1	K3
VX-F065	Stainless Steel	Direct Fit	Standard 233433	Polished 234194	200	62	110	3.1	K3

Gratings for Vinyl Floors

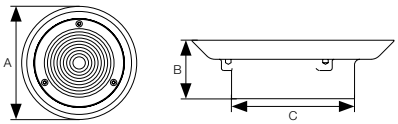


150mm Circular Grating (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F070	Nickel Bronze	NPSM	Standard 227111	Polished 234195	170	53	110	2.3	72	K3
VX-F070	Nickel Bronze	Direct Fit	Standard 233434	Polished 234196	170	53	110	2.3	72	K3
VX-F080	Stainless Steel	NPSM	Standard 227112	Polished 234197	170	53	110	2.1	72	K3
VX-F080	Stainless Steel	Direct Fit	Standard 233435	Polished 234198	170	53	110	2.1	72	K3

If bottle trap* required, see page 123.

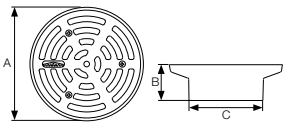
Rodding Eyes for Vinyl Floors

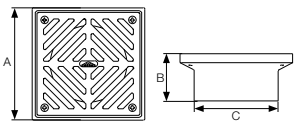


150mm Rodding Eye (NPSM threaded or Direct Fit)

GEN code	Material	FIT	Finish		A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F075	Nickel Bronze	NPSM	Standard 227113	Polished 234199	170	53	110	2.4	N/A	K3
VX-F075	Nickel Bronze	Direct Fit	Standard 233438	Polished 234200	170	53	110	2.4	N/A	K3
VX-F085	Stainless Steel	NPSM	Standard 227114	Polished 234201	170	53	110	2.2	N/A	K3
VX-F085	Stainless Steel	Direct Fit	Standard 233439	Polished 234202	170	53	110	2.2	N/A	K3

Cast Iron Gratings





150mm Circular Cast Iron Grating

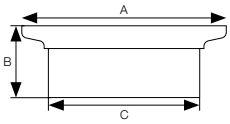
GEN code	SAP Code	Fit	A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F090	247771	NPSM	182	57	119	2.9	72	L15
VX-F090	247773	Direct	182	57	119	3	72	L15

150 x 150mm Square Cast Iron Grating

GEN code	SAP Code	Fit	A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F100	247772	NPSM	150	63	119	2.9	119	L15
VX-F100	247774	Direct	150	63	119	3	119	L15

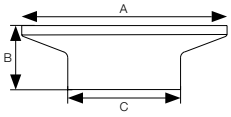
Can be machined to accommodate bottle trap by special request.

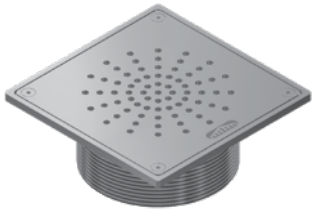
Anti-Ligature Gratings



150mm Circular Grating (NPSM threaded)

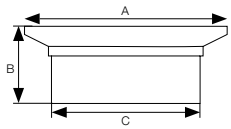
GEN code	Material	FIT	Finish	A	B	C	wt/kg	Flow rate L/sec	Load class
VX-F021	Stainless Steel	NPSM	Standard 250676	150	53	110	1.5	1.1	K3





150 x 150mm Square Grating (NPSM threaded)

GEN code	Material	FIT	Finish	A	B	C	wt/kg	Flow rate L/sec	Load class
VX-F041	Stainless Steel	NPSM	Standard 250677	150	53	110	1.6	1.1	K3



170mm Circular Grating (NPSM threaded)

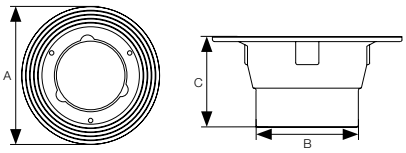
GEN code	Material	FIT	Finish	A	B	C	wt/kg	Flow rate L/sec	Load class
VX-F081	Stainless Steel	NPSM	Standard 250678	170	53	110	2.1	1.1	K3

Gully Bodies (Non-Trapped)

Gully Bodies (Non-Trapped)
The VortX gully bodies are manufactured in cast iron, trapped or non-trapped, NPSM threaded to accept raising pieces and gratings.

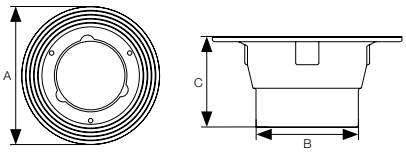
The VortX bodies have been designed to reduce the chance of build up of debris and provide improved flow. The unique flange design has 4 identification rings that give an excellent key to the waterproofing membrane or final floor finish and has dimples to assist drill location for fixing to the structural floor removing the requirement for a deck clamp.

All gully bodies are supplied in a grey epoxy coating consistent with BS EN 877 fittings.



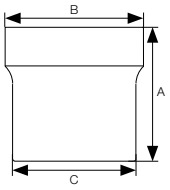
Medium Sump Body (110mm Outlet)

GEN code	SAP code	A	B	C	wt/kg
VX-F200	227119	205	110	100	2.4



Medium Sump Body (Threaded 4" BSP)

GEN code	SAP code	A	B	C	wt/kg
VX-F200	227118	205	121	100	2.6

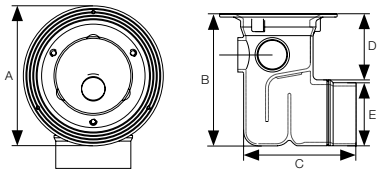


Sumpless Body (110mm outlet)

GEN code	SAP code	Material	A	B	C	wt/kg
VX-F210	227120	Cast Iron	124	120	110	1.6

Gully Bodies (Trapped)

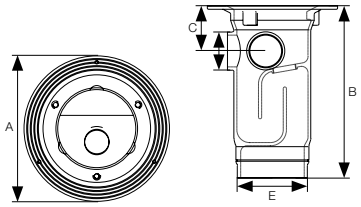
Gully Bodies (Trapped)
New innovative “P” and “S” trap designs are lighter in weight and minimise the space required that is needed by the more traditional products on the market. Supplied with 110mm spigot outlets, three plugged 2" BSP inlets incorporating the same flange design features and can be installed with the standard clamp ring if required.



P Trap (110mm outlet)

GEN code	SAP code	A	B	C	D	E	wt/kg
VX-F220	227129	205	230	196	115	110	5.6

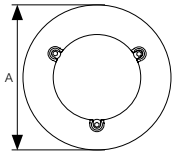
Registered Design 1345789-0001



S Trap (110mm outlet)

GEN code	SAP code	A	B	C	D	E	wt/kg
VX-F230	227130	205	295	72	60	110	5.6

Registered Design 1345789-0002



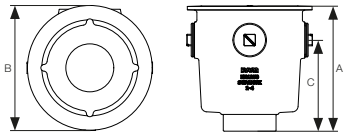
Clamping Ring (to suit all gullies)

GEN code	SAP code	Material	A	B	wt/kg
VX-F205	223440	Cast Iron	205	12	0.9

New Deep Sump Gullies

New Deep Sump Gullies

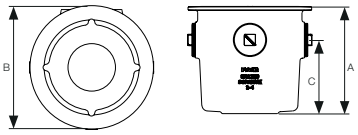
New to VortX is a range of cast iron deep sump gullies, bell traps and brewery traps that offer a variety of solutions for any application. The cast iron deep sumps are available with 100mm spigot outlets or 4" and 6" BSP outlets, 3 x 2" BSP inlet positions, and the option of a 100mm BSP inlet. The bodies are supplied in a grey epoxy coating.



Cast Iron Deep Sump Body (100mm Spigot Outlet)

GEN code	SAP code	A	B	C	wt/kg
VX-F215	260384	270	260	200	12.3

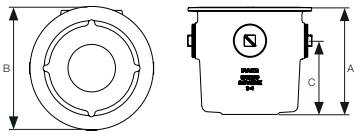
Body can also include 4" BSP Inlet on upon request.



Cast Iron Deep Sump Body (4" BSP Outlet)

GEN code	SAP code	A	B	C	wt/kg
VX-F215	260385	226	260	155	11.5

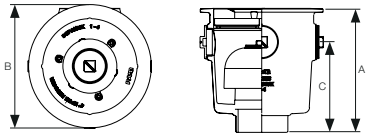
Body can also include 4" BSP Inlet on upon request.



Cast Iron Deep Sump Body (6" BSP Outlet)

GEN code	SAP code	A	B	C	wt/kg
VX-F215	260386	226	260	155	10.1

Body can also include 4" BSP Inlet on upon request.



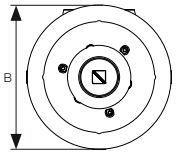
Bell Trap Body (100mm Spigot Outlet)

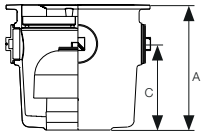
GEN code	SAP code	A	B	C	wt/kg
VX-F250	260387	270	260	200	12.3

Body can also include 4" BSP Inlet on upon request.

Includes a 4" NPSM reducing body collar to allow compatibility with all VortX – nickel, bronze and stainless steel gratings and rodding eyes with NPSM thread.

New Deep Sump Gullies

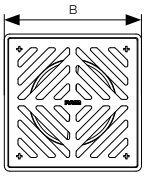


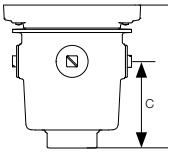


Bell Trap Body (4" BSP Outlet)

GEN code	SAP code	A	B	C	wt/kg
VX-F250	260388	226	260	155	11.5

Body can also include 4" BSP Inlet on upon request.
Includes a 4" NPSM reducing body collar to allow compatibility with all VortX – nickel, bronze and stainless steel gratings and rodding eyes with NPSM thread.

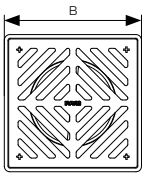


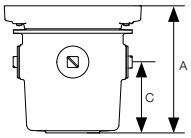


100mm Brewery Trap (100mm Spigot Outlet)

GEN code	SAP code	A	B	C	wt/kg
VX-F240	260389	312-342	300	190	29.6

Grating height variable 30mm.

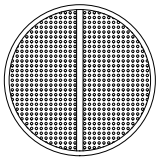


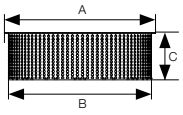


100mm Brewery Trap (4" BSP Outlet)

GEN code	SAP code	A	B	C	wt/kg
VX-F244	260390	280-310	300	155	28.6

Grating height variable 30mm.



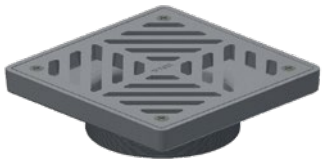


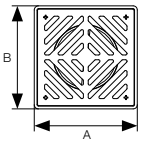
Galvanised Filter Basket

GEN code	SAP code	A	B	C	wt/kg
VX-F415	260391	188	178	60	0.5

To suit deep sump and bell trap.

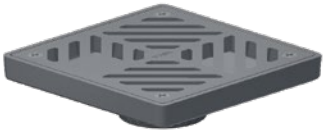
New Deep Sump Gullies – Gratings

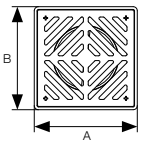




Ductile Iron Gratings (8" NPSM 300 x 300mm Ductile Iron Grating Sheradised)

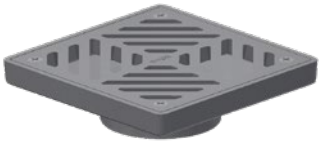
GEN code	SAP code	A	B	C	wt/kg
VX-F110	260392	300	300	84	14

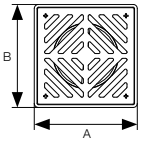




Ductile Iron Gratings (4" NPSM 300 x 300mm Ductile Iron Grating Sheradised)

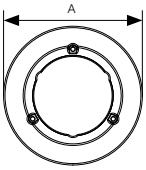
GEN code	SAP code	A	B	C	wt/kg
VX-F130	260393	300	300	82	14.5





Ductile Iron Gratings (300 x 300mm) Direct Fit (Sheradised)

GEN code	SAP code	Size SP16	A	B	C	wt/kg
VX-F110	260394	200	300	300	84	14
VX-F120	260395	150	300	300	82	14.1
VX-F130	260396	100	300	300	82	14.4



VortX Bell Trap/Deep Sump Reducing Ring 4" NPSM

GEN code	SAP code	A	wt/kg
VX-F206	260397	200	0.5

Can be fitted to Deep Sump/Bell Traps to enable connection with nickel bronze/stainless steel gratings.

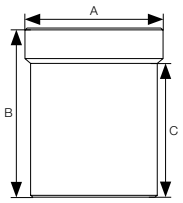
Accessories

Raising Pieces

Supplied in grey epoxy coated cast iron, NPSM threaded and in three standard height sizes to provide additional adjustment for the gratings and rodding eyes.

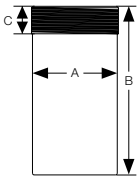
Adaptors

Manufactured in cast iron – BSP threaded which are available in a number of diameters to connect to the 4" BSP floor drain body utilising reducing bushes. The adaptors allow connection to cast iron, PVC and other materials.



Cast Iron Raising Pieces (NPSM threaded)

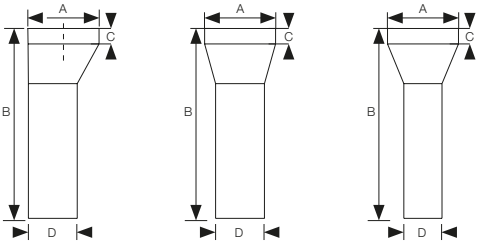
GEN code	SAP code	Size	A	B	C	wt/kg
VX-F350	227123	95-140	120	155	120	2.0
VX-F350	227122	40-95	120	117	80	1.5
VX-F350	227121	20-40	120	62	25	0.8



Spigot Adaptors (BSP)

GEN code	SAP code	Size	A	B	C	wt/kg
VX-F500	227131	110 to 4" (BSP)	110	215	35	2.7
VX-F500	234206	56 to 2" (BSP)	56	215	27	1.1
VX-F500[1]	247249	160 to 6" (BSP)	160	300	35	6.2

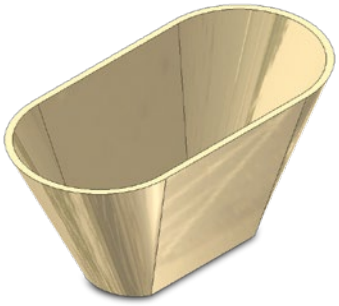
[1]Use with 150 Vortx Roof Outlets. See page 79.

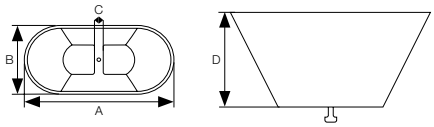


Concentric/Eccentric Spigot Adaptors

GEN code	SAP code	Size	A	B	C	D	wt/kg
VX-F501	256614	4" BSP to 80mm	4" BSP	300	25	80	2.8
VX-F501	256615	4" BSP to 80mm	4" BSP	300	25	80	2.8
VX-F501	256613	4" BSP to 60mm	4" BSP	300	25	60	2.3

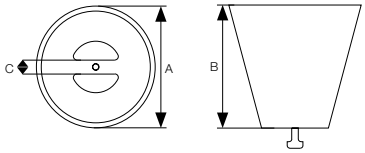
Accessories





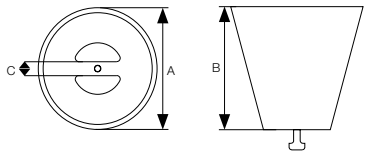
Oval Funnel/VX-F305

SAP code	Material	A	B	C	D	wt/kg
227116	Nickel Bronze	225	100	12	95	0.7



Circular Funnel/VX-F300

SAP code	Material	A	B	C	wt/kg
227117	Nickel Bronze	100	94	12	0.3



Circular Funnel/VX-F310

SAP code	Material	A	B	C	wt/kg
227115	Stainless Steel	100	94	12	0.2

Security Screws/VX-F420

SAP code	Material	A	B	C	wt/kg
233455	Stainless Steel	–	–	–	0.1

For securing gratings/rodding eyes.

Airtight Bung

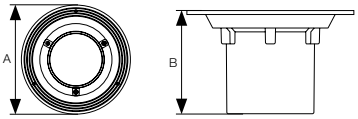
GEN code	Material	Code	Size	wt/kg
VX-F420	ABS	241195	105	0.01

To fit all rodding eyes to make double seal.

Shower Drain Bodies

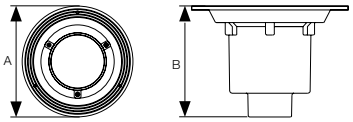
Shower Drain Bodies

Manufactured in cast iron with grey epoxy coating incorporating the VortX styling flange design. The shower gullies are available in 110mm O.D. and 60mm O.D. horizontal spigots and 60mm O.D. vertical spigots. The shower gullies should be fitted with the VortX removable bottle trap®.



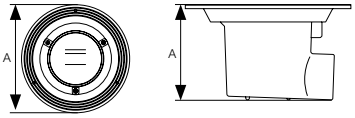
Cast Iron Vertical Shower Drain

GEN code	SAP code	Size	A	B	wt/kg
VX-S260	227125	110mm	210	130	2.4



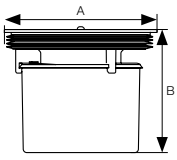
Cast Iron Vertical Shower Drain

GEN code	SAP code	Size	A	B	wt/kg
VX-S260	227126	60mm	210	149	2.4



Cast Iron Horizontal Shower Drain

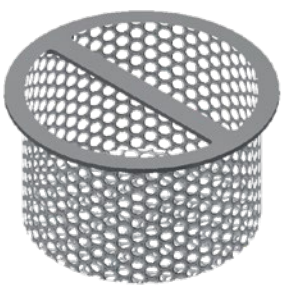
GEN code	SAP code	Size	A	B	wt/kg
VX-S261	227127	60mm	210	121	2.5

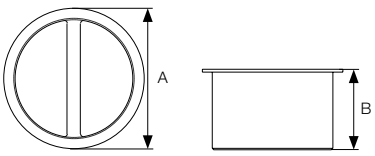


50mm Removable Bottle Trap (Registered design)

GEN code	SAP code	Material	A	B	wt/kg
VX-F400	227128	ABS	111	92	0.1

Registered design number 1285415 – 0001-0005. Can be fitted to gratings nickel bronze/ stainless steel.

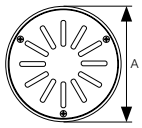




Gravel Guard

GEN code	SAP code	Material	A	B	wt/kg
VX-F410	227138	Stainless Steel	102	60	0.2

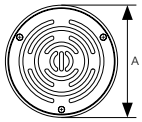
Shower Drain Gratings



150mm Circular Grating for Vinyl Floor

GEN code	Material	Finish		A	wt/kg	Flow rate L/sec V.O	Flow rate L/sec H.O	Load class
VX-S270	Stainless Steel	Standard 227132	Polished 234208	150	0.8	1.1	0.9	K3

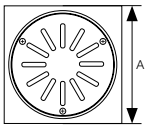
Flow rate at 20mm water depth – trapped body. V.O = Vertical Shower Outlet. H.O = Horizontal Shower Outlet.



150mm Circular Decorative Grating for Vinyl Floor

GEN code	Material	Finish		A	wt/kg	Flow rate L/sec V.O	Flow rate L/sec H.O	Load class
VX-S270	Stainless Steel	Standard 227133	Polished 234209	150	0.7	1.1	0.9	K3

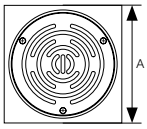
Flow rate at 20mm water depth – trapped body. V.O = Vertical Shower Outlet. H.O = Horizontal Shower Outlet.



150 x 150mm Square Grating for Tiled Floor

GEN code	Material	Finish		A	wt/kg	Flow rate L/sec V.O	Flow rate L/sec H.O	Load class
VX-S271	Stainless Steel	Standard 227134	Polished 234210	150	1.0	1.1	0.9	K3

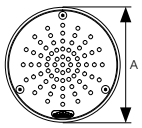
Flow rate at 20mm water depth – trapped body. V.O = Vertical Shower Outlet. H.O = Horizontal Shower Outlet.



150 x 150mm Square Decorative Grating for Tiled Floor

GEN code	Material	Finish		A	wt/kg	Flow rate L/sec V.O	Flow rate L/sec H.O	Load class
VX-S271	Stainless Steel	Standard 227135	Polished 234211	150	0.9	1.1	0.9	K3

Flow rate at 20mm water depth – trapped body. V.O = Vertical Shower Outlet. H.O = Horizontal Shower Outlet.

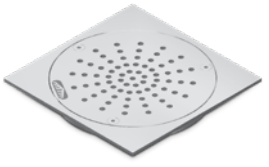


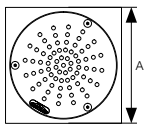
Anti-ligature

150mm Circular Grating for Vinyl Floor

GEN code	Material	Finish		A	wt/kg	Flow rate L/sec V.O	Flow rate L/sec H.O	Load class
VX-S272	Stainless Steel	Standard 250679	Polished POA/to order	150	0.8	1.1	0.9	K3

Flow rate at 20mm water depth – trapped body. V.O = Vertical Shower Outlet. H.O = Horizontal Shower Outlet.





Anti-ligature

150 x 150mm Square Decorative Grating for Tiled Floor

GEN code	Material	Finish		A	wt/kg	Flow rate L/sec V.O	Flow rate L/sec H.O	Load class
VX-S273	Stainless Steel	Standard 250680	Polished POA/to order	150	1.0	1.1	0.9	K3

Flow rate at 20mm water depth – trapped body. V.O = Vertical Shower Outlet. H.O = Horizontal Shower Outlet.

TBA – Please contact technical department 01952 262 529

Shower Drain Kits

Shower Drain Kits

VortX shower drain kits consist of a cast iron shower drain, a removable bottle trap and a stainless steel grating of choice in either standard or polished finish, supplied in a box.

VX-S260

Cast Iron Vertical Shower Drain – 100mm with a 50mm removable trap (VX-F400)
Choice of Gratings:

					Flow rate L/sec
Standard	239376	239736	239734	239738	1.1
Polished	239733	239737	239735	239739	1.1
Kit wt/kg	3.3	3.2	3.5	3.4	

Flow rate at 20mm water depth – trapped

VX-S260

Cast Iron Vertical Shower Drain – 50mm spigot with a 50mm removable trap (VX-F400)
Choice of Gratings:

					Flow rate L/sec
Standard	239340	239744	239742	239746	1.1
Polished	239741	239745	239743	239747	1.1
Kit wt/kg	3.3	3.3	3.5	3.4	

Flow rate at 20mm water depth – trapped

VX-S261

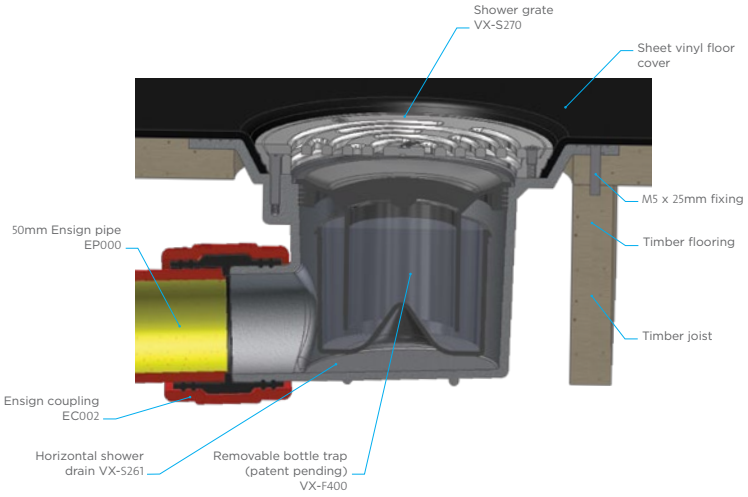
Cast Iron Horizontal Shower Drain – 50mm spigot with a 50mm removable trap (VX-F400
Choice of Gratings:

					Flow rate L/sec
Standard	239348	239752	239750	239754	0.9
Polished	239749	239753	239751	239755	0.9
Kit wt/kg	3.4	3.3	3.6	3.5	

Flow rate at 20mm water depth – trapped

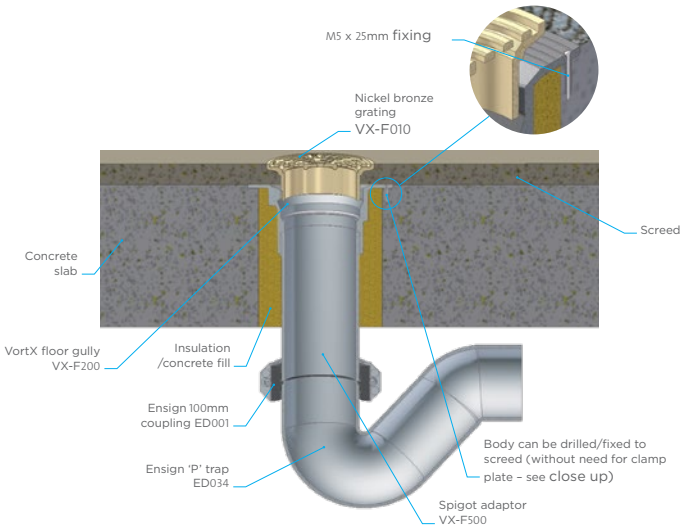
Typical installations

Shower application



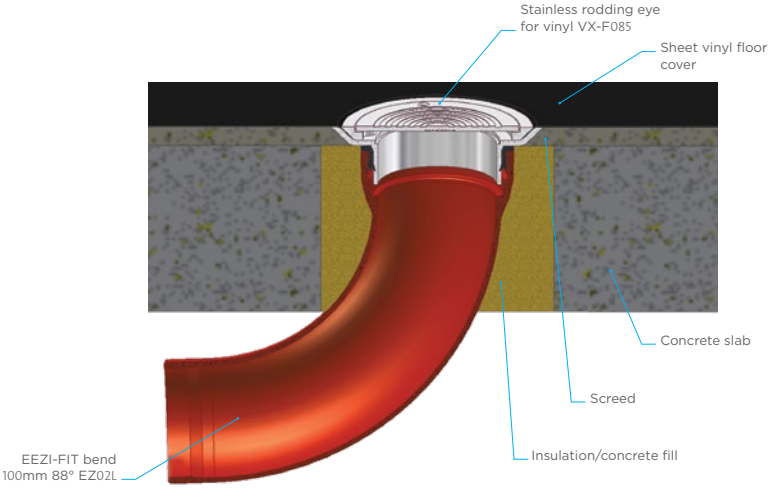
VortX shower drains can be installed in many different applications. Typically the circular gratings VX-S270 are used for vinyl sheet style floor finishes, solid flooring, or timber deck as shown in the diagram. For tiled flooring use the square grates VX-S271. New anti-ligature shower gratings have now been added to the range – check for availability.

Screed Floor with 'P' Trap



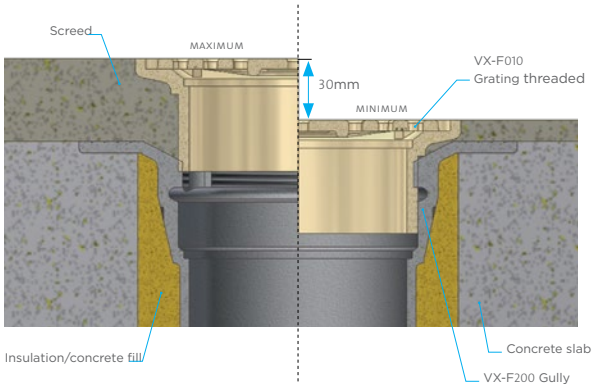
Installations which require a higher level of flow through the grating should use a P trap arrangement which offers less restriction as shown in the diagram. The VortX range of floor gullies, connect directly to the Ensign/Timesaver above and below ground systems using the VX-F500 spigot adaptors.

Connection to Direct Fit Gratings (without gully)



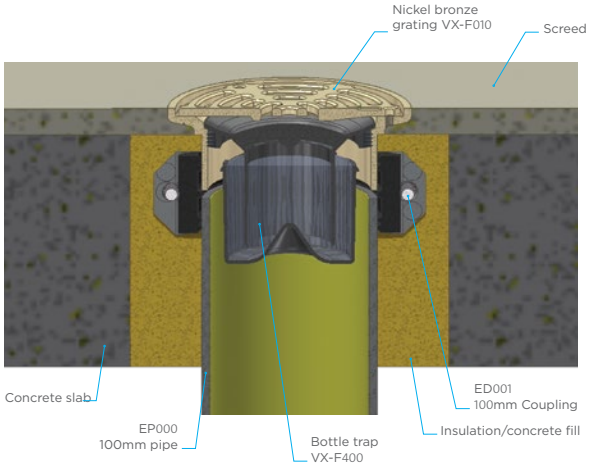
Access to below ground or suspended drainage systems can be designed as simple rodding eye points using Direct Fit gratings. This diagram again shows the flexibility of the PAM ranges of products demonstrating how the grating can connect directly with an EEZI-FIT large radius bend.

Adjustable Grating Height



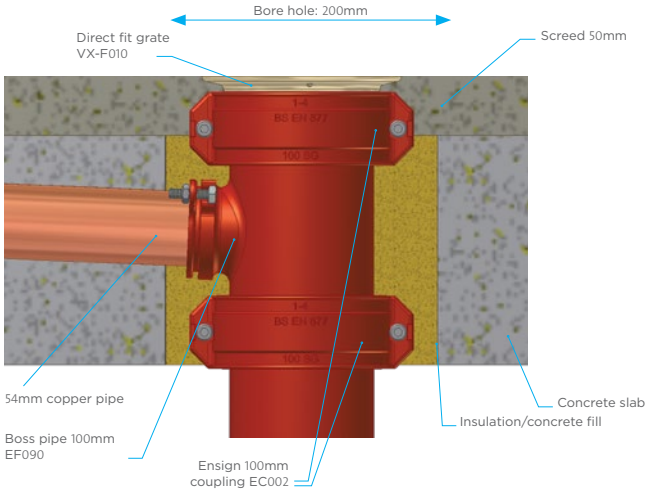
All VortX Nickel bronze and Stainless steel gratings with NPSM threaded spigots allow up to 30mm height adjustment for various depths of floor finish, when screwed directly into the floor gully (as shown). If further height adjustment is needed use in conjunction with VX-F350 NPSM threaded cast iron raising pieces to reach the height required.

Direct Fit Floor Drain



If the grating can be installed in the floor screed without the need for height adjustment then a cost effective option can be to use a Direct Fit grating fitted with a bottle trap. The grating has a spigot of 110mm OD which allows connection to cast iron, HDPE, PVC pipework using a mechanical coupling to suit various ranges ie. EC002 / ED001 /GT01 /TD02.

Drain with Side Inlet

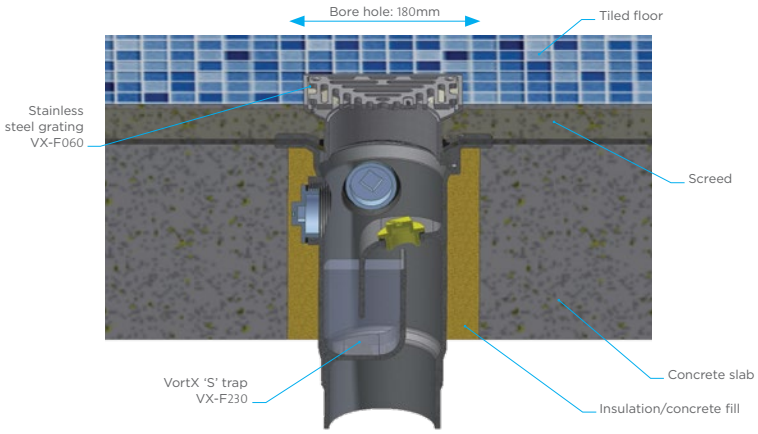


The VortX floor drain range can offer flexible solutions when used in conjunction with the Ensign or Timesaver cast iron drainage system. If there is a need to connect waste pipes from appliances to a back or side inlet – this can be achieved using a direct fit nickel bronze grating connected to an Ensign boss pipe (EF090) using a standard ductile iron coupling EC002.

For an EEZI-FIT system the grating can be pushed directly into EEZI-FIT Boss pipes EZ090/91/92.

New ‘S’ Trap (for tiled floor)

Highlighting space saving opportunities for diameter of bore hole.



The VortX range includes the innovatively designed S Trap in 100mm diameter which has 3 no. 2" BSP back inlet positions which are supplied plugged off for potential future use.

The slim-line S Trap incorporates an internal plug located for rodding/cleaning access and only requires a bore hole of 180mm.

Side inlet connections

For side inlet connections on the "P" trap VX-F220 & "S" trap VX-F230 bodies, these are provided by a 2"BSP female thread, which comes blanked off when supplied with a 2"BSP plug (with rubber washer). Ensure that these are tightened prior to installation of the body. For connections to alternative materials ie. copper, muPVC or ABS etc please use a BSP adaptor and a PTFE tape to seal the thread.

Side inlets can also be achieved on other gully bodies/direct fit gratings by using boss pipes from Ensign EF090 – EF092 and EEZI-FIT EZ090 – EZ093. See page 127.

Rodding eyes – Double seal

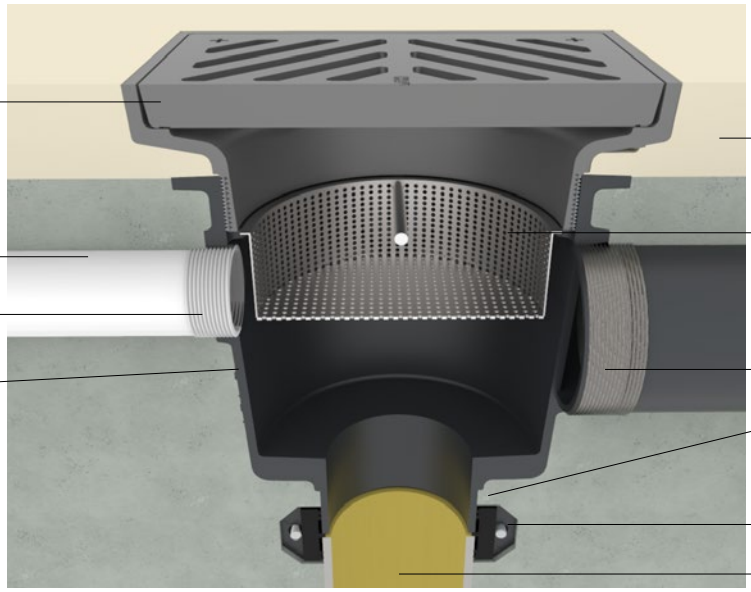
VortX rodding eyes are single seal. Fit airtight bung (see page 122) to rodding eyes to make double seal units.

Connections to Pipe systems

	Material Type						
	Cast Iron					PVC/HDPE	Clay
Floor Gully/ Roof Outlet Bodies	Ensign soil BS EN 877 – 100mm	Ensign drain BS EN 877 – 100mm	EEZI-FIT BS EN 877 – 100mm	Timesaver soil BS 416 – 100mm	Timesaver drain BS 437 – 100mm	BS 46600/ BS EN 1401 – 110mm	BS EN 295-1 100mm
Spigot (110 OD)	EC002	ED001	EZ001	GT01	TD02	EC002/GT01	ED001/ ED076
Spigot (4" BSP)	VXF-500/ EC002	VXF-500 & ED001	VXF-500 & EZ001	VXF-500 & GT01	VXF-500 & TD02	VXF-500/ EC002/GT01	VXF-500/ ED001 & ED076
Shower Gully Bodies							
Spigot (110 OD)	EC002	ED001	EZ001	GT01	TD02	EC002/GT01	ED001 & ED076
Spigot (60 OD)	EC002	–	–	GT01	–	EF071R	–
Direct Fit Gratings							
Nickel Bronze Stainless Steel	EC002	ED001	EZ001	GT01	TD02	EC002/GT01	ED001 & ED076

VortX – Deep sump with 300x300m grating 100mm spigot

Typical applications – Yard or plantrooms

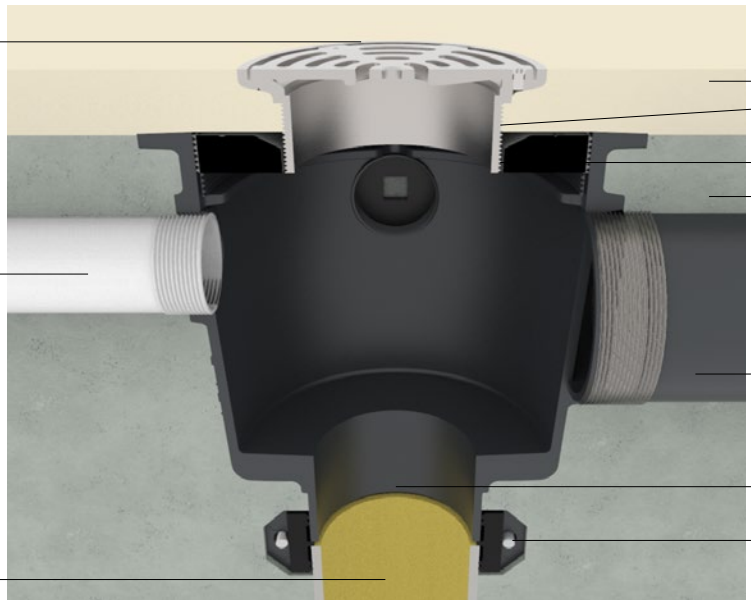


Bill of materials:

Product code	Description
260384	Cast iron deep sump body – VX-F215
260392	300mmx300mm ductile/iron grating sheradised – VX-F210
260391	Galvanised filter basket – VX-F415

VortX – Deep sump – 110 spigot outlet with Stainless steel grating

Typical applications – Plant rooms/service rooms or kitchens

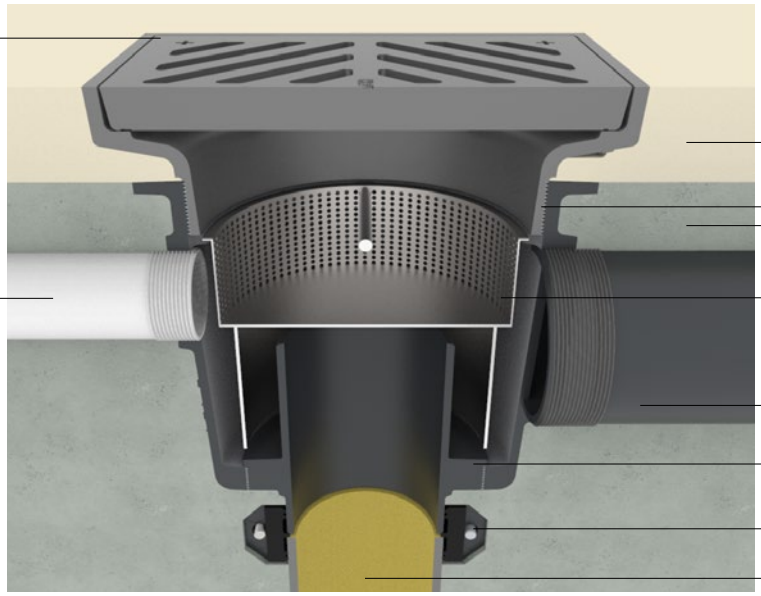


Bill of materials:

Product code	Description
260384	Cast iron deep sump body – VX-F215
260397	200mm cast iron reducing collar – VXF206
227050	ISO circular stainless steel grating NPSM – VXF020

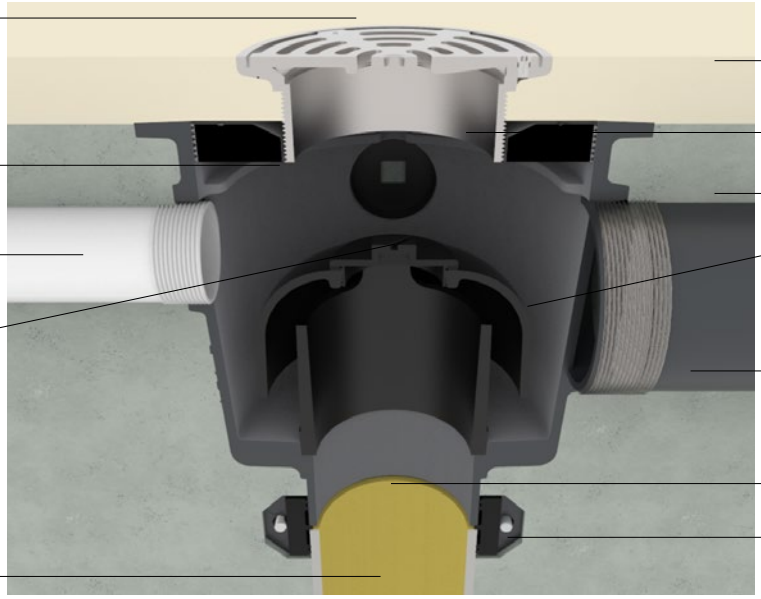
VortX – Brewery trap VX-F240/SAP code 260389

Typical applications – Brewery, railways, industrial – requiring a high flow capability



VortX – Bell trap 110mm spigot outlet VX-F250/SAP code 260387

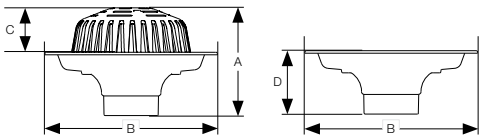
Typical applications – Plant rooms/service rooms or kitchens



Roof Outlets

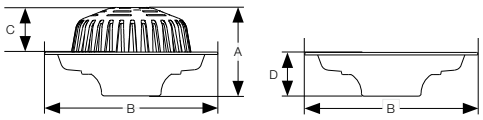
VortX Roof Outlets

A new range of cast iron roof outlets that offer robust long lasting solutions for most construction market applications. Designed in accordance with BS EN 1253 the range consists of cast iron bodies epoxy coated to the high standard of BS EN 877 with the gratings and clamping rings protected by sheradising. All VortX roof outlets have been flowrate tested and comply fully with the standard and will connect to most drainage systems on the market.



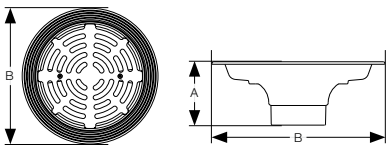
Vertical

GEN code	SAP code	Dia	A	B	C	D	wt/kg	Flow Rate L/S
VX-R105	241181	110	220	350	91	89	8.9	10.7



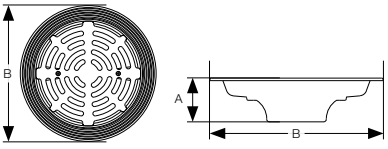
Vertical

GEN code	SAP code	Dia	A	B	C	D	wt/kg	Flow Rate L/S
VX-R155	241183	4" (BSP)	180	350	91	89	8.4	10.7
VX-R155	247413	6" (BSP)	184	386	64	120	12.8	14.5



Vertical

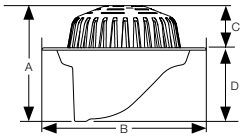
GEN code	SAP code	Dia	A	B	wt/kg	Load Class	Flow Rate L/S
VX-R100	241180	110	129	350	10.5	L15	8.1



Vertical

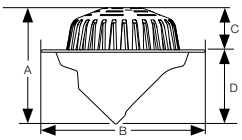
GEN code	SAP code	Dia	A	B	wt/kg	Load Class	Flow Rate L/S
VX-R150	241182	4" (BSP)	89	350	10	L15	8.1
VX-R150	247428	6" (BSP)	64	386	14.8	L15	14.2

Roof Outlets



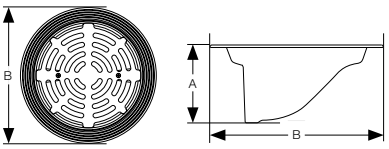
Angled 88° Dome Grate

GEN code	SAP code	Dia	A	B	C	D	wt/kg	Flow Rate L/S
VX-R255	255261	4" BSP	249	350	86	163	7.9	10.7



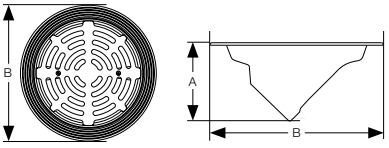
Angled 45° Dome Grate

GEN code	SAP code	Dia	A	B	C	D	wt/kg	Flow Rate L/S
VX-R256	255249	4" BSP	255	350	86	169	9.9	10.7



Angled 88° Flat Grate

GEN code	SAP code	Dia	A	B	wt/kg	Load Class	Flow Rate L/S
VX-R250	255262	4" BSP	163	350	6.5	L15	8.1

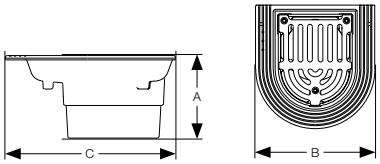


Angled 45° Flat Grate

GEN code	SAP code	Dia	A	B	wt/kg	Load Class	Flow Rate L/S
VX-R251	255250	4" BSP	169	350	8.5	L15	8.1

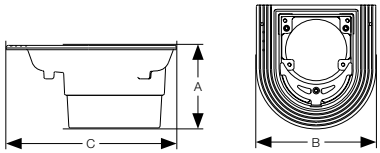
Smaller Diameters
Use spigot adaptors VX-F500 – VX-F501 for 110, 80 and 60mm Ø pipe connection.
See page 74.

Roof Outlets



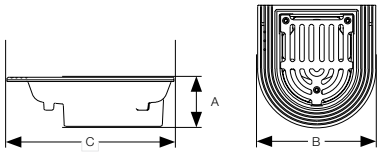
Balcony Spigot – Flat Grating

GEN code	SAP code	Spigot Dia	A	B	C	wt/kg	Flow Rate L/S
VX-R300	241184	110	100	200	210	3.6	4.99



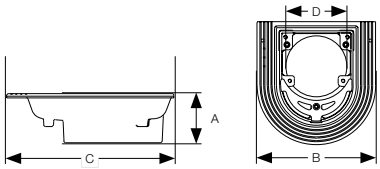
Balcony Spigot – Notched Grating

GEN code	SAP code	Spigot Dia	Pipework Dia	A	B	C	wt/kg	Flow Rate L/S
VX-R305	241187	110	100	100	200	210	3.2	4.99
VX-R305	241186	110	75	100	200	210	3.4	4.15
VX-R305	241185	110	50	100	200	210	3.5	1.41



Balcony Threaded – Flat Grating

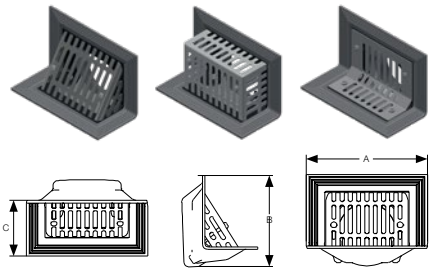
GEN code	SAP code	Spigot BSP	A	B	C	wt/kg	Flow Rate L/S
VX-R350	241188	4"	60	200	210	3.0	4.99



Balcony Threaded – Notched Grating

GEN code	SAP code	Spigot Dia	Pipework Dia	A	B	C	wt/kg	Flow Rate L/S
VX-R355	241191	4"	100	60	200	210	2.3	4.99
VX-R355	241190	4"	75	60	200	210	2.8	4.15
VX-R355	241189	4"	50	60	200	210	2.9	1.41

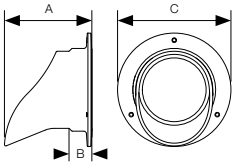
Roof Outlets



Two-Way Outlet BSP Threaded

GEN code	SAP code	Grating	BSP	A	B	C	wt/kg	Flow Rate L/S
VX-R500	241192	Angled	4"	234	172	111	6.2	1.09
VX-R501	247964	Flat	4"	234	172	111	6.2	1.09
VX-R502	248015	Boxed	4"	234	172	111	6.2	1.09

Stainless steel gratings.

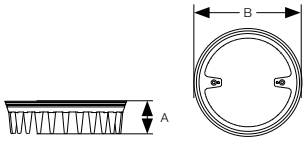


Two-Way Downspout

GEN code	SAP code	A	B	C	wt/kg
VX-R510	253762	140	35	180	2.2

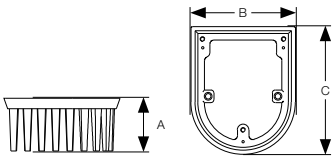
Cast iron push-fit black polyester coated.

Raising Pieces



Raising Piece for Vertical Outlet VX-R100/150

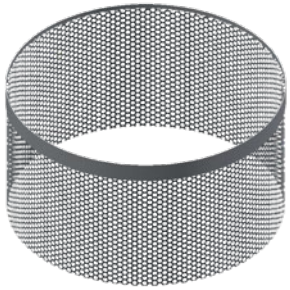
GEN code	SAP code	A	B	wt/kg
VX-R710	241193	75	285	2.5

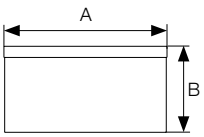


Raising Piece for Balcony Outlet VX-R300/350

GEN code	SAP code	A	B	C	wt/kg
VX-R720	241194	73 (63 effective)	134	165	0.9

Gravel Guard

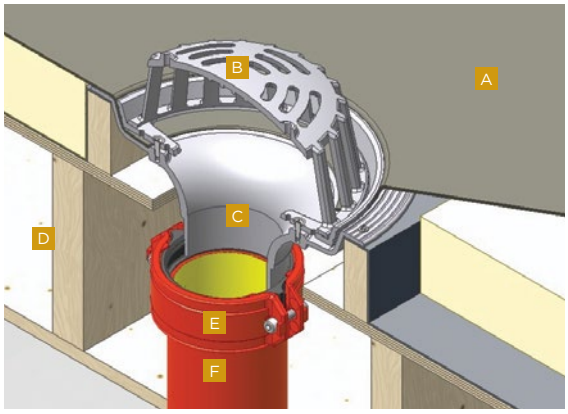




Filter Basket

GEN code	SAP code	Material	A	B	wt/kg
VX-R730	247752	Stainless Steel	291	155	0.2

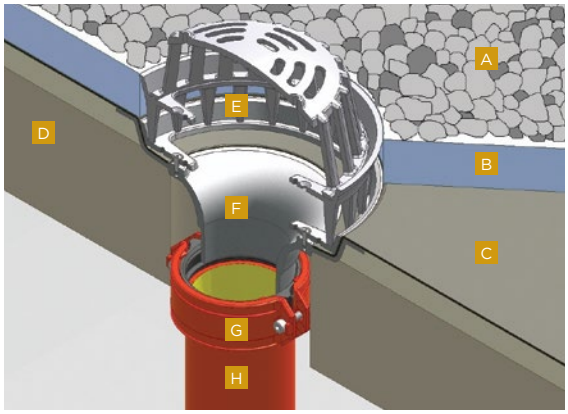
Cast Iron Roof Outlets – Typical Installations



Cold Roof Applications

1. Vertical outlet with dome grating

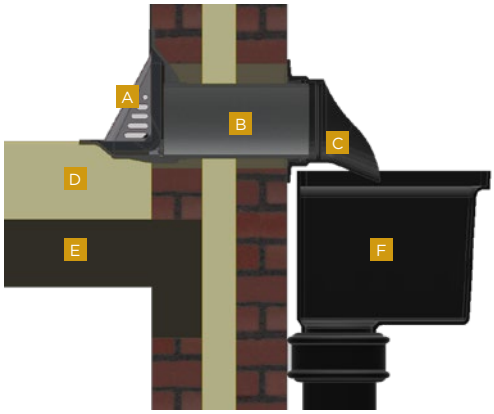
A. Membrane
B. Cast Iron Dome Grate
C. VX-R105 Spigot Body
D. Timber Deck
E. 100mm Ensign/Timesaver Coupling ECO02/GT01
F. 100mm Ensign Timesaver Pipework



Warm Roof Applications

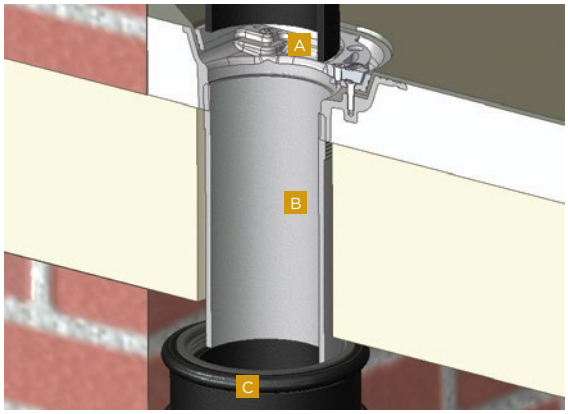
2. Vertical spigot outlet with raising piece

A. Gravel
B. Insulation
C. Membrane
D. Concrete Deck
E. Raising Extension Piece VX-R710
F. VX-R105 Spigot Body
G. 100mm Ensign/Timesaver Coupling ECO02/GT01
H. 100mm Ensign/Timesaver Pipework



3. Two way outlet with spigot adaptor

A. VX-R500 BSP Body
B. VX-F500 Adaptor 4" BSP/110mm
C. Push-Fit Two-Way Downspout VX-R510
D. Insulation
E. Concrete Deck
F. Cast Iron Rainwater Head



4. Balcony roof outlet with notched grating

A. VX-R355 BSP Body
B. VX-F500 Spigot Adaptor 4" BSP/110mm
C. Timesaver Heritage Soil Pipe Coupling GT05

Section 10

Timesaver

Saint-Gobain PAM UK is the primary supplier of ductile iron pipes and fittings, manhole covers, gullies and grates, as well as being the leading producer of cast iron above and below ground drainage systems. Its markets include water and sewerage, telecommunications, highways, civil engineering, construction and housing.

Contents

Why specify Timesaver

Proven drainage system for nearly 45 years

The Timesaver system, was first launched in 1973, for use on above ground soil and ventilating installations.

In 1980 a below ground Timesaver system was launched to complement the soil range, and together they became market leaders in cast iron drainage.

Both systems were recognised for their quality performance, and were awarded the highly coveted BS Kitemark in 1982.

B4516 Part 2:
For soil, waste and ventilating pipes and fittings.

B5437:
For drains, pipes and fittings.

B56087:
Now incorporated in BSEN877

For flexible joints for B5416 part 2 and B4537 pipes and fittings.

Above ground

Refurbishment

Prestigious commercial buildings built in the 1970's to the mid 90's which are serviced by cast iron soil stacks, will most likely be Timesaver. If the building is to be refurbished and changes are required, the latest Timesaver range is best suited to connect to the original pipework.

Timesaver Heritage couplings give traditional appearance

The Timesaver range contains push-fit couplings that turns a mechanical pipe system into a system with a traditional socket appearance of yesteryear, as depicted in BS 416 Part 1.

Its primer black coating makes it easy to overpaint for external soil stacks, and is the perfect solution for listed buildings and those situated in areas of conservation. Pipes are available in 3m lengths or in the traditional 1.8m (6ft) length, in 75 and 100mm diameter and by using the Timesaver Heritage couplings, waste is minimised and installation time, compared to the old socket/spigot caulking method, is significantly reduced.

The Timesaver Heritage couplings have been accepted by recognised bodies for all grade listed properties ie. National Heritage, English Heritage etc.

Extensive access fittings

One of the main traits of British design was not only its attention to maintaining the drainage flow with swept branches, but also making sure sufficient access to the system was provided to ensure any blockages could be easily cleared. As a result, the Timesaver range carries more access fittings than any cast iron system on the market, for above and below ground.

Connections to waste systems

Timesaver offers a number of fittings to be able to connect to waste pipes to the mainstack ie. boss pipes, push-fit or threaded (BSPT) but also includes the 'strap-on-boss' fitting which enables connection cutting into the pipe.

Why specify Timesaver

Below ground

Strength

Timesaver is recognised as the strongest of all the drainage systems in any material, in particular for below ground applications. The substantial section thickness of BS 437, makes it the first choice for under building drainage, especially on commercial buildings where fit and forget is a high priority and provides peace of mind.

Also in areas where the drainage is to be installed in unstable ground, or ground containing methane gases, the strength of Timesaver puts it out on its own.

The above ground soil range can provide further strengths in areas where impact can occur ie. externally on the building fabric and car parks.

Exceptional crush resistance – vastly superior to other materials

- Timesaver BS437 150KN/m
- Clay 40KN/m
- PVC 6KN/m
- The strongest soil and drain system – no contest
- Exceptional crush resistance – vastly superior to HDPE and PVC
- Exceptional resistance to over vigorous rodding
- No. 1 choice for exposed areas ie. car parks, shopping centres, inner cities – which are accessible to damage by accidental impact or vandalism
- Used in areas where ground is unstable or the trenches are shallow
- Less bedding required.

The first choice solution for under building buried drainage, for fit and forget peace of mind encased in the concrete slab

- Cast iron has the proven strength and crush resistance to withstand the weight of the concrete unlike the more volatile lighter weight plastic materials which can and often require filling to weigh it down
- Cast iron is not affected by the high temperatures from the concrete generated during the pouring process – which can reach temperatures of 70 degrees or more depending on the volume of concrete.
- Cost of failure can be very high – if concrete slabs require digging up to repair drainage failures

British Standard designs

The Timesaver ranges are based on British Standards BS 416 Part 2 for above ground and BS 437 for below ground and as such, contain fittings and diameters appropriate to those standards. In particular the below ground range contains an extensive range of traps/raising pieces and inspection chambers in 100, 150 and 225mm diameters.

Section 1

Drain Pipes and Fittings

Jointing method

A. Pipe or fitting
B. Pipe or fitting
C. Synthetic rubber gasket
D. Coupling
E. Stainless steel set screws and nuts

All couplings have four set screws and nuts.

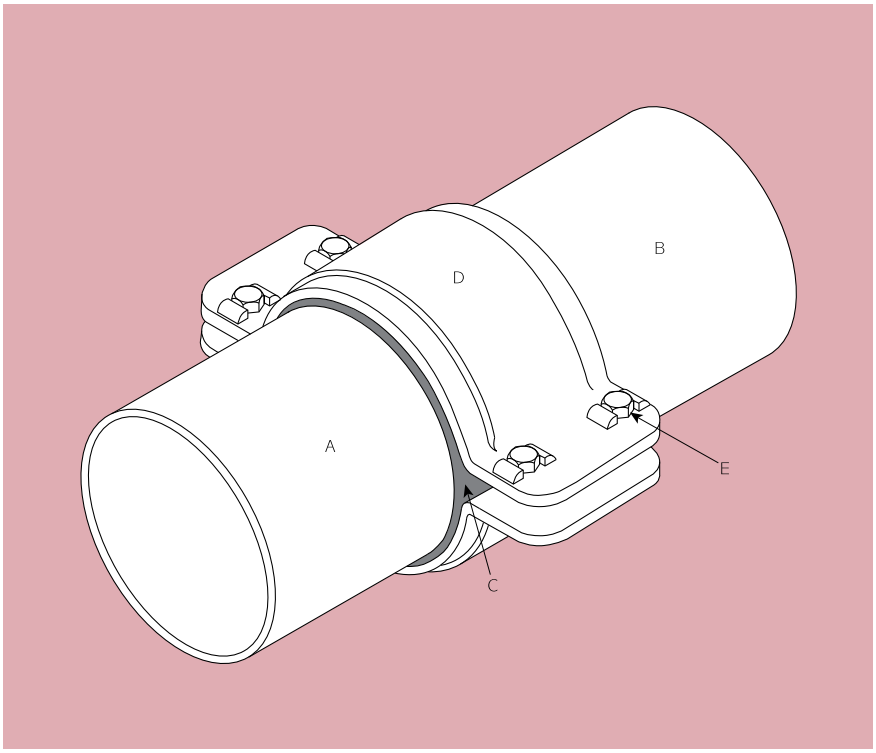
Couplings are supplied ready assembled

1. Slacken bolts to fullest extent.
2. Place synthetic rubber gasket on end of pipe or fitting A, and slide loosely assembled coupling over pipe B.
3. Fit pipe B into gasket ensuring both A and B are butting against the internal central register.
4 Slide coupling over gasket ensuring that it is centrally located and tighten bolts alternately so that the gap between coupler halves is even on both sides. When hand tight check alignment of assembly.
5 Complete tightening operation by use of a Ratchet Spanner – EF100 and Deep Socket – EF101 until a suitable resistance is achieved (min 20Nm).

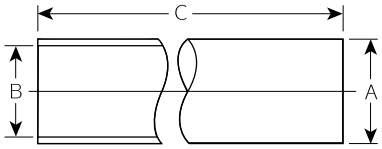
Joints may be deflected up to 5° without affecting the sealing properties.

The Timesaver couplings meet the performance requirements of BS 6087:1990 and incorporate synthetic rubber gaskets conforming to BS EN 681-1/ISO 4633 and stainless steel set screws and nuts conforming to BS 970 Part 2. A Ratchet Spanner – EF100 is the recommended tool required to tighten the stainless steel set screws which give a 'for all time seal' water and airtight installation.

Saint-Gobain PAM UK do not accept liability for any complaints on installations where components not manufactured by Saint-Gobain PAM UK are included.



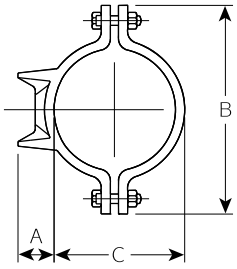
Pipes double spigot



Product code	Dia	A Max o/dia	B Min i/dia	Min section	C Metre lengths available	Nominal wt per metre kg
Pipe – TD00						
156568	100	119	99	7	3	18.7
156832	150	173	150	8	3	31.7
157042	225	256	225	10	3	60.0

Pipes are internally lined with a two part epoxy paint (ochre colour). Externally coated with black acrylic paint and stencilled every metre with blue marking.

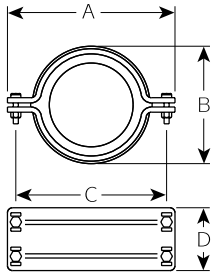
Brackets fixing



Product code	Dia	A	B	C	Nominal wt/kg
Wall fixing or hanging brackets – TD640					
191358	100	40	205	130	2.3
191359	150	40	255	175	2.8
192374	225	18	358	260	4.0

Fixing hole in bracket is plain without BSPT thread (see page 167). 225 bracket is manufactured from mild steel-coated in a red anti-rust primer.

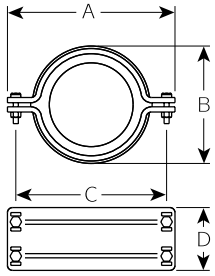
Couplings standard and transitional



Standard

Ductile iron coupling with stainless steel nuts and set screws and synthetic rubber gasket for jointing Timesaver drain to Timesaver drain (black gasket with identity marking).

Product code	Dia	A	B	C	D	*E	Nominal wt/kg
Two-piece ductile iron coupling – TD01							
191294	100	203	140	180	75	5	2.8
191295	150	252	195	230	75	5	3.6
191296	225	345	290	320	100	5	7.8



Transitional

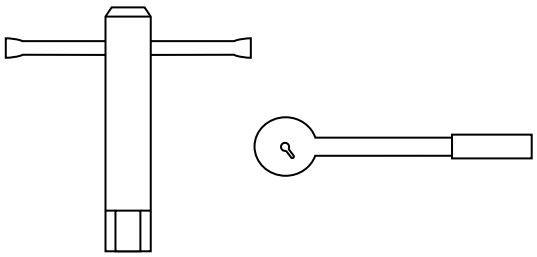
Ductile iron coupling with stainless steel nuts and set screws and synthetic rubber gasket for jointing Timesaver drain to Timesaver soil or Ensign soil (black gasket with identity marking). *Electrical continuity clips are available supplied separately in standard quantity bags of 25 number (see ref table page 172).*

Product code	Dia	A	B	C	D	*E	Nominal wt/kg
Two-piece ductile iron coupling – TD02							
191297	100	203	140	180	75	5	2.8
191298	150	252	195	230	75	5	3.6

Four set screws are supplied on all couplings TD01/TD02. Electrical continuity clips are available supplied separately in standard quantity bags of 25 number (see ref table page 172).

** Minimum allowance (E) to accommodate gasket register (for guidance only).*

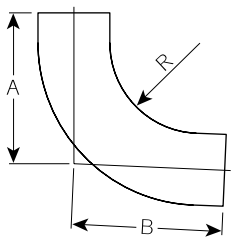
Tools



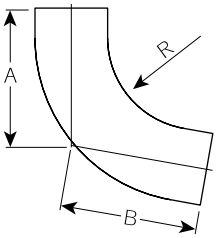
Ratchet spanner – EF100: product code 191201
A ratchet spanner is the recommended tool required to tighten the stainless steel screws, used in conjunction with a deep socket – EF101: product code 191202.

'T' box spanner – EF098: product code 191200
13mm A/F, dual purpose, for use with Timesaver and Ensign systems.

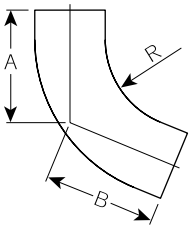
Bends medium radius



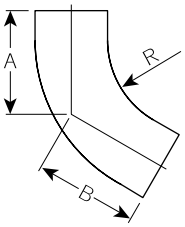
Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend • Medium radius – TD06					
191219	100	250	250	150	8.8
191225	150	275	275	150	16.0
191229	225	335	335	150	41.5



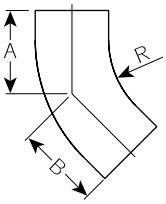
Product code	Dia	A	B	R	Nominal wt/kg
80° Bend • Medium radius – TD06					
191218	100	225	225	150	8.1



Product code	Dia	A	B	R	Nominal wt/kg
67½° Bend • Medium radius – TD06					
191217	100	190	190	150	7.0
191224	150	205	205	150	10.9

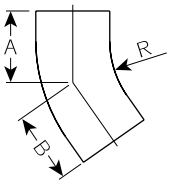


Product code	Dia	A	B	R	Nominal wt/kg
60° Bend • Medium radius – TD06					
191216	100	170	170	150	6.0

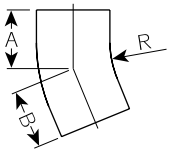


Product code	Dia	A	B	R	Nominal wt/kg
45° Bend • Medium radius – TD06					
191215	100	135	135	150	5.8
191223	150	145	145	150	11.0
191228	225	215	215	150	31.8

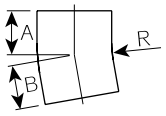
Bends medium radius



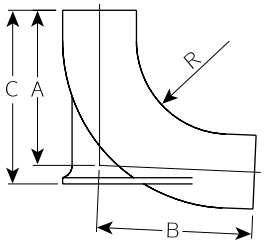
Product code	Dia	A	B	R	Nominal wt/kg
35° Bend • Medium radius – TD06					
191214	100	115	115	150	4.3
191222	150	125	125	150	9.1



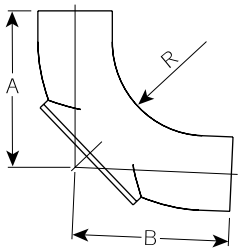
Product code	Dia	A	B	R	Nominal wt/kg
22½° Bend • Medium radius – TD06					
191213	100	95	95	150	3.6
191221	150	95	95	150	7.1
191227	225	120	120	150	18.4



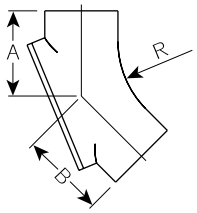
Product code	Dia	A	B	R	Nominal wt/kg
10° Bend • Medium radius – TD06					
191212	100	70	70	150	3.1
191220	150	70	70	150	4.5
191226	225	85	85	150	13.0



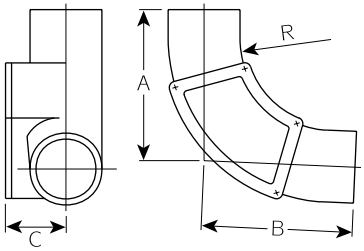
Product code	Dia	A	B	C	R	Nominal wt/kg
87½° Bend with heel rest • Medium radius – TD07						
191230	100	250	250	255	150	9.4
191231	150	275	275	310	150	19.4



Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend with access rear • Medium radius – TD08					
191233	100	250	250	150	12.0
191235	150	275	275	150	21.3
191237	225	335	335	150	57.8



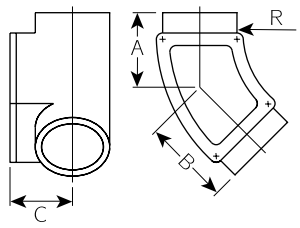
Product code	Dia	A	B	R	Nominal wt/kg
45° Bend with access rear • Medium radius – TD08					
191232	100	135	135	150	8.6
19234	150	145	145	150	25.9
† 191236	225	215	215	150	46.8



Product code	Dia	A	B	C	R	Nominal wt/kg
87½° Bend with access side • Medium radius – TD09						
191239	100	250	250	100	150	13.1
191241	150	275	275	120	150	20.5
† 191243	225	335	335	190	150	57.5

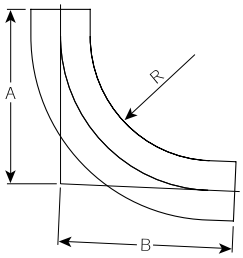
†Made to order.

Bends medium radius

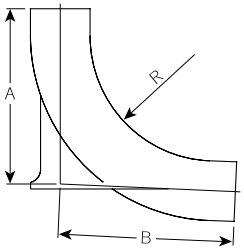


Product code	Dia	A	B	C	R	Nominal wt/kg
45° Bend with access side • Medium radius – TD09						
191238	100	135	135	100	150	10.0
191240	150	145	145	120	150	26.6
† 191242	225	215	215	190	150	46.8

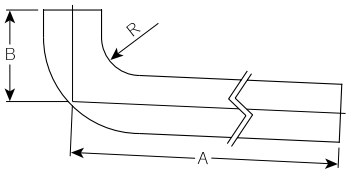
Bends long radius



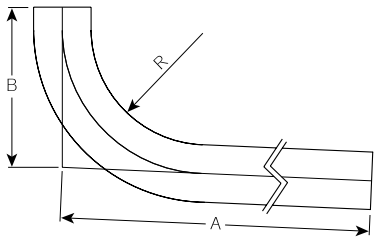
Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend • Long radius – TD15					
191244	100	350	350	250	13.2
191245	150	375	375	250	25.0



Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend with heel rest• Long radius – TD22					
191246	100	350	350	250	15.0
191247	150	375	375	250	28.0

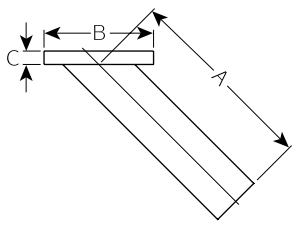


Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend • Long tail – TD102					
191289	100	815	180	90	18.6



Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend • Long tail – TD104					
† 197173	100	850	650	230	33.0
† 192699	150	850	650	203	54.0

Bends clearing arm

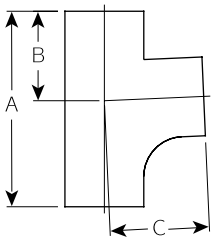


Product code	Dia	A	B	C	Nominal wt/kg
45° Bend • Clearing arm – TD425					
191292	100 x 45°	405	235	35	12.5

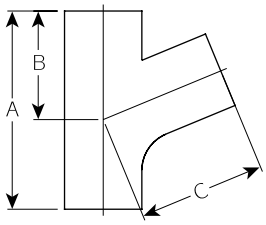
Loading: B125
Can be used with gratings and covers – TD612-TD616 and raising pieces – TD525, commonly used with TD615.

†Made to order.

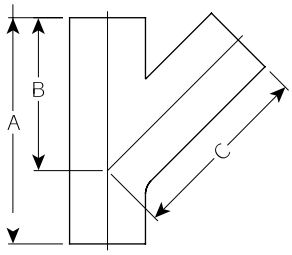
Branches



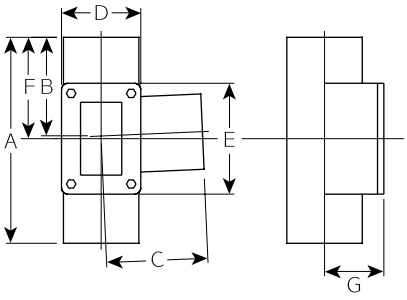
Product code	Dia	A	B	C	Nominal wt/kg
87½° Branch • Radius curve – TD37					
191250	100 x 100	295	130	150	7.8
191252	150 x 100	370	135	235	16.1
191254	150 x 150	445	170	255	19.1
191256	225 x 100	390	155	275	40.0
191258	225 x 150	460	185	295	46.3
191260	225 x 225	590	225	365	58.5



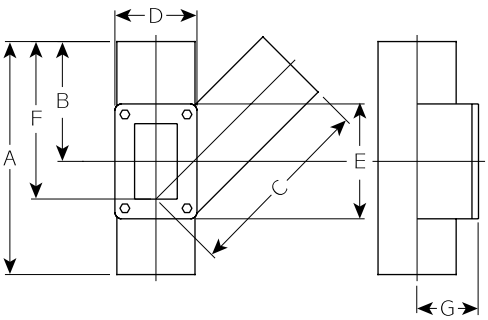
Product code	Dia	A	B	C	Nominal wt/kg
67½° Branch • Radius curve – TD37					
191249	100 x 100	305	165	195	8.8



Product code	Dia	A	B	C	Nominal wt/kg
45° Branch – TD37					
191248	100 x 100	355	245	290	11.3
191251	150 x 100	365	280	325	15.4
191253	150 x 150	435	315	355	24.4
191255	225 x 100	390	340	395	42.0
191257	225 x 150	460	375	410	45.8
191259	225 x 225	590	445	510	64.4



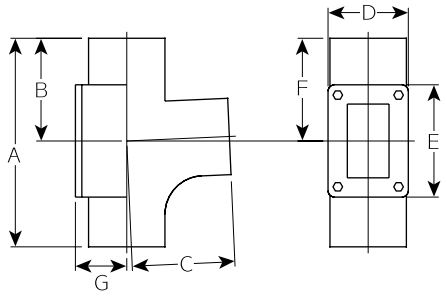
Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
87½° Branch with access side RH • Radius curve – TD51									
191262	100 x 100	325	160	160	205	215	160	105	14.2
191264	150 x 100	370	140	235	175	175	140	135	20.9
† 191267	225 x 150	590	225	295	260	260	250	190	67.3
† 191269	225 x 225	590	225	365	260	260	250	190	79.5



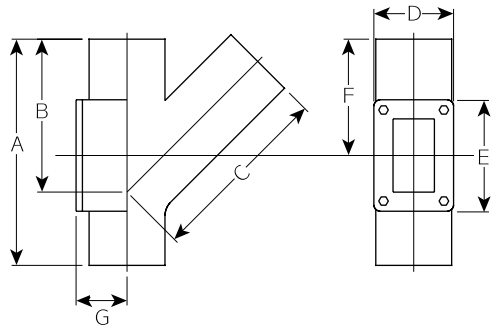
Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
45° Branch with access side RH – TD51									
191261	100 x 100	355	245	290	125	175	245	105	14.2
191263	150 x 100	420	300	325	175	175	200	135	21.9
† 191265	225 x 100	590	445	330	260	260	350	190	62.8
† 191266	225 x 150	590	445	355	260	260	350	190	66.8
† 191268	225 x 225	590	445	510	260	260	350	190	85.4

†Made to order.

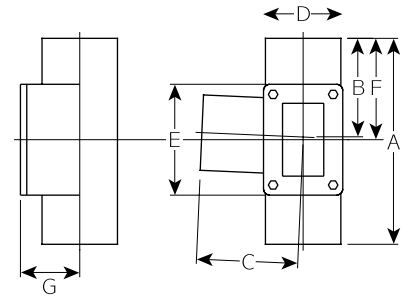
Branches



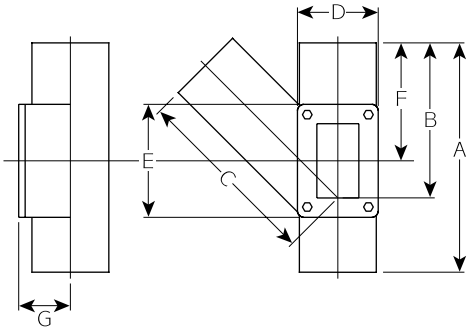
Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
87½° Branch with access rear • Radius curve – TD52									
191271	100 x 100	325	160	160	205	215	160	80	13.4
191273	150 x 100	370	140	235	175	175	140	110	22.9
† 191275	225 x 100	590	225	275	260	260	250	190	60.0
† 191276	225 x 150	590	225	295	260	260	250	190	62.4
† 191278	225 x 225	590	225	365	260	260	250	190	79.5



Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
45° Branch with access rear – TD52									
191270	100 x 100	355	240	290	205	215	185	80	16.1
191272	150 x 100	420	300	325	175	175	200	110	22.9
† 191274	225 x 100	590	445	330	260	260	350	190	63.0
† 191277	225 x 225	590	445	510	260	260	350	190	84.4

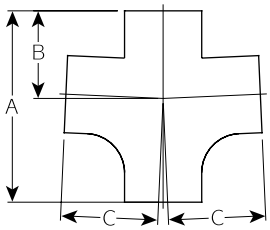


Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
87½° Branch with access side LH • Radius curve – TD53									
191280	100 x 100	325	160	160	205	215	160	105	14.2
191282	150 x 100	370	140	235	175	175	140	135	21.2
† 191284	225 x 100	590	225	275	260	260	250	190	61.0
† 191286	225 x 150	590	225	295	260	260	250	190	67.3
† 191288	225 x 225	590	225	365	260	260	250	190	79.5



Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
45° Branch with access side LH – TD53									
191279	100 x 100	355	245	290	125	175	245	105	14.2
191281	150 x 100	365	280	325	175	175	200	135	21.9
† 191283	225 x 100	590	445	330	260	260	350	190	62.8
† 191285	225 x 150	590	445	355	260	260	350	190	66.8
† 191287	225 x 225	590	445	510	260	260	350	190	85.4

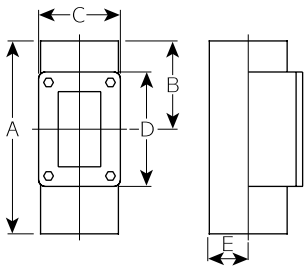
Branches double



Product code	Dia	A	B	C	Nominal wt/kg
87½° Double branch • Plain – TD447					
191293	100 x 100	325	160	160	11.6

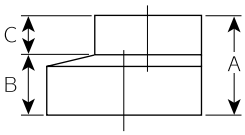
†Made to order.

Pipes access



Product code	Dia	A	B	C	D	E	Nominal wt/kg
Rectangular door – TD56							
191344	100	270	135	125	175	95	9.7
191345	150	270	135	175	175	125	15.4
191346	225	590	250	260	260	190	62.6

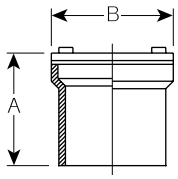
Pipes taper



Product code	Dia	A	B	C	Nominal wt/kg
Pipes • Diminishing – TD41					
191333	150 x 100	100	47	43	3.5
191334	225 x 100	210	160	50	13.6
191335	225 x 150	210	160	50	13.4
191336	*225 x 200	100	60	40	6.2
192431	†225 x 250	152	82	70	9.8

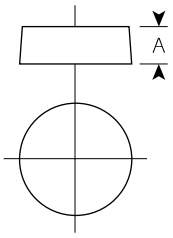
**Connects 225 Timesaver drain to 200 Ensign soil/drain.*
†Connects 225 Timesaver drain to 250 Ensign soil/drain.

Socket ferrules



Product code	Dia	A	B	Nominal wt/kg
Socket ferrule with cast iron cap – TD36				
191330	100	120	130	3.8

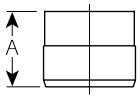
Blank ends



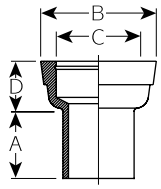
Product code	Dia	A	Nominal wt/kg
Blank ends – TD34			
191326	100	40	1.3
191327	150	40	2.6
191328	225	75	10.7

If you require blank ends drilled to accommodate 50mm waste – use GT71 (see page 182) with TD02 stepped coupling.

Pipes transitional



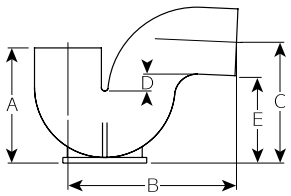
Product code	Dia	A	Nominal wt/kg
Adaptor from Timesaver drain to supersleve – TD118			
191350	100	100	2.2
191351	150	125	5.1



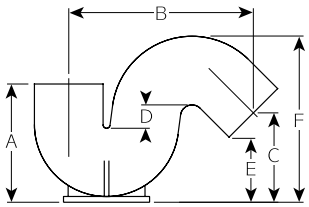
Product code	Dia	A	B	C	D	Nominal wt/kg
Socket for cast iron to suit BS 437 – TD47						
191341	100	100	185	135	75	8.0
191342	150	80	240	190	90	11.8
† 191343	225	120	355	275	115	31.3

Note: Transitional pipe for WC (see soil page 176).

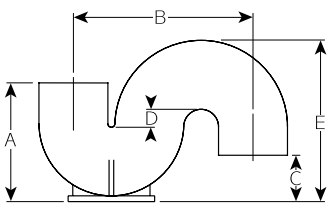
Gully traps



Product code	Dia	A	B	C	D	E	Nominal wt/kg
87½° Gully trap – TD60							
191399	100	205	300	215	50	165	12.4
191400	150	295	400	295	50	220	24.4



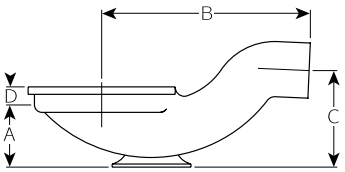
Product code	Dia	A	B	C	D	E	F	Nominal wt/kg
45° Gully trap – TD60								
191398	100	205	320	155	50	120	275	13.2



Product code	Dia	A	B	C	D	E	Nominal wt/kg
Vertical gully trap – TD60							
191397	100	205	310	80	50	275	13.2

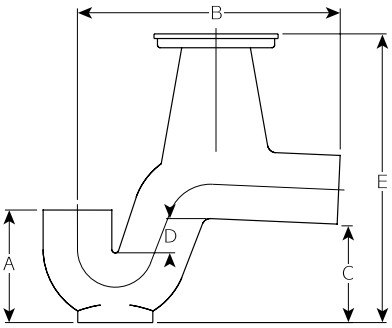
† *Made to order.*

Gully traps

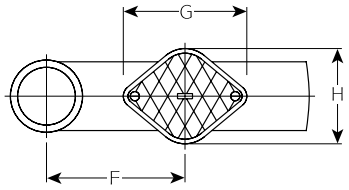


Product code	Dia	A	B	C	D	Nominal wt/kg
87½° Gully trap with 225mm inlet – TD64						
191401	100	130	450	220	43	24.0

Can be used with raising pieces – TD678 and TD108/TD111.

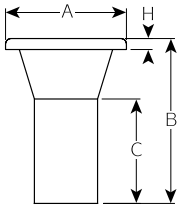


Product code	Dia	A	B	C	D
87½° Gully trap with surface access – TD107					
191402	100	195	455	230	75



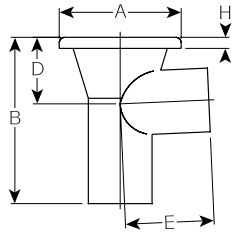
	Dia	E	F	G	H	Nominal wt/kg
87½° Gully trap with surface access – TD107						
	100	500	240	215	165	23.3

Gully inlets bellmouth



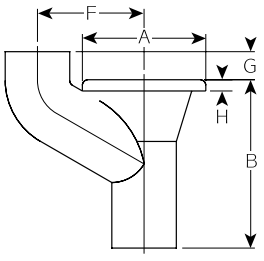
Product code	Dia	A	B	C	H	Nominal wt/kg
Gully inlet • Plain – TD500						
191301	100	220	300	190	17	8.6

Can be used with gratings and covers – TD612-TD616 and raising pieces – TD525.



Product code	Dia	Branch	A	B	D	E	H	Nominal wt/kg
Gully inlet with single branch – TD105								
191299	100	100	220	300	120	160	17	11.8

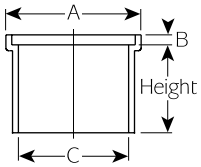
Can be used with gratings and covers – TD612-TD616 and raising pieces – TD525.



Product code	Dia	Branch	A	B	F	G	H	Nominal wt/kg
Gully inlet with vertical branch – TD106								
191300	100	100	220	300	190	50	17	13.7

Can be used with gratings and covers – TD612-TD616 and raising pieces – TD525.

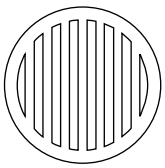
Raising pieces



Product code	Height	A	B	C	Nominal wt/kg
Raising piece – TD525					
191303	150	220	17	190	9.1
191305	305	220	17	190	11.3

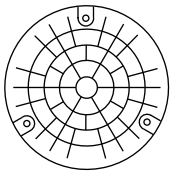
To suit Bellmouth – TD500/TD105/TD106.
Can be used with gratings and covers – TD612-TD616.
Raising pieces require caulking into above listed components.
See p168 for details on caulking compound.

Gratings and covers



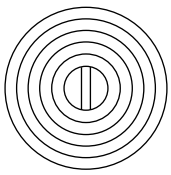
Product code	Dia	Nominal wt/kg
Grating plain – TD612		
191385	200	1.8

Maximum load 2.0 tonnes.



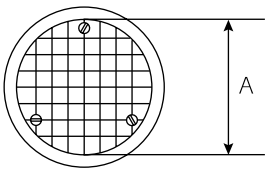
Product code	Dia	Nominal wt/kg
Solid cover – TD613S		
191386	200	2.0

Maximum load 2.0 tonnes.



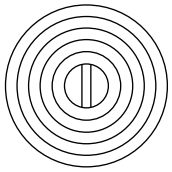
Product code	Dia	Nominal wt/kg
Grating hinged and locking – TD614		
191387	200	1.8

Maximum load 2.0 tonnes.



Product code	Dia	A	Nominal wt/kg
Sealed plate and frame – TD615			
191388	200	180	2.7

Maximum load 2.0 tonnes. Sealed with rubber seal three screws.

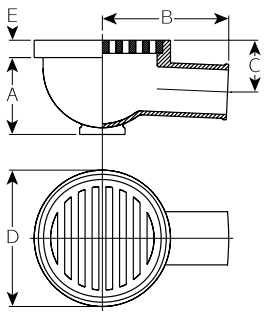


Product code	Dia	Nominal wt/kg
Grease sealed cover and frame – TD616		
191389	200	2.2

Maximum load 2.0 tonnes. Three screws to fix.

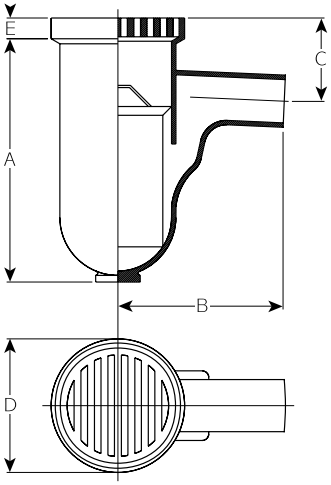
TD612-TD616 can be used in conjunction with raising pieces – TD525.
Bellmouths – TD500/TD105/TD106 and clearing arm bends – TD425.
Gratings – TD614/TD615/TD616 require caulking into above listed components. See p168 for details on caulking compound.

Gully traps



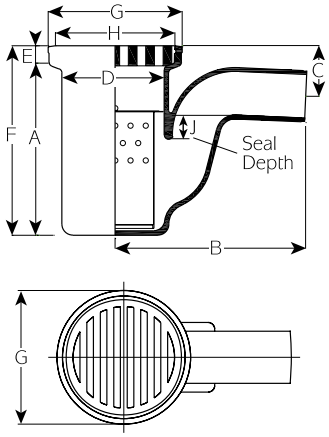
Product code	Dia	A	B	C	D	E	Nominal wt/kg
87½° Trapless gully trap • 230 diameter inlet – TD467							
191403	100	225	280	130	305	43	17.7

Can be used with raising pieces – TD678 and TD108/TD111.
Can be fitted with covers and gratings – TD650-TD653 and TD661/TD662.



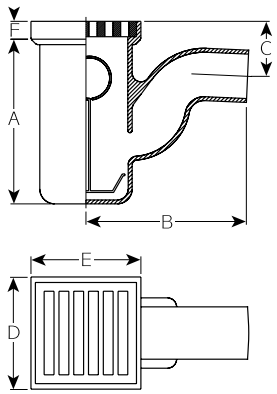
Product code	Dia	A	B	C	D	E	Nominal wt/kg
87½° Deans gully trap • 230 diameter inlet – TD550							
191407	100	560	380	190	305	43	55.4

Can be used with raising pieces – TD678 and TD108/TD111.
Can be fitted with covers and gratings – TD650-TD653 and TD661/TD662.
Can be supplied with Galvanised Sediment Pan: product code 191181.
If used with Galvanised Sediment Pan this fitting can only be fitted with TD650 or TD651 gratings.



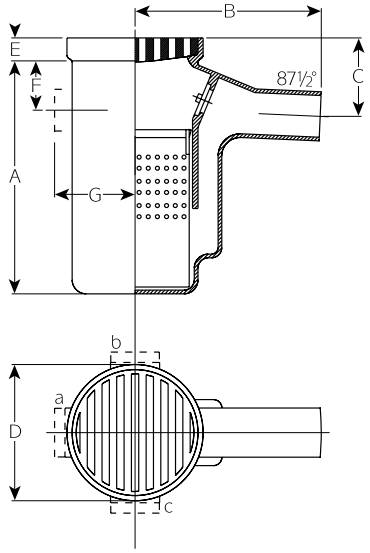
Product code	Dia	A	B	C	D	E	F	G	H	J	Nominal wt/kg
87½° Gully trap • 230 diameter inlet – TD551											
191408	100	395	437	117	225	40	435	308	274	56	30.8

Can be used with raising pieces – TD678 and TD108/TD111.
Can be fitted with covers and gratings – TD650-TD653 and TD661/TD662.
Can be supplied with Galvanised Sediment Pan: product code 191182.
If used with Galvanised Sediment Pan this fitting can only be fitted with TD650 or TD651 gratings.



Product code	Dia	A	B	C	D	E	F	Nominal wt/kg
87½° Gully Trap • 230 x 230 inlet – TD553								
191381	100	380	370	125	255	250	35	26.8

Can be supplied with Galvanised Sediment Pan: product code 191183.
Can be supplied with Grating: product code 191380.
Maximum load 2.0 tonnes.

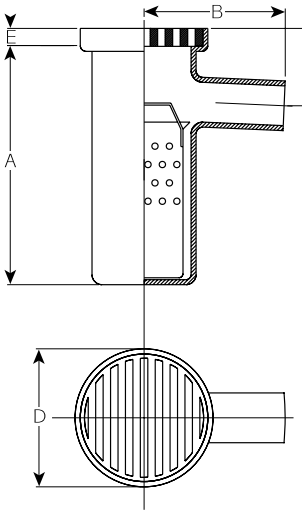


Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
87½° Garage gully trap • 305 diameter inlet – TD554									
191410	100	478	363	168	380	67	101	210	58.4

Can be supplied with raising pieces – TD559.
Can be supplied with Galvanised Sediment Pan: product code 191184. Can be supplied with grating: product code 191382. Maximum load 7.5 tonnes.

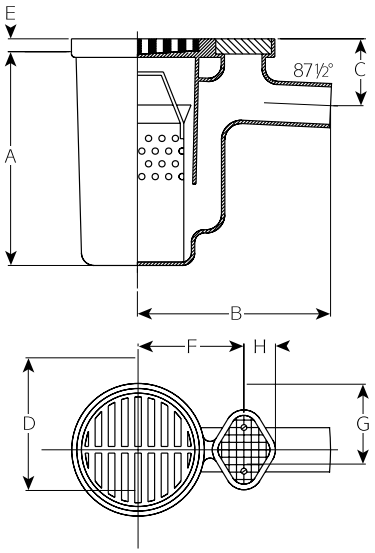
100 Inlets can be cast on in positions a, b, or c to order.

Product code	Inlet position
191411	a
191414	b
191415	c
191412	a and b
191413	a and c
1911416	a, b and c



Product code	Dia	A	B	C	D	E	Nominal wt/kg
87½° Trapless gully trap • 230 diameter inlet – TD556							
191409	100	570	335	185	300	45	45.4

Can be used with raising pieces – TD678 and TD108-TD111.
Can be fitted with covers and gratings – TD650-TD653 and TD661-TD662. Can be supplied with Galvanised Sediment Pan: product code 191181. If used with Galvanised Sediment Pan this fitting can only be fitted with TD650 or TD651 gratings.

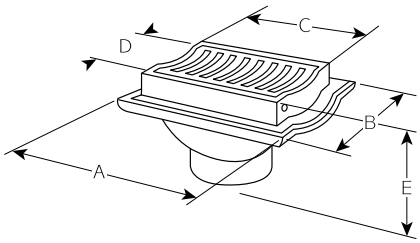


Product code	Dia	A	B	C	D	E	F	G	H	Nominal wt/kg
87½° Garage gully trap • 330 diameter inlet – TD558										
191418	100	560	520	180	405	50	285	215	85	75.5

Can be supplied with Galvanised Sediment Pan: product code 191185. Can be supplied with Grating: product code 191383. Maximum load 7.5 tonnes.

Yard gully

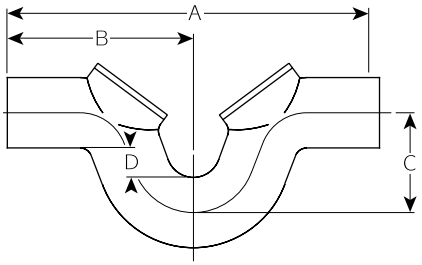
Heavy roadway hinged grating and frame.
Grating dished 25mm deep for channel or flat.



Product code	Outlet dia	A	B	C	D	E	Nominal wt/kg
Gully trap with luting flange – TD561							
191357	225	445	375	335	265	205	44.0

For use with traps – TD550/TD551 and TD556.
Raising pieces – TD678 and TD108/TD111 and tapered inlet gullies – TD684 and TD120/TD123.
Grating maximum load 7.5 tonnes.
Requires caulking into fittings.
See p168 for details on caulking compound.

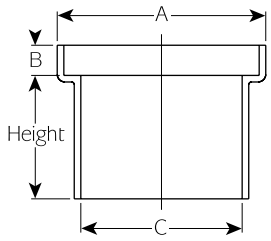
Running traps



Product code	Dia	A	B	C	D	Nominal wt/kg
Running trap with double access – TD475						
191404	100	413	206	150	50	14.2
191405	150	775	370	215	50	55.4
191406	225	1200	600	325	100	144.0

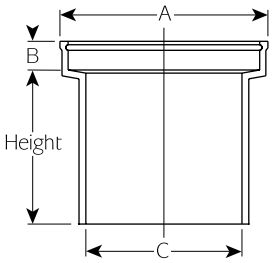
225 diameter comes supplied with foot.
100 and 150 diameter have round accesses.
225 diameter has rectangular accesses.

Raising pieces



Product code	Height	A	B	C	Nominal wt/kg
Raising piece – TD559					
191354	75	380	50	305	12.7
191356	150	380	50	305	20.4
191355	300	380	50	305	37.0

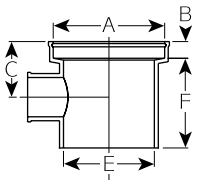
For use with gully trap – TD554.
Requires caulking into gully trap.
See p168 for details on caulking compound.



Product code	Height	A	B	C	Nominal wt/kg
Raising pieces • 225 inside diameter • Plain – TD678					
191363	75	305	43	225	9.5
191365	115	305	43	225	11.6
191364	150	305	43	225	13.5
191366	225	305	43	225	17.0
191367	300	305	43	225	21.5

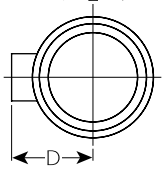
Raising pieces

TD108/111



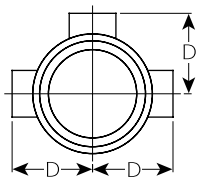
Product code	A	B	C	D	E	F	Nominal wt/kg
Raising piece with 100 inlet branch – TD108							
191347	305	43	140	205	225	225	19.0

TD108



Product code	A	B	C	D	E	F	Nominal wt/kg
Raising piece with 100 inlet branches – TD111							
191348	305	43	140	205	225	225	23.1

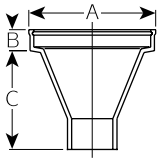
TD111



Raising pieces – TD678 and TD108/TD111 can be used in conjunction with gully traps – TD64/TD467/TD550/TD551/ TD556 and tapered gully inlets – TD684 and TD120/123.
Can also be used with grating and covers – TD650-TD653 and TD661/TD662.
Raising pieces require caulking into Gully Traps.
See p168 for details on caulking compound.

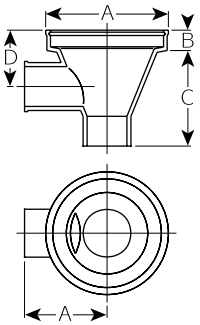
Tapered gully inlets

TD684



Product code	Outlet dia	A	B	C	Nominal wt/kg
Tapered gully inlet • 225 inside diameter • Plain – TD684					
191368	100	305	43	245	12.9
191369	150	305	43	225	12.3

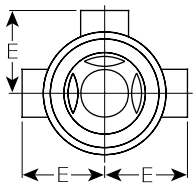
TD120



Product code	Outlet dia	A	B	C	D	E	Nominal wt/kg
Tapered gully inlet with 100 inlet branch – TD120							
191352	100	305	43	245	140	205	14.2

Commonly known as back inlet gully.

TD123

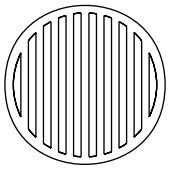


Product code	Outlet dia	A	B	C	D	E	Nominal wt/kg
Tapered gully inlet with 100 inlet branches – TD123							
191353	100	305	43	245	140	205	20.3

Tapered gully inlets – TD684 and TD120/TD123 can be used in conjunction with raising pieces – TD678 and TD108/TD111 and can be used with gratings and covers – TD650-TD653 or TD661/TD662.

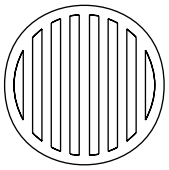
Gratings and covers

For gully traps, raising pieces and tapered gully inlets 265 diameter to suit TD678 and TD108/TD111 raising pieces, TD684 and TD120/TD123 tapered gully inlets, and gully traps TD467/TD550/TD551/TD556.



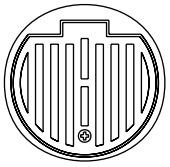
Product code	Dia	Nominal wt/kg
Light grating – TD650		
191390	265	3.6

Maximum load 2.0 tonnes.



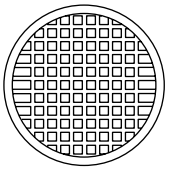
Product code	Dia	Nominal wt/kg
BS heavy grating – TD651		
191391	265	8.0

Maximum load 7.5 tonnes.



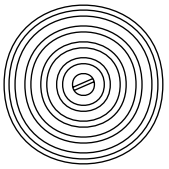
Product code	Dia	Nominal wt/kg
Hinged and locking grating and frame – TD653		
191360	265	5.3

Maximum load 2.0 tonnes.



Product code	Dia	Nominal wt/kg
Sealing plate and frame fitted with two screws – TD661		
191361	265	5.0

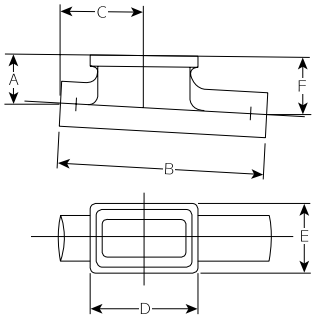
Maximum load 7.5 tonnes.



Product code	Dia	Nominal wt/kg
Grease seal cover and frame fitted with two screws – TD662		
191362	265	3.6

Maximum load 2.0 tonnes.
Requires caulking into above listed gully traps, raising pieces and tapered gully inlets. See p168 for details on caulking compound.

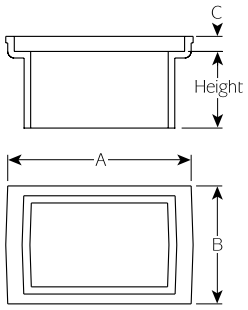
Rainwater shoes



Product code	Dia	A	B	C	D	E	F	Nominal wt/kg
Rainwater shoe with horizontal inlet – TD114								
191349	100	125	530	215	280	180	147	15.5

Can be used with gratings and covers – TD790-TD795.
Can be used with raising pieces – TD793.

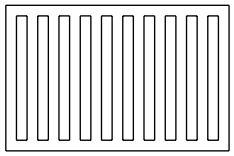
Raising pieces



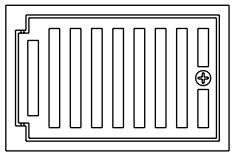
Product code	Height	A	B	C	Nominal wt/kg
Raising piece – TD793					
191378	305	280	180	25	15.4

For use with TD114.
Can be used with gratings and covers – TD790-TD795.
Raising pieces require caulking into rainwater shoes.
See p168 for details on caulking compound.

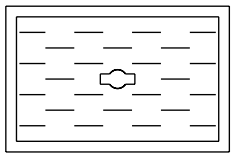
Gratings and covers



Product code	Dimensions	Nominal wt/kg
Grating – TD790		
191374	240 x 140	2.4

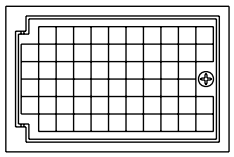


Product code	Dimensions	Nominal wt/kg
Hinged and locking grating and frame – TD791		
191375	240 x 140	3.2



Product code	Dimensions	Nominal wt/kg
Grease seal cover and frame – TD792		
191376	240 x 140	2.4

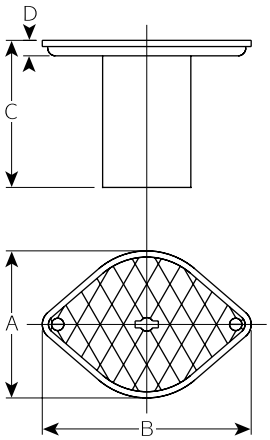
Fitted with two screws if required.



Product code	Dimensions	Nominal wt/kg
Hinged and locking cover and frame – TD795		
191379	240 x 140	3.2

The above gratings and covers are for use with rainwater (drain) shoes – TD114 and raising pieces – TD793. Gratings – TD791-TD795 require caulking into above listed components.
See p168 for details on caulking compound.

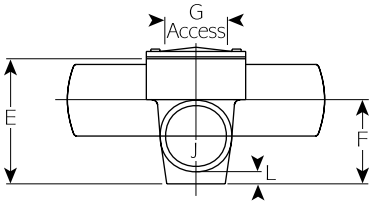
Airtight inspection eye covers

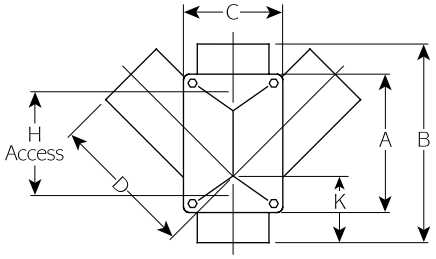


Product code	Dia	A	B	C	D	Nominal wt/kg
Airtight inspection eye covers – TD724						
191394	100	215	270	190	35	10.0
191395	150	260	320	180	30	16.2

Loading: B125 (5 tonne slow moving load 12.5 tonne gross)

Chambers

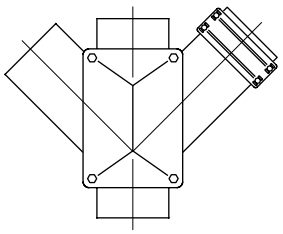




Product code	Dia	A	B	C	D	E	F	G	H	J	K	L	Nominal wt/kg
Chamber • Double branch – TD14													
191306	100 x 100	230	330	165	240	210	140	100	170	65	110	20	19.6
191307	150 x 100	210	300	215	285	250	170	150	150	90	55	25	24.7
191308	150 x 150	285	380	215	330	300	200	150	225	95	105	25	38.6
† 191309	225 x 100	500	910	280	400	370	220	226	450	110	320	62	100.0
† 191310	225 x 150	500	910	280	450	370	220	226	450	85	320	62	110.0
† 191311	225 x 225	500	910	280	565	370	220	226	450	45	320	62	174.0

L and J are dimensions to invert.

†Made to order.



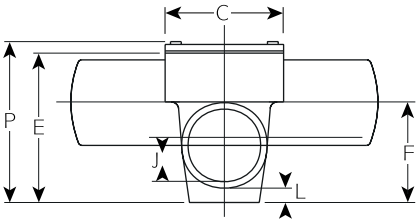
Single branch arm:
if only one branch arm is required, blank off unused arm using TD34 Blank End with TD01 coupling.

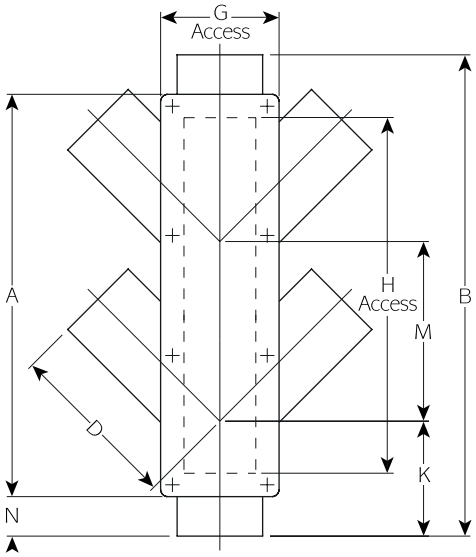
Chambers

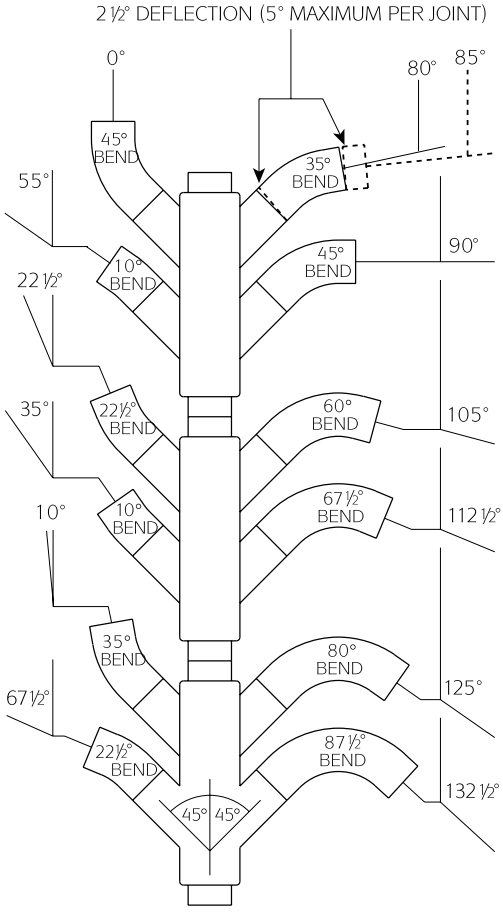
	Product code	Dia	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Nominal wt/kg
Chamber – TD17																	
	191312	100 x 100	560	670	140	250	210	140	100	520	65	160	20	250	55	240	40.2
	191313	150 x 100	560	670	190	285	245	165	150	520	90	160	25	250	55	280	55.9
	191314	150 x 150	700	810	190	330	300	195	150	660	95	135	25	360	55	335	87.2
†	191315	225 x 100	500	920	280	400	370	220	226	450	110	210	62	250	235	410	210.0
†	191316	225 x 150	1050	1460	280	450	370	220	226	1000	85	320	62	550	235	410	220.0
†	191317	225 x 225	1050	1460	280	565	370	220	226	1000	45	320	62	550	235	410	240.0

L and J are dimensions to invert.

†Made to order.







Inspection chambers

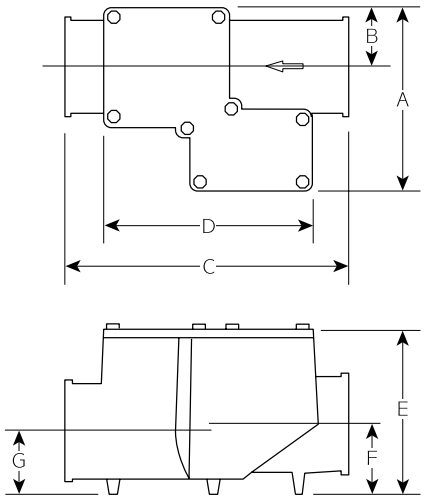
Inspection chamber branch arm entries are all at 45° to conform with BS 437 and Codes of Practice BS EN 12056 Parts 2 and 3.

Where other angles of entry are necessary these can be achieved by the use of standard bends as shown. The Timesaver joint having at 5° deflection capability enables other angles to be achieved eg. 10° gap from 80° to 90° deflect each joint of 35° bend according to angle required. An 85° angle is illustrated.

The diagram assumes that the branch drains have a fall of 1 in 40 or less. Falls steeper than this will alter the bend apparent angle in plan.

†Made to order.

Eureka anti-flooding trunk valves



Jones 'Eureka' anti-flooding trunk valves and interceptors for disconnecting chambers and tidal outfalls.

These valves consist of a cast iron body, stainless steel flap faced with rubber seal, separate cast iron valve seating, polystyrene float fixed to a brass pivot rod, and a bolted cover with rubber seal.

The valve and float are fixed to the same brass spindle in adjoining chambers separated by baffles which allow water to enter but excludes solids. Under normal circumstances the valve hangs clear of the flowing sewage, but when the flood water rises the float rises with it and closes the valve.

When flood water subsides the float falls, the valve is raised and the rush of pent up water cleans the valve.

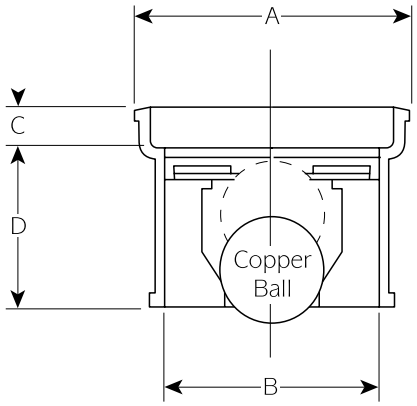
Inspection/maintenance required every 6-12 months.

Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
Anti-flooding trunk valve 'Eureka' – TD750									
191420	150	330	105	490	365	285	115	105	50.0

100, 225, 300mm diameter are currently available in traditional socket and spigot specification (see page 163).
225 and 300mm diameter are made to order.

Note: 1" BSP float vent is supplied plugged. Plug should be removed and a vent pipe carried upwards to such a height and so positioned as not to transmit foul air in such a manner as to become prejudicial to health or a nuisance. These valves are sold at customers' risk only without guarantee. They are checked before despatch and no liability can be accepted after installation. It is recommended that these valves are serviced before the start of each wet season or a least twice a year.

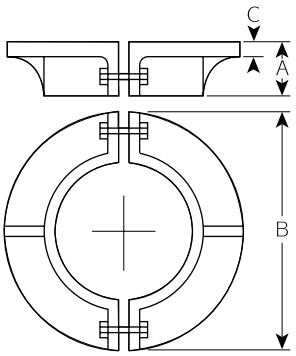
Ball valve anti-flooding



Product code	A	B	C	D	Nominal wt/kg
Anti-flooding ball valve – TD756					
191421	305	225	43	180	21.8

Can be used with grating – TD650.
Can be used in conjunction with TD64/TD467/TD550/TD551/ TD678 and TD684.
Not recommended for use in foul drain systems.
This valve is sold at customers' risk only without guarantee. They are checked before despatch and no liability can be accepted after installation.
It is recommended that these valves are serviced before the start of each wet season or a least twice a year.

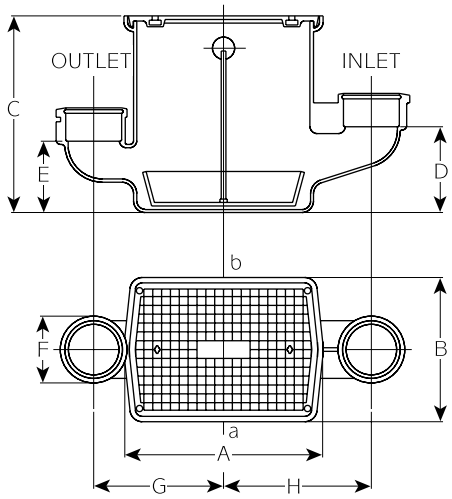
Flanges loose puddle



Product code	Dia	A	B	C	Nominal wt/kg
Flange – TD777					
191371	100	50	220	13	3.9
191372	150	65	275	13	5.6
191373	225	65	360	13	8.6

This collar is in two halves which can be bolted around the pipe even when pipe is in position.
Can also be used as a firestop.
Due to manufacturing tolerances it is recommended that the puddle flange is bedded on Denso tape or similar material.

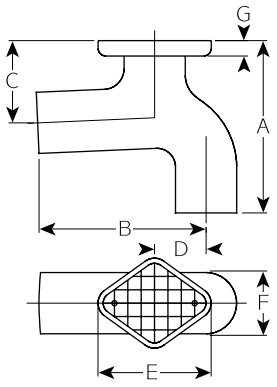
Grease traps



For use inside and outside building.
Inside dimensions for TD706: 455 x 305 x 545.

Product code	Dia	A	B	C	D	E	F	G	H	Nominal wt/kg
Grease trap – TD706 with grease seal cover										
191419	100	545	400	545	250	210	185	360	410	113.1

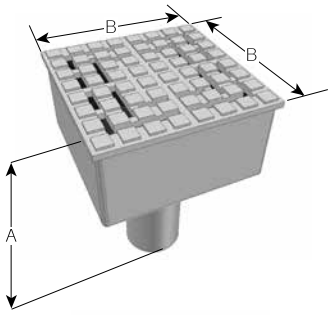
Single seal cover: product code 191393
Can be used with Galvanised Sediment Pan: product code 191187.
Can be used with Bellmouth – TD105 and TD106 on Inlet.
Can used with TD708 on outlet.
Can be tapped 1½" BSPT for vent at a or b to order.
It is recommended that if an appliance, which has its own water seal is connected directly to the grease trap, the waste pipe should be vented and this should be positioned as close to the grease trap as possible.



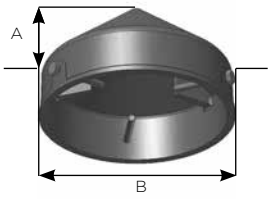
Product code	Dia	A	B	C	D	E	F	G	Nominal. wt/kg
Grease trap outlet for TD706 grease trap – TD708									
191370	100	330	330	155	100	220	175	30	17.1

SOCKET AND SPIGOT DRAIN FITTINGS TO BS 437

Inlets fresh air

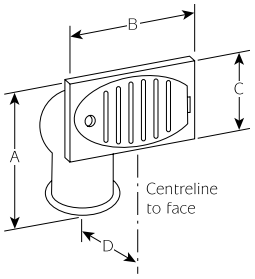


Product code	Dia	A	B	Nominal wt/kg
'CREGEEN' with hinged cover – 585				
191590	100	343	305	22.2



Product code	Dia	A	B	Nominal wt/kg
Ventilating head with three GM screws – 589				
191591	100	178	292	8.8

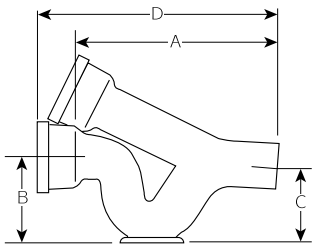
To fit 100 drain pipe socket or 150 drain pipe spigot.



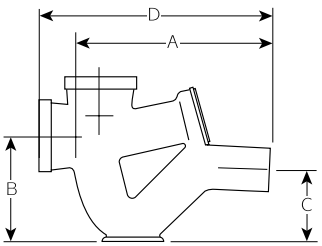
Product code	Dia	A	B	C	D	Nominal wt/kg
Fresh air inlet – 591						
191592	100	315	255	175	115	10.0

Without flap valve.
With locking grill.

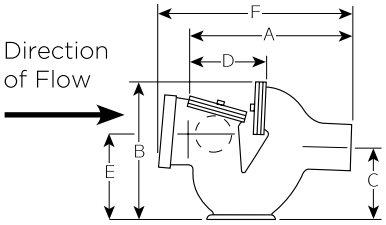
Traps



Product code	Dia	A	B	C	D	Nominal wt/kg
Intercepting trap – 477						
191602	100	530	230	220	582	34.0
191603	150	660	300	290	740	66.0



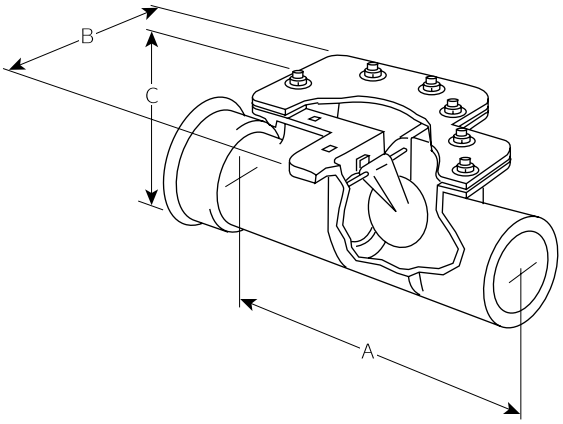
Product code	Dia	A	B	C	D	Nominal wt/kg
Intercepting trap – 479						
191605	100	580	290	220	660	47.0



Product code	Dia	A	B	C	D	E	F	Nominal wt/kg
Intercepting trap – 481								
191607	100	530	240	230	240	235	660	44.0
191610	150	610	485	290	290	320	700	68.0

100 and 150mm dia with 100 dia FAI. Can be supplied with fresh air inlet LH or RH. 100 LH 191608, 100 RH 191609, 50 LH 191611, 150 RH 191612. Position of inlet left/right decided when viewing against the direction of the flow. If in doubt – contact Technical Dept. 01952 262529

Eureka anti-flooding trunk valves



Jones 'Eureka' anti-flooding trunk valves and interceptors for disconnecting chambers and tidal outfalls.

These valves consist of a cast iron body, stainless steel flap faced with rubber seal, separate cast iron valve seating, polystyrene float fixed to a brass pivot rod, and a bolted cover with rubber seal.

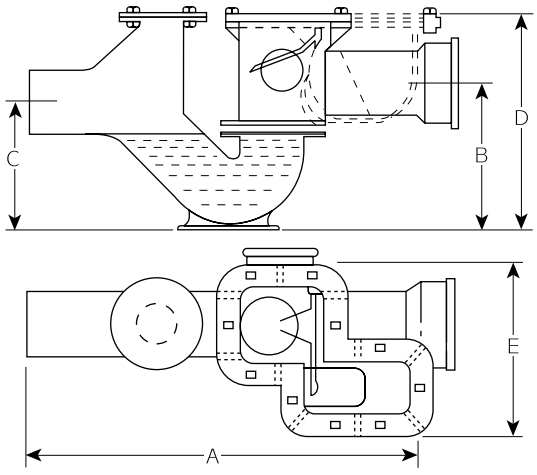
The valve and float are fixed to the same brass spindle in adjoining chambers separated by baffles which allow water to enter but excludes solids. Under normal circumstances the valve hangs clear of the flowing sewage, but when the flood water rises the float rises with it and closes the valve.

When flood water subsides the float falls, the valve is raised and the rush of pent up water cleans the valve.

Note: 1" BSP float vent is supplied plugged. Plug should be removed and a vent pipe carried upwards to such a height and so positioned as not to transmit foul air in such a manner as to become prejudicial to health or a nuisance. These valves are sold at customers' risk only without guarantee. They are checked before despatch and no liability can be accepted after installation. It is recommended that these valves are serviced before the start of each wet season or a least twice a year.

Product code	Dia	A	B	C	Nominal wt/kg
Anti-flooding trunk valve 'Eureka' – 750					
191593	100	597	356	241	51.0
†191594	225	889	610	406	120.0
†191870	300	1035	748	540	350.0

150mm diameter (see page 160).

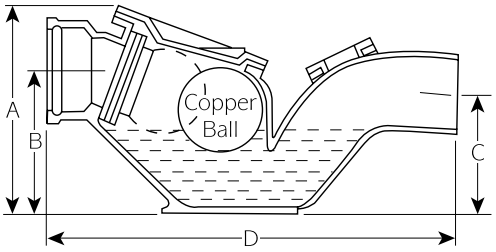


Product code	Dia	A	B	C	D	E	Nominal wt/kg
Anti-flooding trunk valve 'Eureka' – 752							
†191595	100	845	299	267	396	343	105.0
†191596	150	978	355	305	546	406	145.0
†191597	225	1372	559	432	800	584	-

Note: 1" BSP float vent is supplied plugged. Plug should be removed and a vent pipe carried upwards to such a height and so positioned as not to transmit foul air in such a manner as to become prejudicial to health or a nuisance. These valves are sold at customers' risk only without guarantee. They are checked before despatch and no liability can be accepted after installation. It is recommended that these valves are serviced before the start of each wet season or a least twice a year.

The PAM range of traditional drain anti-flooding traps and valves are progressively being updated. This involves the removal of the traditional socket and the spigot bead, which will simplify installation, enabling connections to be made with standard ductile iron mechanical couplings.

Ball valve anti-flooding

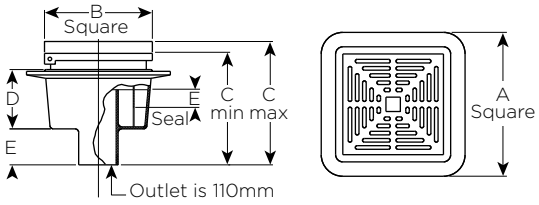


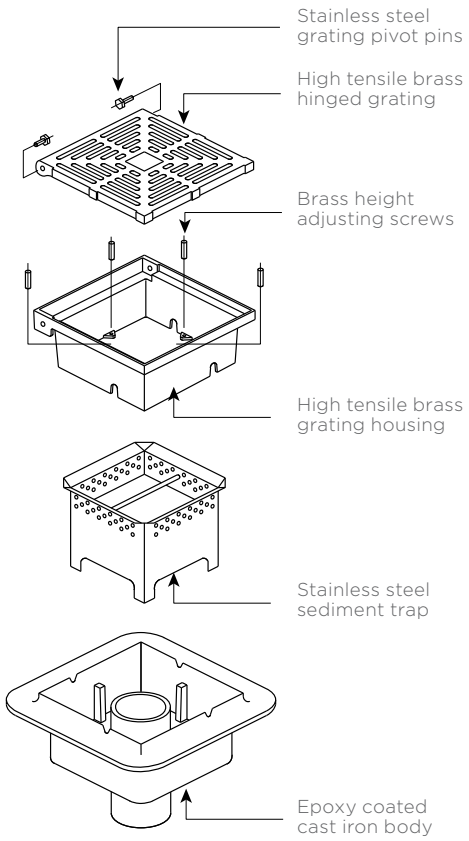
Product code	Dia	A	B	C	D	Nominal wt/kg
Anti-flooding ball valve – 755						
† 191598	100	350	240	185	660	53.5
† 191599	150	460	315	260	820	98.9
† 191600	225	616	438	383	1219	–

Not recommended for use in foul drain systems.
These valves are sold at customers' risk only without guarantee. They are checked before despatch and no liability can be accepted after installation.
It is recommended that these valves are serviced before the start of each wet season or a least twice a year.
These valves should be set horizontally with the aid of a spirit level.

†*Made to order.*

Square bell trap





Product code	Dia	A	B	C min	C max	D	E	F
191396	100	400	300	310	335	160	100	50

Adjustable height for use with non-membrane floors VX-F950 square trapped floor drain.
Outlet is 110mm.

Weights	kg
Body	20.6
Sediment trap	2.8
Grating housing	5.3
Grating	5.2

Design recommendations

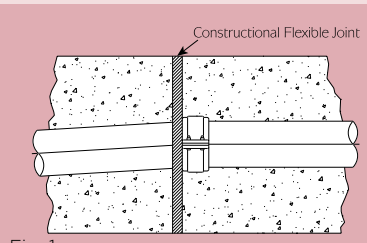


Fig. 1

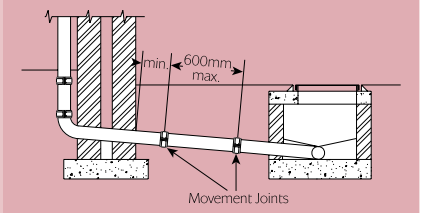
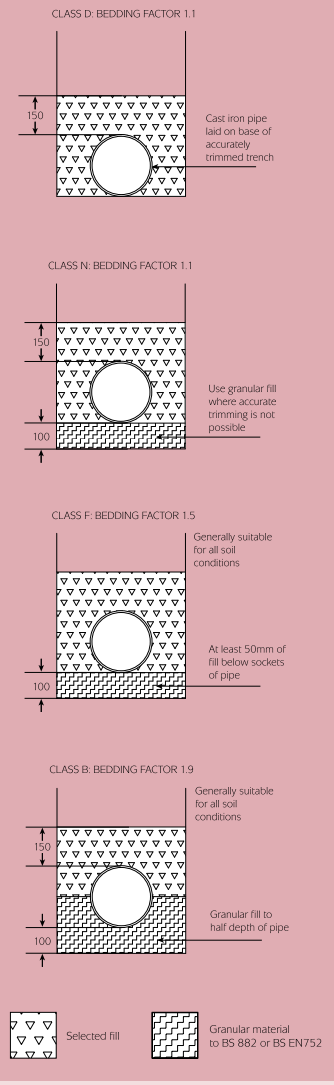


Fig. 2

Backfilling for rigid pipes



Trench preparation

Timesaver drain may be laid directly into a naturally trimmed trench allowing 50mm clearance at each joint between coupling and trench bottom. The trench bottom should be flat to give continuous support to the pipework.

If the subsoil can't be accurately trimmed with a spade, the trench should be excavated to a depth of 100mm below the pipe invert and a granular bed laid. This also should allow 50mm clearance at each joint between the coupling and the granular bed. Where Timesaver drain is to be set in concrete, the trench should be prepared as described above to allow a minimum of 100mm of concrete under the pipe.

The pipe should be supported on a compressible material (eg. expanded polystyrene), either side of each joint. The concrete should have a suitable flexible joint at intervals not greater than 5m in order to reduce the natural rigidity of the concrete. This should be made of a compressible material (eg. expanded polystyrene), which should be placed next to a pipe joint, and conform to the full cross section of the concrete (see Fig. 1).

Haunching and surround should not be carried out until the pipework has been tested and inspected.

Differential movement

Timesaver couplings allow up to 5° deflection at each joint.

Pipelines leaving buildings, manholes or other structures which are likely to be subject to settlement, should have a minimum of two joints a maximum of 600mm apart, thereby allowing a short length of pipe to act as a 'rocker pipe'. The joint nearest the structure should be as close to it as possible and in areas where large settlement is expected, more than one 'rocker pipe' may be required (see Fig. 2).

Minimum depth of pipework

Timesaver drain can be installed with a minimum cover of 75mm under building without further protection. Where Timesaver drain is installed under roads and yards, subject to normal usage, protection need only be considered if the cover is less than 300mm. However, in areas that are subject to special loadings or abuse, extra protection should be considered.

Minimum bedding – limits of cover

The choice of bedding and backfilling depends on the depth at which the pipes are to be laid and the size and strength of the pipes. Rigid pipes like cast iron are more robust than flexible plastics pipes and backfilling can therefore be simpler. The Building Regulations specify the limits of cover for rigid pipes as follows:

Limits of cover for standard strength rigid pipes in any width of trench (as per BS EN 752) Backfill sequence

Pipe size	Bedding class	Fields and gardens		Light traffic roads		Heavy traffic roads	
		Min metres	Max metres	Min metres	Max metres	Min metres	Max metres
100	D or N	0.4	4.2	0.7	4.1	0.7	3.7
	F	0.3	5.8	0.5	5.8	0.5	5.5
	B	0.3	7.4	0.4	7.4	0.4	7.2
150	D or N	0.6	2.7	1.1	2.5	–	–
	F	0.6	3.9	0.7	3.8	0.7	3.3
	B	0.6	5.0	0.6	5.0	0.6	4.6

Trenches should be backfilled in stages, and at least 150mm of earth free from stones larger than 40mm, lumps of clay over 100mm and vegetable matter should cover the pipe before tamping down. Further 300mm thick layers of selected fill should be tamped down until the trench is full.

Design recommendations

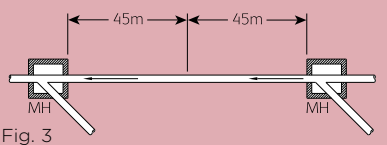


Fig. 3

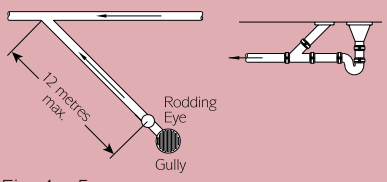


Fig. 4 + 5

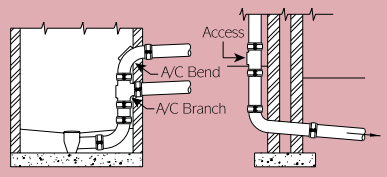


Fig. 6 + 7

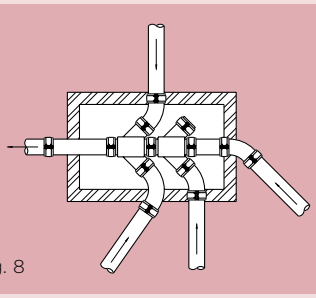


Fig. 8

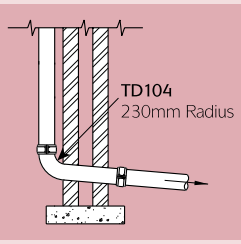


Fig. 9

Falls

Pipework gradients should be chosen to obtain a self-cleaning action under normal discharge conditions. For flows of less than 1 litre/sec a gradient of 1 in 40 for 100mm pipe and 1 in 60 for 150mm pipe, are usually sufficient and for practical purposes, the gradients should not be less than 1 in 80 for 100mm pipe and 1 in 150 for 150mm pipe.

Access

Access is required on all pipelines to facilitate the rodding and clearing of debris and can be provided by manholes, chambers, access fitting or rodding eye – the latter allowing downstream access only.

Generally, no part of a drain should be further from a manhole than 45m and the distance between manholes should not exceed 90m (see Fig. 3).

Where a drain connects with another drain without the provision of an inspection chamber or manhole, access should be provided on the branch drain within 12m of the junction (see Fig. 4 and Fig. 5).

It is recommended that access to the pipework is installed each time the drain changes direction either horizontally or vertically by the inclusion of an access fitting (see Fig. 6 and Fig. 7).

Inspection chambers

Inspection chamber branch arm entries are all at 45° to conform with BS 437 and BS EN 12056 Parts 2 and 3.

Where other angles of entry are necessary these can be achieved by the use of standard bends as shown above. The Timesaver joint having at 5° deflection capability enables other angles to be achieved, eg. 10° gap from 80° to 90° deflect each joint of 35° bend according to angle required. An 85° angle is illustrated (see Fig. 10).

The diagram assumes that the branch drains have a fall of 1 in 40 or less. Falls steeper than this will alter the bend apparent angle in plan.

Use of bends

Bends in drains should be kept to a minimum. Wherever possible bends should be at or near to manholes or in a position which will allow ease of rodding (see Fig. 8).

At the base of soil and rainwater stacks, it is recommended that long or large radius bends be used (see Fig. 9).

Use of branches

Branches or junctions on drains should be, where possible, at access points, such as manholes, to facilitate rodding.

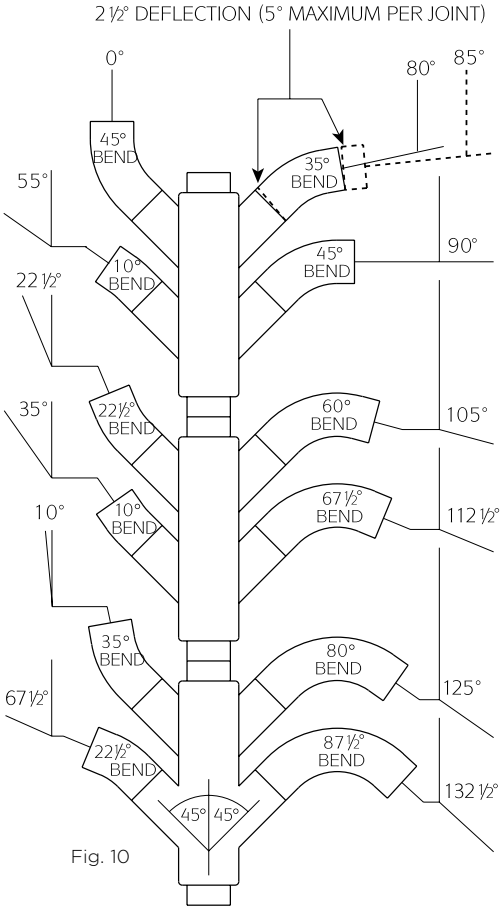


Fig. 10

Design recommendations

TD777

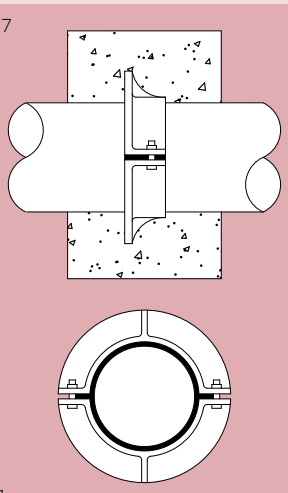


Fig. 11

Gullies, floor drains and traps

A drainage gully is a fitting that enables wastewater to enter the drainage system without allowing smells or sewer gases to escape. A variety of designs have been developed to suit different situations, for example – back inlet gully, which is used to connect rainwater pipes and waste pipes from ground floor sinks.

Ventilation of drains

It is important to allow a passage of air through the drainage system to enable any foul gases to escape. This is achieved by providing air inlets at the low point and vent pipes that terminate at high level, and also at the head of the drain. Convection currents cause a slow flow of air through the system. Also, if the air pressure in the drain was reduced, say by the pipes flowing full, the trap seals of gullies and WC's would be lost and the sewer gases would be able to enter the building.

Puddle flanges

Where pipes pass through external walls, a puddle flange may be required to prevent water from entering where the pipe is below the natural ground water table, or methane gas from entering the building from made-up ground. Loose, two-piece flanges should be bedded onto 'Denso' tape and tightened into position (see Fig. 11).

Support recommended for suspended drainage

It is important that all suspended horizontal pipework is adequately supported by brackets and fixings of sufficient strength to support the pipes and their maximum contents.

The distance between pipe supports should not exceed 3m (BS EN 12056-2 Code of Practice for Sanitary Pipework'). However, as shown in Fig. 12, it is recommended that suspended BS 437 pipes should have two bracket supports per 3m length.

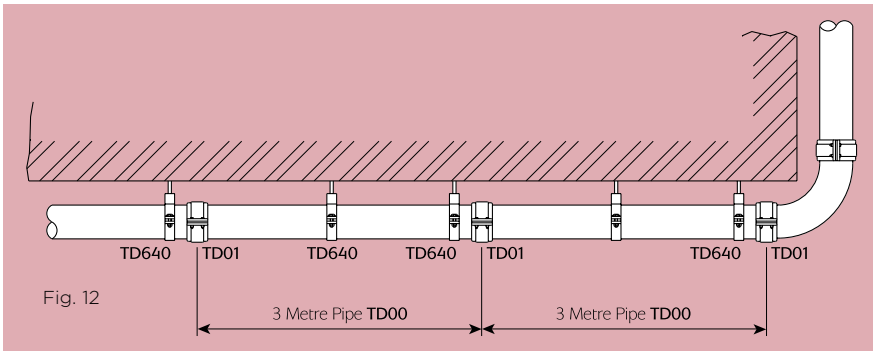
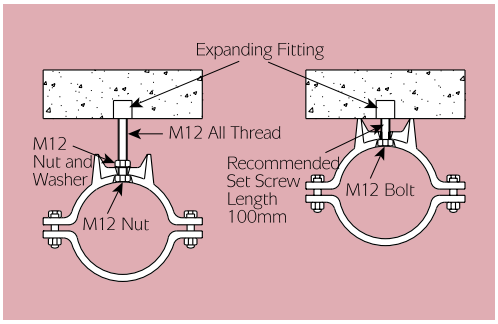


Fig. 12



Connection to other systems

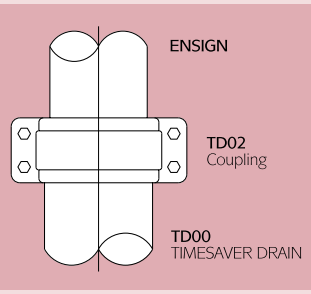


Fig. 13

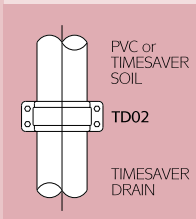


Fig. 14

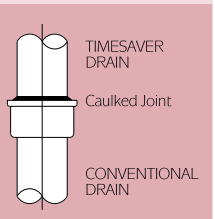


Fig. 15

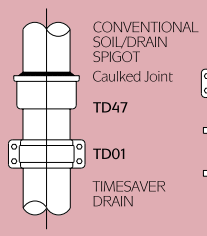


Fig. 16

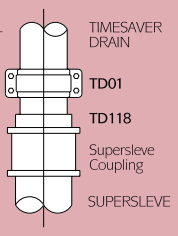


Fig. 17

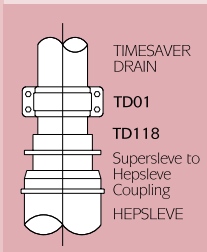


Fig. 18

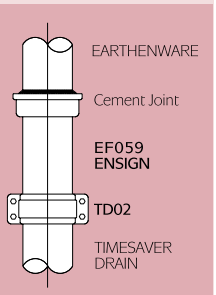


Fig. 19

A. Timesaver drain dimensions

Most materials can be connected to Timesaver drain by using a TD01 coupling if their dimensions conform to the following table:

Timesaver drain nominal dia	Min o/dia	Max o/dia
100	116	119
150	170	173
225	250	256

or by using a TD02 coupling if their dimensions conform to the following table:

Other material

Timesaver drain nominal dia	Min o/dia	Max o/dia
100	110	114
150	161	165

B. Ensign

Couple directly to Ensign using a TD02 transitional coupling (see Fig. 13). Four bolt, two piece coupling to BS 6087.

C. Timesaver soil

Timesaver soil can be connected directly to Timesaver drain using a TD02 coupling (see Fig. 14).

D. Conventional drain/soil

To connect Timesaver drain/soil into a conventional drain socket use a traditional caulked joint (see Fig. 15).

If connecting to a conventional drain/soil spigot use a TD47 with a caulked joint and a TD01 at the spigot of the TD47 (see Fig. 16).

E. Hepworth clayware

100 and 150 Supersleve can be connected to Timesaver drain by using a TD118 adaptor and a TD01 coupling (see Fig. 17).

100 and 150 Hepsleve can be connected to Timesaver Drain by using a TD118 adaptor and a TD01 coupling in conjunction with a Supersleve to Hepsleve transitional coupling manufactured by Hepworth (see Fig. 18).

F. Earthenware

Timesaver drain can be connected to an earthenware socket using a traditional cement joint.

If connecting to an earthenware spigot use a EF059 and a TD02 coupling with a traditional cement joint at the socket of the EF059 (see Fig. 19).

Advice on cold caulking

For products which require to be caulked ie. socketed BS437 fittings or raising pieces we recommend the following:

Cold Caulking

Item	Product code	Weight
Caulking Compound MS252NF	222754	12kg
Caulking Compound Hardener W252	222753	1.45kg

Application Instructions

1. Empty the 1.45kg hardener into the 12kg container of resin and mix thoroughly for 5 minutes.
2. Centralise the pipe into the socket (the cut face of the pipe should be flush with the internal socket face). If any small gaps are present they can be sealed with a small amount of packing material to act as a barrier while the compound sets.
3. Use small Blocks or Wedges of wood to support the pipe centrally and steady within the socket.
4. Then simply fill the socketed joint around the pipe with the mixed caulking compound and finish at a flush level with the face of the socket.

Please Note: This is a single use product and comes in one size only.

Quality control procedures & tests

All pipes, fittings and couplings are subjected to tests in accordance with the requirements of the relevant British Standard prior to despatch from works.

Pipes and fittings

A. Hydrostatic test
Pipes and fittings, after coating, conform to the hydrostatic pressure requirements of BS 437:

Pipes	345kPa	(3.45 Bars)
Fittings	170kPa	(1.70 Bars)

The test pressure is applied internally and maintained for not less than 15 seconds and up to a maximum of one minute.

B. Crushing test
Pipes and, where applicable, fittings conform to the BS 437 requirements of being capable of withstanding a test load of 150kN per metre run.

Couplings

A. Deflection test procedure
Fully engage pipe ends into joint assembly. Align them axially with one pipe restrained from movement and the other pipe completely free to move. Separate the pipes axially by 5mm on either side of central register.

Angularly deflect one pipe with respect to the other, to an angle of 3° with the fulcrum on the centre line of the pipes within the joint. Apply and maintain a hydrostatic pressure of 1 bar for period of five minutes without leakage.

B. Drain testing
It is normal practice to carry out two soundness tests on drainage systems. The first, before back filling the trench, followed by a second test after back filling which may be required to be witnessed by the local building control officer.

Methods of testing – two methods of soundness testing are possible: a water test or an air test.

Water test – to carry out a water test the length of drain to be tested is blocked off at its lower end by means of a drain stopper. Another stopper is fitted at the top of the run of drain with an up-stand pipe of 1.5m height attached. The drain is then filled with water and the joints can then be inspected for leaks. It is recommended that the total head of water should not exceed 4m so it may be necessary to test the drain in sections.

Air test – the air test is quicker to carry out and more searching than the water test, and should be used in preference. To carry out the test, drain stoppers are filled to any open ends, and gullies have their traps filled with water. A length of hose is then passed through a trap and air is gently blown into the drain until a pressure of 100mm is indicated on a manometer. Provided a pressure of a least 75mm remains after 5 minutes of the test, the drain can be considered sound. Where traps or gullies are connected the drain should withstand a pressure of 50mm water gauge and this should not fall by more than 12.5mm in a 5-minute period.

C. Straight draw test procedure
Fully engage the pipes in the joint assembly, as Fig. 20. Align them axially. Separate the pipes axially by 5mm on either side of the central register. Prevent further longitudinal movement. Apply and maintain a hydrostatic pressure of 1 bar for a period of five minutes without leakage.

D. Shear loading test procedure
Fully engage the pipes in the joint assembly and align them axially on supporting structure, as Fig. 21. Separate the pipes axially by 5mm on either side of central register. Prevent further longitudinal movement. Apply a shear load of 0.025kN x nominal pipe diameter in mm, inclusive of the mass of the pipe and contents, uniformly over a length of 300mm adjacent to the coupling, as Fig. 21.

Apply and maintain a hydrostatic pressure of 1 bar for a period of five minutes without leakage.

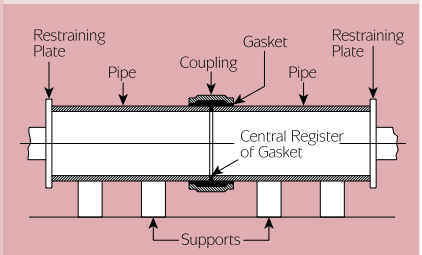


Fig. 20

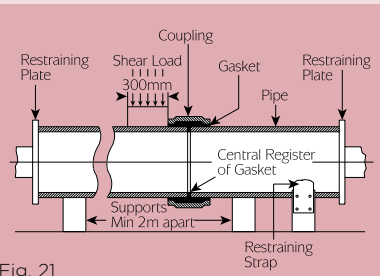


Fig. 21

It is recommended that these technical notes should be read in conjunction with the following British Standards:

1. BS EN 12056-2: Code of Practice for Sanitary Pipework (inside the building).
2. BS EN 12056-3: Code of Practice for Drainage of Roofs and Paved Areas (inside the building).
3. BS EN 752: Drains and Sewers Outside Buildings.
4. BS 8301: Code of Practice for Building Drainage (now obsolete).

Section 2

Soil Pipes and Fittings

Jointing method

A. Pipe or fitting
B. Pipe or fitting
C. Synthetic rubber gasket
D. Coupling
E. Set screws and nuts

50, 75 and 100 diameter couplings have two set screws and nuts.
150 couplings have four set screws and nuts.

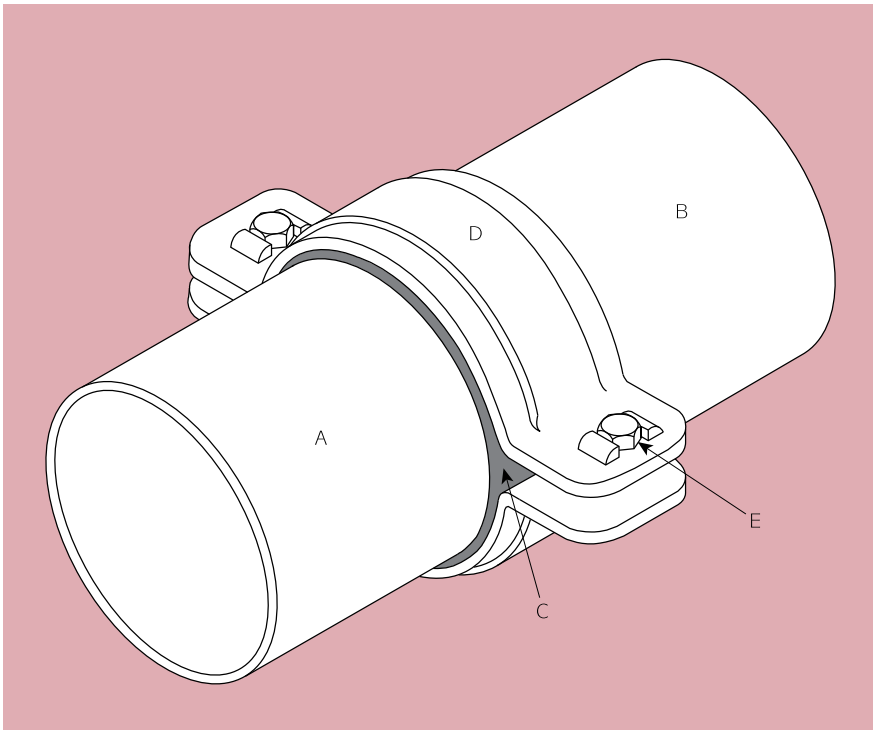
Couplings are supplied ready assembled

1. Slacken bolts to fullest extent.
2. Place synthetic rubber gasket on end of pipe or fitting A, and slide loosely assembled coupling over pipe B.
3. Fit pipe B into gasket ensuring both A and B are butting against the internal central register.
4. Slide coupling over gasket ensuring that it is centrally located and tighten bolts alternately so that the gap between coupler halves is even on both sides. When hand tight check alignment of assembly.
5. Complete tightening operation by use of a Ratchet Spanner – EF100 with Deep Socket – EF101 until a suitable resistance is achieved (min 20Nm).

Joints may be deflected up to 5° without affecting the sealing properties.

The Timesaver couplings meet the performance requirements of BS 6087:1990 and incorporate synthetic rubber gaskets conforming to BS EN 681-1/ISO 4633 and set screws and nuts. A Ratchet Spanner – EF100 is the recommended tool required to tighten the set screws which give a 'for all time seal' water and airtight installation.

Saint-Gobain PAM UK does not accept liability for any complaints on installations where components not manufactured by Saint-Gobain PAM UK are included.



Electrical continuity

Designed for use in situations where equipotential bonding (earthing) has been specified, the Timesaver electrical continuity clips are available for use with Timesaver soil and Timesaver drain systems.

The Timesaver electrical continuity clip fits a standard Timesaver coupling. Only one electrical continuity clip is required per coupling. Note: The electrical continuity test should be carried out in accordance with BS 6087.

Continuity clips

These are supplied separately to the coupling in standard quantity bags of 25 number.

Coupling	Product code	Ref no.
To suit 50, 75, 100, GT01	191189	GT96S
To suit 150 GT01, 100, 150TD01	191190	GT96L
To suit 100 TD02	191191	GT96T
To suit 150 TD02	191192	GT96T6
To suit 225 TD01	191193	GT968

Assembly instructions:

1. Slacken bolts to fullest extent.
2. Place synthetic rubber gasket C on pipe or fitting A and slide loosely assembled coupling over pipe B.
3. Fit pipe B into gasket ensuring both A and B are butting up to central register.
4. Fit continuity clip D centrally by peeling back one edge of the gasket and slipping it into the Continuity clip.
5. Repeat for other edge of gasket, so the gasket is held within the continuity clip D.
6. Position clip at 90° to gasket ears and in the direction of the pipe run.
7. Slide coupling over gasket and tighten bolts alternately so that the gap is even on both sides. When hand tight check alignment.
8. Complete tightening operation by use of a ratchet spanner – EF100 and deep socket – EF101 (min 20Nm).

Note: Use one continuity clip per coupling joint. Continuity clip must not be reused after tightening.

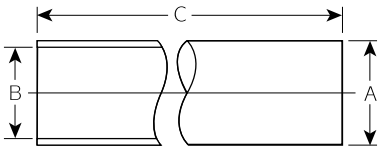
The installation should be tested to BS EN 12056 for a soil installation or to BS EN 752 for a drain installation and to IEE Regulations on equipotential bonding (earthing).

Provided that the Timesaver electrical continuity coupling is assembled and installed as recommended in our instructions, and the pipework is bonded to the main electrical earth or similar earth, it is considered that the Timesaver electrical continuity coupling will satisfy the IEE Regulations.

It is recommended that the installation is regularly checked for equipotential bonding (earthing) in case of accidental damage, unauthorised pipework modifications, etc.

If a Timesaver electrical continuity installation is to be modified for any reason Timesaver electrical continuity couplings must be used and the installation re-tested for equipotential bonding (earthing).

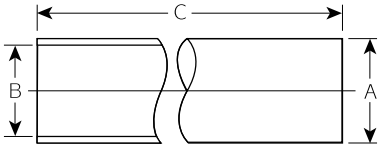
Pipes double spigot



Product code	Nom dia	A Max o/dia	B Min i/dia	Min section	C Metre lengths available	Wt per mt kg
Pipe – GT00						
156366	50	63	50	4	3	6.4
156456	75	89	75	4	3	8.3
156567	100	112	101	4	3	9.3
156831	150	165	152	4	3	15.7

Pipes are internally lined with a two part epoxy paint (ochre colour). Externally coated with black acrylic paint and stencilled every metre with silver marking.

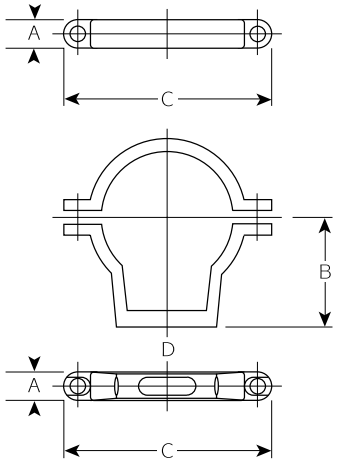
Pipes double spigot – Heritage



Product code	Nom dia	A Max o/dia	B Min i/dia	Min section	C Metre lengths available	Wt per mt kg
Pipe – GT00 – Timesaver Heritage						
192423	100	112	101	4	1.8	9.3
206854	75	89	75	4	1.8	8.3

1.8 (6ft) pipe coated internally/externally in a black water based primer, for use with Timesaver Heritage couplings.

Brackets



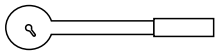
Product code	Dia	A	B	C	Nominal wt/kg
Ductile iron bracket • Elongated slot at fixing point (D) to ease fixing – GT48					
191720	50	27	64	110	0.3
191721	75	27	75	140	0.5
191722	100	27	90	166	0.6
191723	150	30	115	214	0.8

50-100 brackets suit M10 fixing.
150 bracket suit M12 fixing.

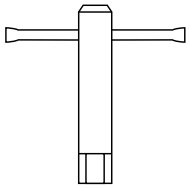
Can be fitted with a new acoustic dampener for exceptional sound deadening performance (see page 187). Contact technical department 01952 262529 for information.

Tools

EF100



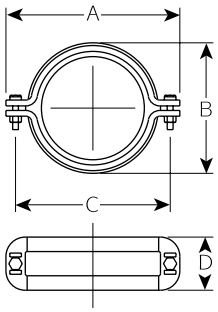
EF098



Ratchet spanner – EF100: product code 191201
A ratchet spanner is the recommended tool required to tighten the set screws, used in conjunction with a deep socket – EF101: product code 191202.

'T' box spanner – EF098: product code 191200
13mm A/F, dual purpose, for use with Timesaver and Ensign systems.

Couplings

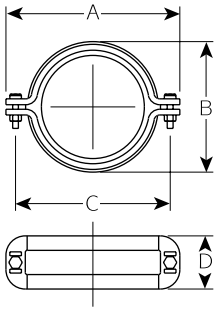


Standard

Ductile iron coupling with synthetic rubber gasket for jointing Timesaver soil to Timesaver soil (black gasket).

Product code	Dia	A	B	C	D	*E	Nominal wt/kg
Two-piece ductile iron coupling – GT01							
191691	50	126	85	105	55	5	0.8
191692	75	158	110	130	55	5	1.0
191693	100	185	135	160	55	5	1.4
191694	150	250	190	220	75	5	2.8

Two set screws are supplied on 50, 75, 100 couplings.
Four set screws are supplied on 150 couplings.
Electrical continuity clips are available supplied separately in standard quantity bags (see ref table page 172).
** Minimum allowance (E) to accommodate gasket register (for guidance only).*



Transitional

Ductile iron coupling with synthetic rubber gasket for jointing Timesaver soil to conventional soil (black gasket with identity marking).

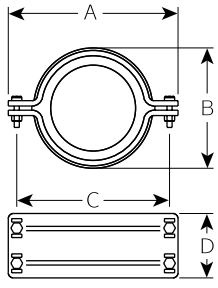
Product code	Dia	A	B	C	D	*E	Nominal wt/kg
Two-piece ductile iron coupling – GT12							
191695	65-75	158	110	130	55	5	1.0
191429	†70-75	158	110	130	55	5	1.0
191696	90-100	185	135	160	55	5	1.4

Two set screws are supplied on GT12 couplings.
Designed for connecting:
65 (2½") conventional soil to 75 Timesaver soil.
90 (3½") conventional soil to 100 Timesaver soil.
† Connects 75mm Timesaver soil with 70mm Ensign.
** Minimum allowance (E) to accommodate gasket register (for guidance only).*

Allowable pipe diameters when using the GT12 coupling

Coupling	Conventional pipe dia.		Timesaver pipe dia.	
	Min.	Max.	Min.	Max.
65-75	72	76	85	89
90-100	97	101	110	114

For connection to other materials see page 56.



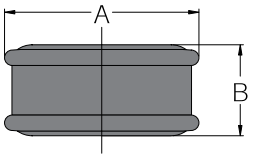
Transitional

Ductile iron coupling with stainless steel nuts and set screws and synthetic rubber gasket for jointing Timesaver drain to Timesaver soil (black gasket with identity marking).

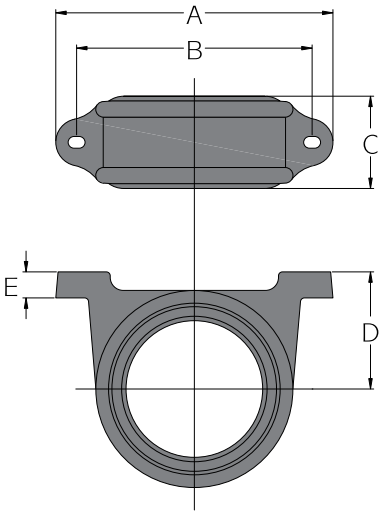
Product code	Dia	A	B	C	D	*E	Nominal wt/kg
Two-piece ductile iron coupling – TD02							
191297	100	203	140	180	75	5	2.8
191298	150	252	195	230	75	5	3.6

Four set screws are supplied on TD02 couplings.
Electrical continuity clips are available supplied separately in standard quantity bags (see ref table page 172).
** Minimum allowance (E) to accommodate gasket register (for guidance only).*

Heritage couplings



Product code	Dia	A	B	Nominal wt/kg
Joint • Plain no ears – GT05P				
192418	50	99	73	0.9
206855	75	128	73	1.4
192421	100	152	73	1.8



Product code	CAD Ref	Dia	A	B	C	D	E	Nominal wt/kg
Joint • With fixing ears – GT05E								
192417		50	146	114	73	62	20	1.4
206856		75	178	146	73	76	20	2.0
192420		100	213	181	73	90	20	2.6

Product code	Dia	A	B	C	D	E	Nominal wt/kg
Joint • Slip – GT05S with reduced central register							
192419	50	146	114	73	62	20	1.4
206836	75	178	146	73	76	20	2.0
192422	100	213	181	73	90	20	2.6

To connect Timesaver Heritage couplings – 100mm diameter to 90mm traditional soil utilise reducing gasket: product code 156132 (see page 190).
150mm diameter see Ensign range.

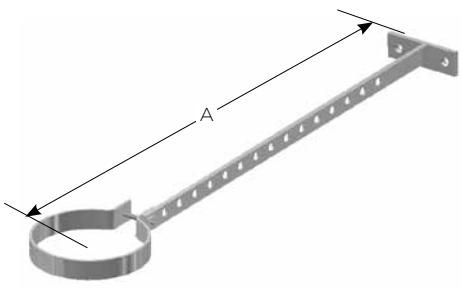
Reducing Gasket

Product code	Dia	Nominal wt/kg
Cast iron wall spacer		
192424	50	0.2
206838	75	0.2
192425	100	0.3

To suit eared PFJ GT05E.

Product code	Dia	Nominal. wt/kg
Mild steel restraining bracket – EF053		
192333	100	0.5

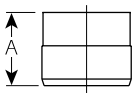
To suit 100mm Timesaver Heritage coupling with ears GT05E.



Product code	Dia	A	Nominal wt/kg
Mild steel restraining bracket – EF053A			
192363	100	450	0.5

To suit 100mm diameter Timesaver Heritage pipework (see page 191 for typical installation).

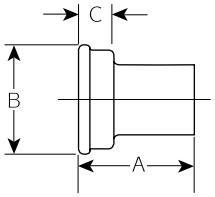
Pipes transitional



Product code	Dia	A	Nominal wt/kg
Adaptor from Timesaver drain to supersleve – TD118			
191350	100	100	2.2
191351	150	125	5.1

Use in conjunction with TD02 connect to Timesaver soil to supersleve.

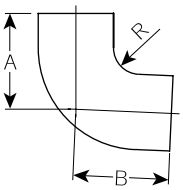
Connectors WC



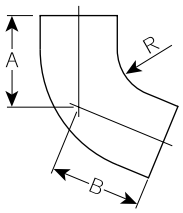
Product code	Dia	A	B	C	Nominal wt/kg
Transitional EF059					
156650	100	155	176	80	2.9

To connect, earthware, WC, stoneware, traditional, soil/drain etc. Note: Ensign product red epoxy coated.

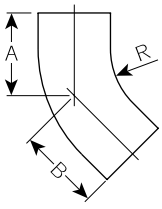
Bends short radius



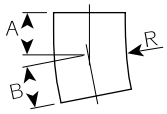
Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend • Short radius – GT02					
191620	50	115	115	40	1.4
191622	75	135	135	40	2.9
191631	100	145	145	40	2.3
191634	150	145	145	15	3.9



Product code	Dia	A	B	R	Nominal wt/kg
67½° Bend • Short radius – GT02					
191625	100	135	135	70	4.0

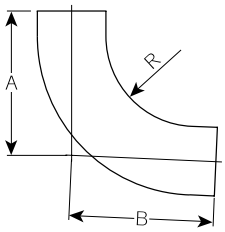


Product code	Dia	A	B	R	Nominal wt/kg
45° Bend • Short radius – GT02					
191619	50	50	50	15	0.6
191621	75	115	115	70	2.3
191626	100	135	135	150	3.5
191632	150	90	90	15	3.0

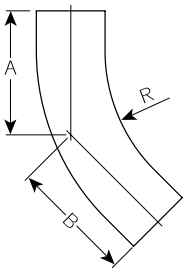


Product code	Dia	A	B	R	Nominal wt/kg
11° Bend • Short radius – GT02					
191628	100	35	55	30	1.6

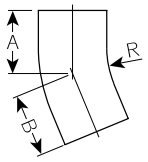
Bends long radius



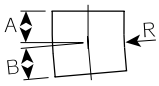
Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend • Long radius – GT02L					
191623	75	230	230	150	4.5
191630	100	269	269	180	4.3
191635	150	274	274	150	10.1



Product code	Dia	A	B	R	Nominal wt/kg
45° Bend • Long radius – GT02L					
191627	100	205	205	275	6.1

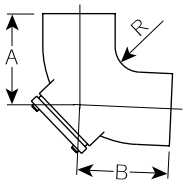


Product code	Dia	A	B	R	Nominal wt/kg
22½° Bend • Long radius – GT02L					
191624	100	90	90	180	1.7
191633	150	140	140	150	4.8

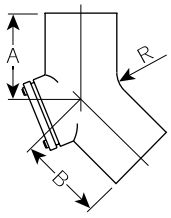


Product code	Dia	A	B	R	Nominal wt/kg
5° Bend • Long radius – GT02L					
191629	100	50	50	230	1.5

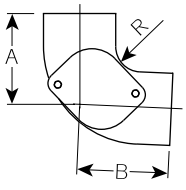
Bends short radius with oval access doors



Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend with access rear • Short radius – GT03					
191636	50	115	115	40	1.9
191638	75	135	135	40	3.6
191642	100	145	145	40	3.3
191644	150	145	145	15	6.1

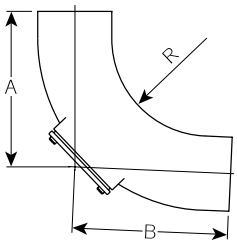


Product code	Dia	A	B	R	Nominal wt/kg
45° Bend with access rear • Short radius – GT03					
191637	75	115	115	70	3.5
191640	100	130	130	120	5.0
191643	150	150	150	120	7.4

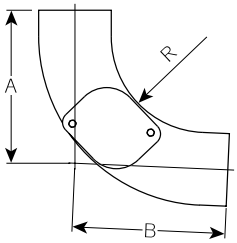


Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend with access side • Short radius – GT04					
191646	100	145	145	40	4.8

Bends medium and long radius with oval access doors

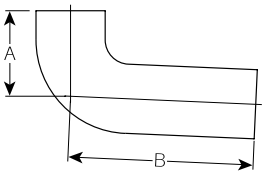


Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend with access rear • Long and medium radius • GT03L					
191639	75	230	230	150	5.3
191641	100	269	269	180	7.4
191645	150	274	274	150	11.7

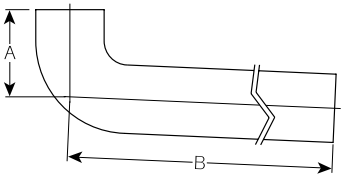


Product code	Dia	A	B	R	Nominal wt/kg
87½° Bend with access side • Long radius – GT04L					
191647	100	250	250	180	7.4

Bends long tail

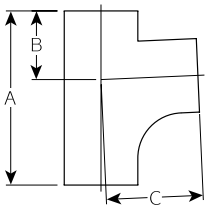


Product code	Dia	A	B	Nominal wt/kg
87½° Bend • Long tail – GT43				
191688	100	110	250	4.6

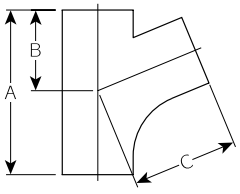


Product code	Dia	A	B	Nominal wt/kg
87½° Bend • 815 long tail – GT55				
191689	100	165	815	13.9

Branches

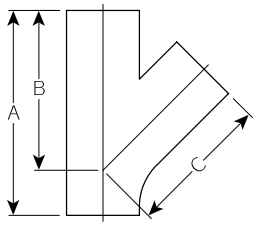


Product code	Dia	A	B	C	Nominal wt/kg
87½° Branch – GT06 Swept					
191649	50 x 50	145	66	80	1.0
191651	75 x 50	205	75	125	2.6
191653	75 x 75	245	85	145	3.2
191655	100 x 50	204	90	120	2.4
191657	100 x 75	245	90	145	4.1
191660	100 x 100	270	102	150	3.5
191662	150 x 100	300	117	202	7.6
191664	150 x 150	375	145	215	10.7



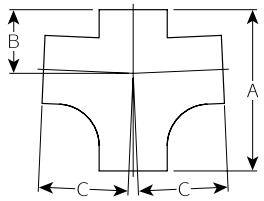
Product code	Dia	A	B	C	Nominal wt/kg
67½° Branch – GT06					
191658	100 x 100	265	130	170	5.0

Branches

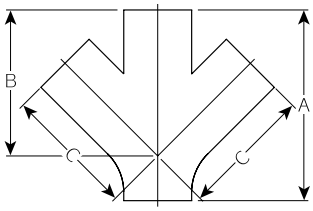


Product code	Dia	A	B	C	Nominal wt/kg
45° Branch - GT06					
191648	50 x 50	185	135	135	1.4
191650	75 x 50	250	190	170	3.5
191652	75 x 75	285	220	185	4.5
191654	100 x 50	200	165	165	2.4
191656	100 x 75	290	225	210	4.9
191659	100 x 100	275	205	205	3.8
191661	150 x 100	295	240	240	6.1
191663	150 x 150	355	265	265	9.0

Branches double

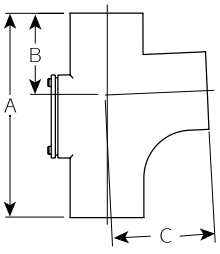


Product code	Dia	A	B	C	Nominal wt/kg
87½° Double branch - GT10 Swept					
191681	75 x 75	245	85	145	4.7
191683	100 x 100	270	102	150	4.2
191684	150 x 100	300	115	200	10.9

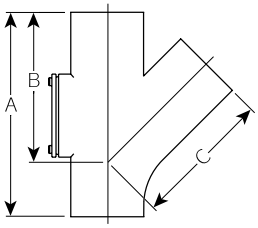


Product code	Dia	A	B	C	Nominal wt/kg
45° Double branch - GT10					
191682	100 x 100	260	190	190	4.0

Branches with access doors

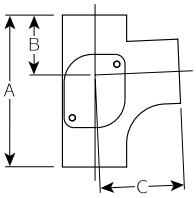


Product code	Dia	A	B	C	Nominal wt/kg
87½° Branch with access rear - GT07 Swept					
191665	50 x 50	195	75	110	2.4
191666	75 x 50	205	75	125	3.7
191668	75 x 75	245	85	145	4.2
191670	100 x 50	204	90	120	3.0
191672	100 x 75	245	90	145	5.3
191674	100 x 100	270	102	150	4.3
191676	150 x 100	300	117	202	10.4
191678	150 x 150	400	140	260	13.9

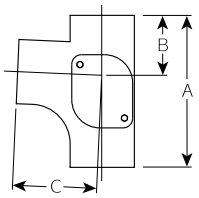


Product code	Dia	A	B	C	Nominal wt/kg
45° Branch with access rear - GT07					
191673	100 x 100	320	245	220	7.6
191675	150 x 100	370	305	255	10.8

Branches with oval access doors

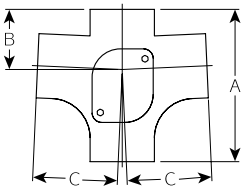


Product code	Dia	A	B	C	Nominal wt/kg
87½° Branch with access right – GT08 Swept					
191679	100 x 100	270	100	150	6.6



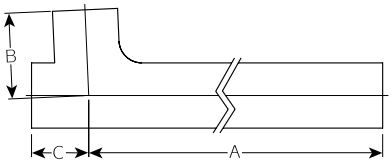
Product code	Dia	A	B	C	Nominal wt/kg
87½° Branch with access left – GT09 Swept					
191680	100 x 100	270	100	150	6.6

Branches double with oval access doors



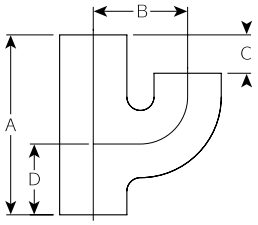
Product code	Dia	A	B	C	Nominal wt/kg
87½° Double branch with access door – GT11 Swept					
191685	100 x 100	265	109	150	7.0

Branches *915* long



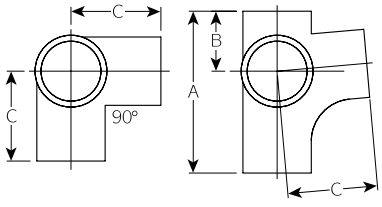
Product code	Dia	A	B	C	Nominal wt/kg
87½° Branch • 915 long tail – GT56 Swept					
191690	100	815	165	100	15.0

Branches parallel



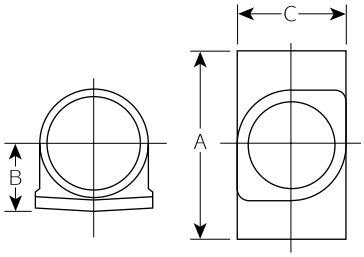
Product code	Dia	A	B	C	D	Nominal wt/kg
Branch • Parallel – GT32						
191686	100 x 100	305	160	65	125	7.4

Branches corner

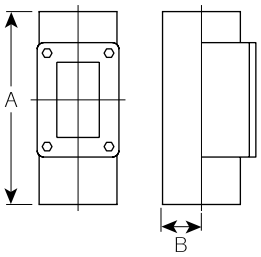


Product code	Dia	A	B	C	Nominal wt/kg
87½° Branch • Corner – GT35					
191687	100 x 100	220	105	115	3.5

Pipes access

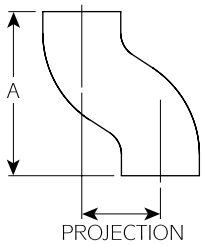


Product code	Dia	A	B	C	Nominal wt/kg
Pipe with oval access door - GT14					
191697	75	280	100	90	4.1
191698	100	250	80	116	3.1
191699	150	280	110	170	6.2



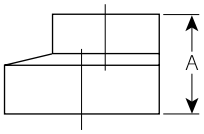
Product code	Dia	A	B	Nominal wt/kg
Pipe with rectangular access door - GT15				
191700	100	320	80	6.7
191701	150	395	105	12.2

Offsets



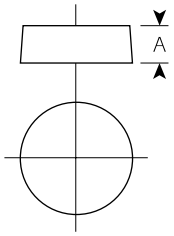
Product code	Dia	A	Nominal wt/kg
Offsets - GT24			
75 Projection			
191702	75	200	2.2
191705	100	215	2.9
115 Projection			
191704	75	220	3.2
191709	100	235	3.4
150 Projection			
191703	75	235	3.5
191706	100	250	4.4
230 Projection			
191707	100	280	5.0
305 Projection			
191708	100	310	6.1

Pipes taper

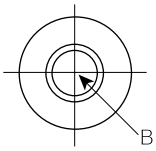


Product code	Dia	A	Nominal wt/kg
Pipes • Diminishing - GT28			
191710	75 x 50	70	0.8
191711	100 x 50	80	0.9
191712	100 x 75	80	1.0
191713	150 x 100	105	1.9

Blank ends



Product code	Dia	A	Nominal wt/kg
Blank ends – GT70			
191724	50	30	0.4
191725	75	35	0.8
191726	100	40	0.8
191727	150	50	2.0

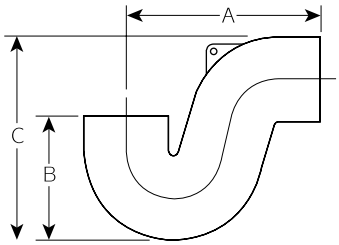


Product code	Dia	A	Nominal wt/kg
Blank ends – GT71			
191728	75	35	0.8
191729	100	40	1.0
191731	150	50	2.0

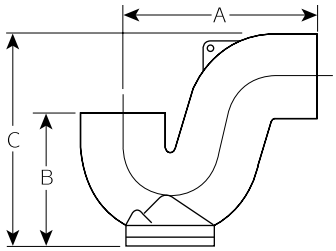
B – Push-fit adaptor to accommodate 54/56mm o/dia PVC/copper waste.
Note: 50 x 56mm connector available (see Ensign product code 155759).

Blank ends – GT71T drilled and tapped 50mm BSPT			
191730	100	40	1.0

Traps 'P'



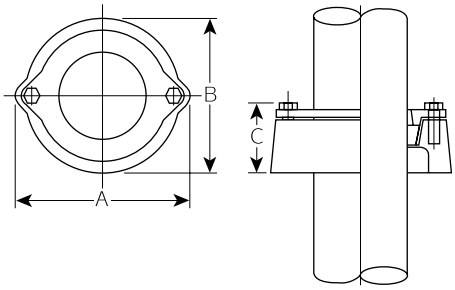
Product code	Dia	A	B	C	Nominal wt/kg
'P' trap • Plain – GT34					
191714	100	255	160	263	4.5



Product code	Dia	A	B	C	Nominal wt/kg
'P' trap with access bottom – GT37					
191715	50	160	115	167	2.0
191716	75	265	210	203	6.3
191717	100	255	175	270	5.2
191718	150	350	240	370	12.1

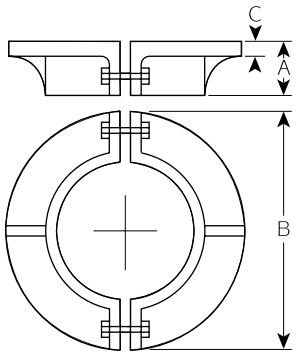
50mm and 75mm do not have support lug as shown on drawing.

Connectors roof



Product code	Dia	A	B	C	Nominal wt/kg
Roof connectors for asphalt – GT73					
191733	100	185	170	72	2.1

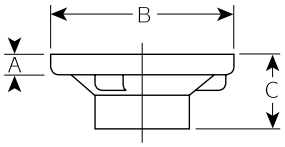
Flanges loose puddle



Product code	Dia	A	B	C	Nominal wt/kg
Flange – ED078 supplied grey epoxy coated only					
191829	100	50	220	12	4.6

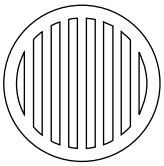
This collar is in two halves which can be bolted around the pipe even when pipe is in position. Can also be used as a firestop. Due to manufacturing tolerances it is recommended that the puddle flange is bedded on Denso tape or similar.

Gully inlets Bellmouth



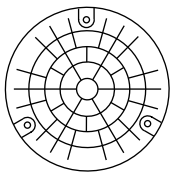
Product code	Dia	A	B	C	Nominal wt/kg
Gully inlet – GT483					
191737	100	25	215	90	2.5

Gratings and covers



Product code	Dia	Nominal wt/kg
Grating plain – TD612		
191385	200	1.8

Maximum load 2.0 tonnes.



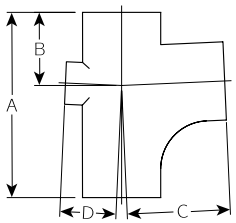
Product code	Dia	Nominal wt/kg
Solid cover – TD613S		
191386	200	2.0

Maximum load 2.0 tonnes.

Product code	Dia	Nominal wt/kg
Grating hinged and locking – TD614		
191387	200	1.8

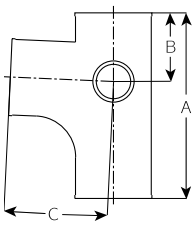
Maximum load 2.0 tonnes.

Boss branches



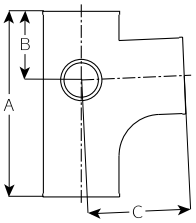
Product code	Dia	A	B	C	D	Nominal wt/kg
87½° Boss branch • Back – GT06 Swept						
191743	100 x 100	270	100	150	75	5.4

Available with 50mm BSPT boss only.



Product code	Dia	A	B	C	D	Nominal wt/kg
87½° Boss branch • Left hand – GT06 Swept						
191744	100 x 100	270	100	150	75	5.4

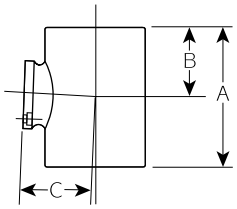
Available with 50mm BSPT boss only.



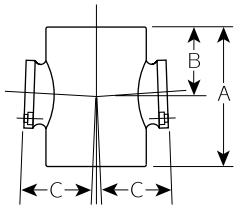
Product code	Dia	A	B	C	D	Nominal wt/kg
87½° Boss branch • Right hand – GT06 Swept						
191745	100 x 100	270	100	150	75	5.4

Available with 50mm BSPT boss only.

Boss pipes

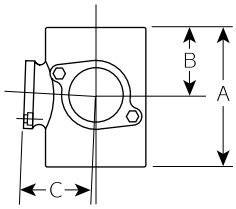


Product code	Dia	A	B	C	Nominal wt/kg
Boss pipe • Single 'O' ring rubber compression boss – GT106					
192236	50	150	75	55	1.2
192237	100	155	75	75	2.1
192239	150	175	87	105	3.8
Boss pipe • Drilled • Tapped 50mm BSPT					
191739	75	150	75	63	2.0
192238	100	155	75	75	2.1



Product code	Dia	A	B	C	Nominal wt/kg
Boss pipe • Double 'O' ring rubber compression boss (opposed) – GT109					
192240	100	155	75	75	2.5
192360	150	175	87	105	4.2

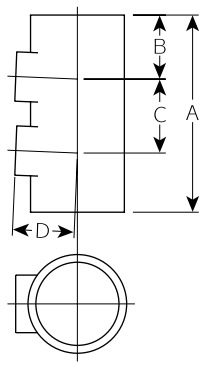
100mm Boss pipe • Drilled • Tapped 50mm BSPT available upon request.



Product code	Dia	A	B	C	Nominal wt/kg
90° Boss pipe • Double 'O' ring rubber compression boss – GT115					
192241	100	155	75	75	2.5

100mm boss pipe • Drilled • Tapped 50mm BSPT available upon request.

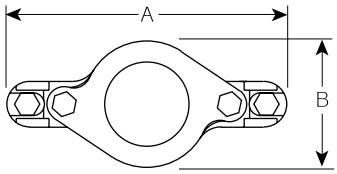
Boss pipes

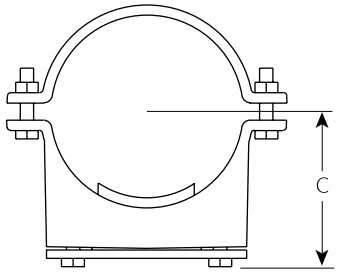


Product code	Dia	A	B	C	D	Nominal wt/kg
87½° Boss pipe – GT132						
191742	100	240	75	90	75	4.1

50mm push-fit connections.

Strap-on boss fitting





Product code	Dia	A	B	C	Nominal wt/kg
Strap-on boss – GT133					
192323	100	166	76	100	1.4

Insertion depth = 30mm.

The strap-on boss provides a simple solution for fitting a 50mm copper or waste pipe to an existing 100mm cast iron soil pipe to BS 416 (pipe outside diameter min/max 109/114mm).

Installation

- Simply determine where the waste pipe is to be positioned.
- Cut a 64mm hole into the cast iron soil pipe with a hole saw (the metal from the hole remains in the cutter – see tools below).
- Mechanically fit the boss strap in position (do not forget the rubber washer) tighten until fully secure.
- Insert in the waste pipe until fully seated in the boss.
- Tighten the boss plate to grip the rubber 'O' ring on the outside of the waste pipe.

Tools required

- A 64mm hole saw: Product code 192326.
- Arbour: Product code 192327.
- ¼" pilot drill: Product code 192328.
- 13mm socket EF101: Product code 191202.

  or
- 13mm spanner for mechanically fitting the boss adaptor EF098: Product code 191200.

Support for vertical pipework

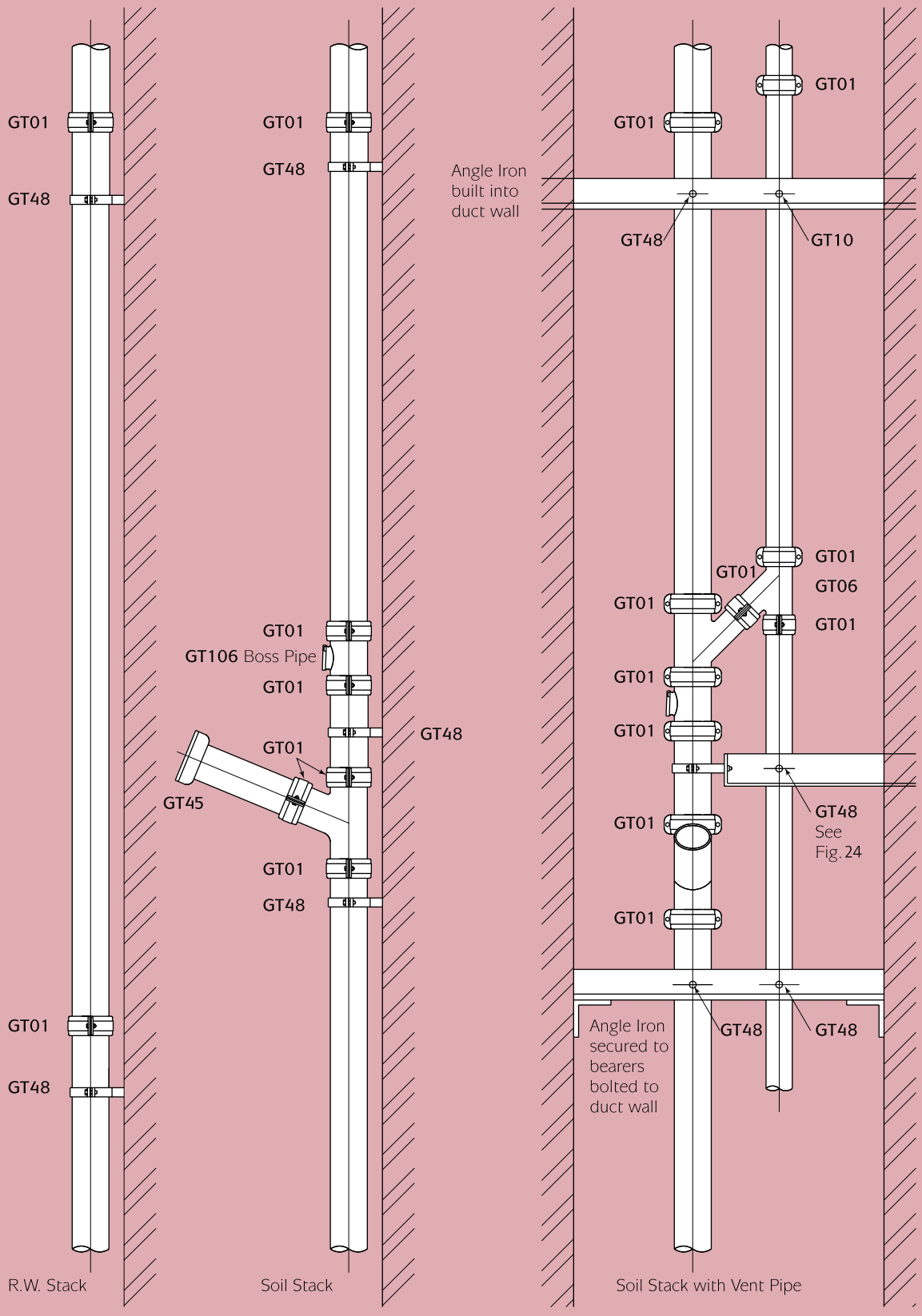


Fig. 22 Fig. 23 Fig. 23a

Support for vertical pipework

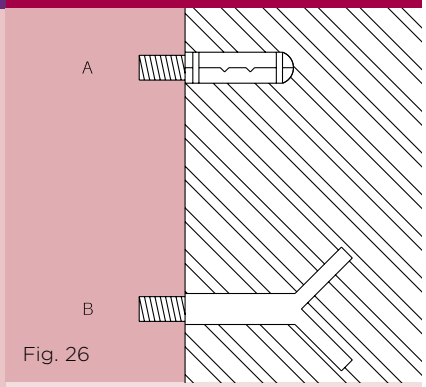
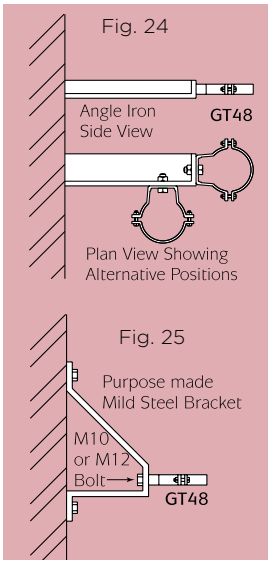


Fig. 26

Suggested fixing methods
A. Expanding type fixing with stud
B. Build in or drive in type fixing

Support for vertical pipework
For vertical soil or rainwater stacks, it is recommended that a load bearing bracket be fitted to each floor level to carry the weight of the soil stack. This is of particular importance on multi-storey applications. These brackets should be tightened as the stack is built up so that each floor height is self-supporting and undue pressure is not imposed on the base of the stack.

Where stacks are located at standard distances from wall or column, ie. 32 from back of pipe to wall face, 50 and 75 diameters and 38 for 100, 150 diameters. RW stacks, (Fig. 22), one bracket GT48 per length will be adequate. Soil stacks, (Fig. 23) may require an extra bracket on or adjacent to the boss pipe in order to ensure correct alignment of stack.



Support for low gradient pipework

The distance between pipe supports should not exceed 3m. Supports should be adjacent to joints and adequate to carry the weight of pipe plus contents. Where the layout requires shorter lengths than the maximum, support distances should be adjusted to suit.

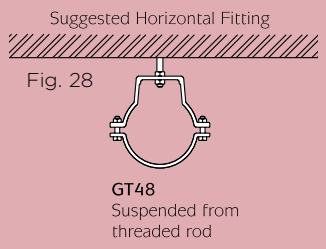


Fig. 28

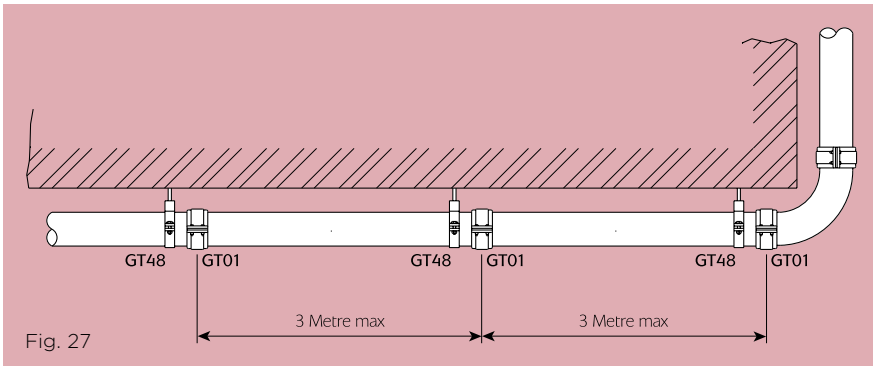


Fig. 27

Acoustic bracket

The GT48 ductile iron bracket fitted with the new acoustic dampener achieves an exceptionally low level of noise transition (see table). The dampener fits all GT48 bracket sizes (50-150mm) and is supplied assembled.

	Airborne sound pressure level dB(A)		Structure borne sound characteristic level dB(A)	
Flow rate (l/s)	2.0	4.0	2.0	4.0
Ductile iron bracket fitted with acoustic dampener	45	47	5	11

Vertical pipe stack – one acoustic bracket per 3 metre
Horizontal suspended pipework – two acoustic brackets minimum per 3 metre

Connection to other materials

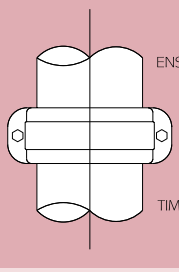


Fig. 29

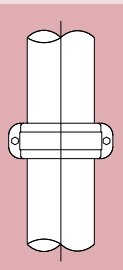


Fig. 30

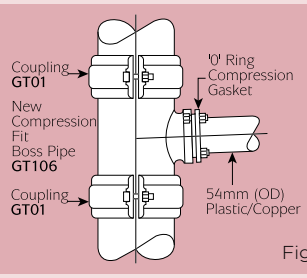


Fig. 31

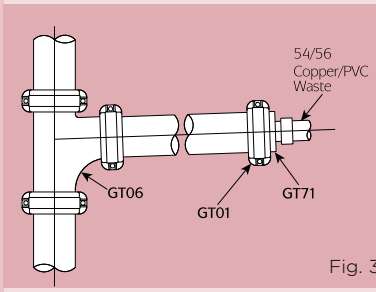


Fig. 32

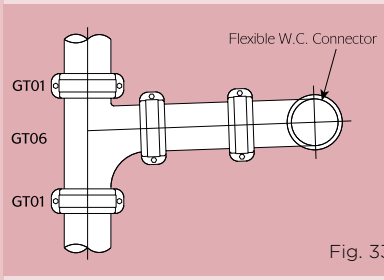


Fig. 33

A. Timesaver soil dimensions

Most materials can be connected to Timesaver soil by using a GT01 coupling if their dimensions conform to the following table:

Timesaver soil nominal dia	Min o/dia	Max o/dia
50	59	63
75	85	89
100	109.5	114
150	160	165

B. Ensign

Couple directly to Ensign using a standard coupling GT01, two piece coupling to BS 6087. (see Fig. 29)

C. PVC pipe

100 and 150 PVC can be connected directly to Timesaver soil using a GT01 coupling. (see Fig. 30)

50 PVC can be connected using either the compression boss pipe GT106 (see Fig. 31), or a GT71 (see Fig. 32), both of which are push-fit connection. Alternatively a traditional drilled and tapped boss pipe with 50mm BSPT is available in
100mm diameter.

D. Waste pipes (copper, plastic etc)

These can be connected via a compression boss pipe (see Fig. 31), or a GT71 (see Fig. 32), both of which are push-fit connection. Traditional drilled tapped 50 BSPT options also available.

E. WC connections

Can be achieved directly by using a flexible WC connector (see Fig. 33), or Transitional Connector EF059 (see page 43).

The WC connector requires a caulked joint.

F. Aluminium and stainless steel

If the outside diameter of these fittings conform to Timesaver dimensions a GT01 coupling can be used (see above for dimensions).

Connection to other materials

Fig. 34

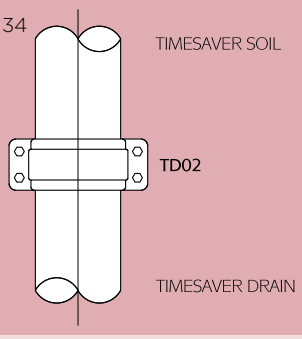


Fig. 35

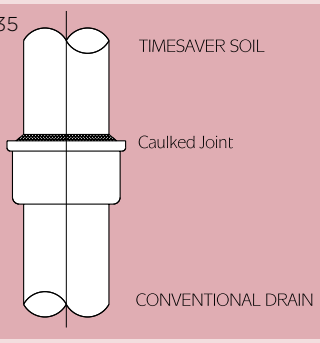


Fig. 36

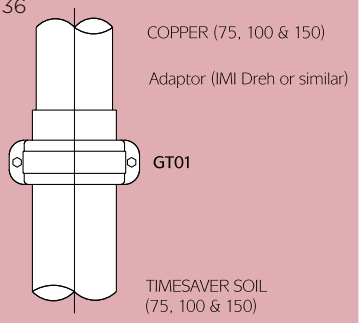


Fig. 37

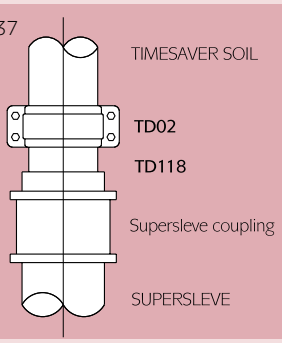
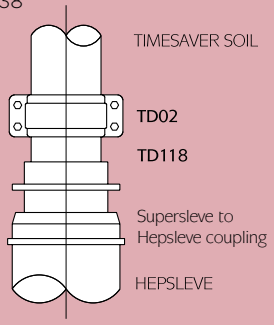


Fig. 38



G. Timesaver drain

Couple directly to Timesaver soil using a TD02 coupling (see Fig. 34).

H. Conventional drain

To connect into a conventional drain socket use a caulked joint (see Fig. 35).

I. Copper

75, 100 and 150 copper can be connected directly to Timesaver soil by using an adaptor available From IMI Dreh or similar and a GT01 coupling (see Fig. 36).

54/56 copper may be connected by a boss pipe (see Fig. 31), or a GT71 (see Fig. 32), both of which are push-fit connection.

J. Hepworth clayware

100 and 150 Supersleve can be connected to Timesaver soil by using a TD118 adaptor and a TD02 coupling (see Fig. 37).

100 and 150 hepsleve can be connected to Timesaver soil by using a TD118 adaptor and a TD02 coupling in conjunction with a supersleve to hepsleve transitional coupling manufactured by Hepworth (see Fig. 38).

Heritage jointing method

1. Apply a small amount of lubricant (ie. silicone grease) on the lip of the rubber gaskets, both ends, to ease insertion of pipe/fittings.

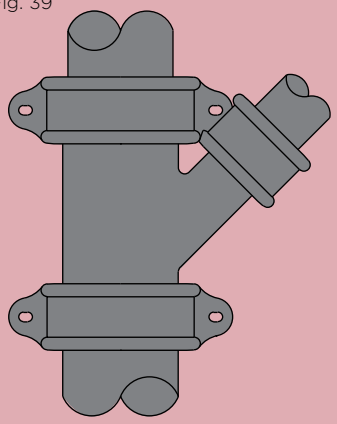
2. Push coupling over the end of pipe/ fitting, ensuring the central register is abutted against the spigot edge evenly. If the coupling is eared, fix to wall using anti-corrosion coach screws or similar.

3. Push the second pipe or fitting into the gasket again ensuring that the spigot is abutted against the central register. Timesaver Heritage couplings eared/plain can be fitted to most fittings within the 50, 75 and 100 diameter ranges *(see table page* 192*)*.

Three joints used on branches can be very close fitting, in some cases they virtually touch. To accommodate this, the plain joint is designed with a flat area which should be lined up with the adjoining socket, to give maximum clearance (see Fig. 39).

Generally when plain sockets are used, ensure flat area is positioned at the rear of the pipe (nearest the wall) away from view.

Fig. 39



Existing systems

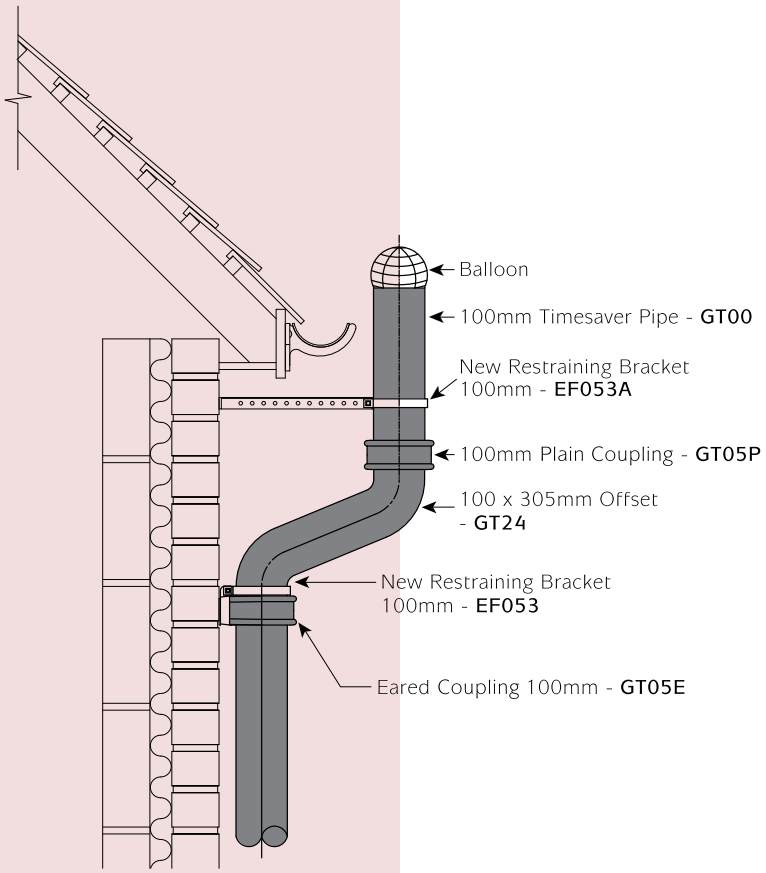
If breaking into an existing Timesaver system, a slip joint should be ordered which is designed with a reduced central register. The joint is made by slipping the whole socket onto the pipe, positioning the new fitting then sliding the socket into the desired position.

Connection to conventional soil

Timesaver can connect directly to 90mm (3½") conventional soil by inserting a traditional gasket into the Timesaver Heritage coupling, product code 156132, replacing one of the standard gaskets.

Lubricate the spigot of the 90mm pipe, and push coupling over the pipe inserting 35mm only. Ensure the 90mm pipe is securely fixed to prevent slipping into new pipework.

Heritage design recommendations



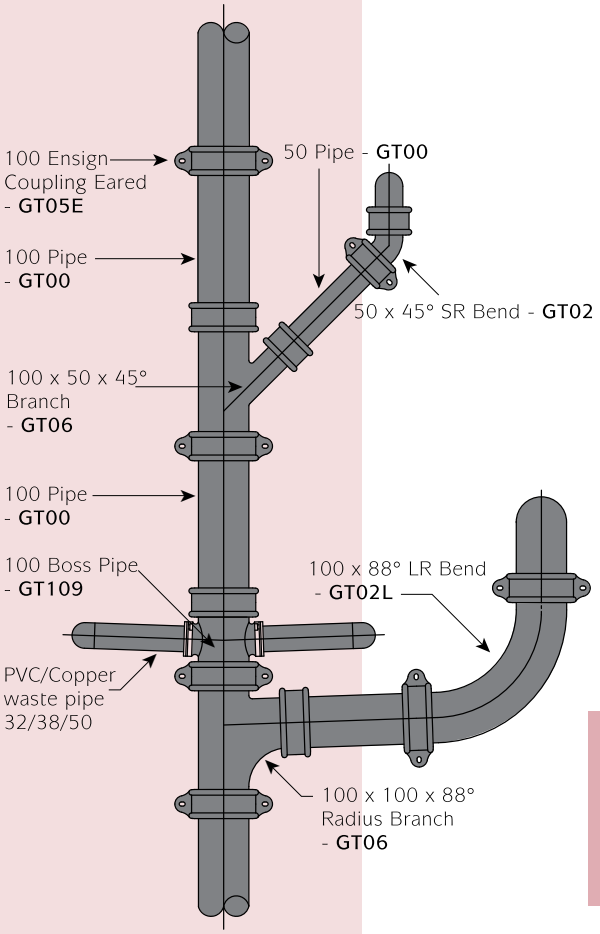
When designing a stack using the new push-fit joint, all fittings require at least one eared socket, to anchor the system to the building. Taking branches as an example, eared joints could be used at the top and bottom of the vertical section to anchor the system, with a plain joint used on the branch arm.

The rubber seals are factory fitted to the socket, and a suitable lubricant (silicone grease) is recommended to ease assembly.

On-site protection

The coating for the Timesaver system is regarded as a primer protection. Therefore when specified for external soil stacks, must be overpainted in accordance with manufacturers recommendations *(see page 193)*.

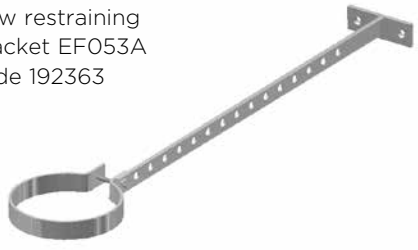
New restraining brackets EF053 and EF053A. These brackets are designed to give support to the system when in an offset situation. See typical installation opposite.



New restraining bracket EF053 code 192333

To suit 100mm eared coupling GT05E

New restraining bracket EF053A code 192363



Note:
Timesaver soil fittings were traditionally supplied with a raised bead on the spigot ends, which over the years have been removed. The Heritage couplings can only be used on fittings without the bead.

Heritage Product range compatibility

Timesaver Heritage – product range
List of products within the Timesaver soil range, which can be used with the Timesaver Heritage couplings

Pipe products		Code	50mm Dia.	75mm Dia.	100mm Dia.
Pipe double spigot		GT00			
3m long			●	●	●
1.8m long				●	●
Bends – Short radius plain	67½°	GT02			●
	87½°, 45°		●	●	●
Bends – Short radius door back	87½°	GT03	●	●	●
	45°			●	●
Bends – Short radius door side	87½°	GT04			●
Bends – Large radius plain	87½°, 45°	GT02L		●	●
	22°				●
Bends – Large radius door back	87½°	GT03L		●	●
Bends – Large radius door side	87½°	GT04L			●
Bends – Long tail	87½°	GT43			●
Branches – Plain single equal	87½°, 45°	GT06	●	●	●
Branches – Plain single reducing	87½°, 45° x 50	GT06		●	●
	x 75				●
Branches – Single door back equal	87½°	GT07	●	●	●
Branches – Single door back reducing	87½° x 50	GT07		●	●
	87½° x 75	GT07			●
Branches – Single door side	87½°	GT08/GT09			●
Branches – Double plain	87½°	GT10		●	●
Branches – Double with door	87½°	GT11			●
Access Pipes – Oval door	87½°	GT14		●	●
Access Pipes – Rectangular door	87½°	GT15			●
Offset projection	75mm	GT24		●	●
	115mm			●	●
	150mm			●	●
	225mm				●
	305mm				●
Taper pipe	x 50	GT28		●	●
	x 75				●
'P' Trap – Plain		GT34			●
'P' Trap – with door		GT37	●	●	●
Blank end – Plain		GT70	●	●	●
Blank end – 50mm push-fit		GT71		●	●
Blank end – 50mm BSPT		GT71T			●
Boss pipe – 50mm single push-fit		GT106	●		●
Boss pipe – 50mm single BSPT		GT106T		●	●
Boss pipe – 50mm double boss opposed – push-fit		GT109			●
Boss pipe – 50mm double boss @90 – push-fit			GT115		●

New bracket EF053/EF053A to suit 100mm eared coupling GT05E: product code 192333/192363 *(see page* 175*)*.
New 100mm reducing gasket to 3½" (90mm) conventional soil pipe now available 156132 *(see page* 175*)*.

General technical details

Testing
It is recommended that pipework installations are tested in sections rather than waiting to complete this in one operation.

Fire proofing
Cast iron has been traditionally used as a pipework material for passing through fire-break partition walls and floors. The TIMESAVER SYSTEM furthers this traditional use. Unlike plastic materials it does not need special protection.

Stoppages and access
In spite of precautions being taken, stoppages may occur and will then require clearing. Ample provision must therefore be provided for access. It is often advantageous to be able to gain access at or near bends including, if possible, the bends leading from the stack to the drain. It is recommended that with a 100 stack, access should be provided at each floor level above or on the WC connection in addition to that at the foot of the stack. With 150 stacks there is less risk of stoppages so it is recommended that access be provided at say every three floors, in addition to that at the foot of the stack. With vented schemes, access should be provided at or near the foot of the stack and at intervals of not more than five floors in height for the purpose of periodic testing.

Coating
All 3m Timesaver pipes are coated externally in black alkyd paint, and internally coated with a two part epoxy paint (ochre colour).

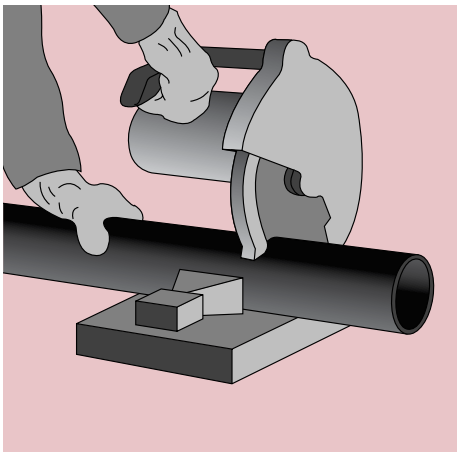
Fittings are coated internally and externally in a black water based paint.

The Timesaver coating shall accept overcoating with alkyd and water based acrylic paints normally used on metallic structures.

Timesaver roof outlets and floor drains are coated in a black water based paint.

Cutting pipes
Timesaver pipe can be readily cut by the use of a powered disc cutter, and wheel cutters.

A chain cutter/snap cutter is not recommended to adequately serve this purpose.



Technical references
It is recommended that these and other listed technical advice, within this manual, are read in conjunction with the following Codes of Practice:

BS EN 12056 Gravity Drainage Systems Inside Building:
Part 2 – Sanitary Pipework
Part 3 – Roof Drainage

BS EN 752 Drains and Sewers Outside Building.

BS 437 and BS 416 Part 2.

Chemical resistance

Suitability of Timesaver materials – cast iron, EPDM rubber and nitrile rubber

A – RECOMMENDED
X – NOT RECOMMENDED
ND – NO DATA

The information contained in this table has been extracted with permission from Robert Jenkins Systems Ltd. Corrosion Chart.

	COUPLING GASKETS IN EPDM RUBBER			CAST IRON			COUPLING GASKETS IN NITRILE RUBBER		
CHEMICAL TEMPERATURE°C	20°	60°	100°	20°	60°	100°	20°	60°	100°
ACETALDHYDE	A	A	ND	A	ND	ND	X	X	X
ACETIC ACID (10%)	A	X	X	X	X	X	X	X	X
ACETIC ACID (GLAC. & ANH.)	X	X	X	X	X	X	X	X	X
ACETIC ANHYDRIDE	ND	ND	ND	A	A	A	X	X	X
ACETO-ACETIC ESTER	A	A	X	X	X	X	ND	ND	ND
ACETONE	X	X	X	A	A	A	X	X	X
ACETONITRILE	ND	ND	ND	X	X	X	ND	ND	ND
ACETYLENE	ND	ND	ND	A	A	A	A	ND	ND
ACETYL SALICYLIC ACID	A	A	ND	X	X	X	A	ND	ND
ALCOHOLS (MOST FATTY)	X	X	X	A	A	A	A	A	A
ALIPHATIC ESTERS	X	X	X	A	A	A	X	X	X
ALUM	A	A	A	X	X	X	A	A	A
ALUMINIUM CHLORIDE	A	A	A	X	X	X	A	A	A
ALUMINIUM SULPHATE	A	A	A	A	A	A	A	A	A
AMMONIA AQUEOUS	A	A	A	A	A	X	A	A	X
AMMONIUM CHLORIDES	A	A	A	A	X	X	A	A	A
ANILINE	X	X	X	A	A	A	X	X	X
AQUA REGIA	X	X	X	X	X	X	X	X	X
ASCORBIC ACID	ND	ND	ND	X	X	X	ND	ND	ND
BEER	A	A	A	A	A	ND	A	A	A
BENZALEHYDE	A	ND	ND	X	X	X	X	X	X
BENZENE PURE	X	X	X	A	A	A	X	X	X
BENZOIC ACID	A	A	A	X	X	X	A	A	A
BENZOYL PEROXIDE	ND	ND	ND	X	X	X	ND	ND	ND
BORIC ACID	A	A	A	X	X	X	A	A	A
BRINES (SATURATED)	A	A	A	A	A	A	A	A	A
BROMIDE (SOLUTION)	A	A	A	X	X	X	A	X	X
BROMINE	ND	ND	ND	X	X	X	X	X	X
BUTYL ACETATE	X	X	X	X	X	X	X	X	X
CALCIUM CHLORIDE	A	A	A	A	A	X	A	A	A
CARBON DISULPHIDE	X	X	X	A	A	A	A	ND	ND
CARBONIC ACID	A	A	A	X	X	X	A	A	A
CAUSTIC SODA & POTASH	A	A	A	A	A	X	A	A	A
CELLULOSE PAINT	ND	ND	ND	A	A	ND	X	X	X
CHLORATES OF Na, K & Ba	A	A	A	X	X	X	ND	ND	ND
CHLORINE	X	X	X	X	X	X	X	X	X
CHLORIDES OF Na, K & Mg	A	A	A	X	X	X	A	A	A
CHLOROACETIC ACIDS	X	X	X	X	X	X	X	X	X
CHLOROBENZENE	X	X	X	A	A	A	X	X	X
CHLOROFORM	X	X	X	A	A	X	X	X	X
CHROMIC ACID	X	X	X	X	X	X	X	X	X
CITRIC ACID	A	A	A	X	X	X	A	A	A
CRESYLIC ACID	ND	ND	ND	X	X	X	X	X	X
CYCLOHEXANE	X	X	X	A	A	A	A	A	A
DETERGENTS	A	A	A	ND	ND	ND	A	A	A
EMULSIFIERS	ND	ND	ND	ND	ND	ND	A	A	A
ETHER	X	X	X	A	A	A	A	X	X
FATTY ACIDS (>C6)	X	X	X	X	X	X	A	X	X
FERRIC CHLORIDE	A	A	A	X	X	X	A	A	A
FERROUS SULPHATE	A	A	A	X	X	X	A	A	A
FLUOSILIC ACID	A	A	A	X	X	X	ND	ND	ND
FORMALDEHYDE	X	X	X	A	X	X	A	X	X
FORMIC ACID	X	X	X	X	X	X	A	X	X
FRUIT JUICES	X	X	X	X	X	X	A	A	A
GELANTINE	A	A	X	A	A	A	A	A	A
GLYCERINE	A	A	A	A	A	A	A	A	A
GLYCOL ETHYLENE	A	A	A	A	A	A	A	A	A
GLYCOLLIC ACID	A	A	A	X	X	X	ND	ND	ND
HEXAMINE	ND	ND	ND	X	X	X	ND	ND	ND
HYDRAZINE	A	ND	ND	ND	ND	ND	A	X	X
HYDROBROMIC ACID (50%)	A	A	ND	X	ND	ND	A	X	X

Chemical resistance

Suitability of Timesaver materials – cast iron, EPDM rubber and nitrile rubber

A – RECOMMENDED
X – NOT RECOMMENDED
ND – NO DATA

The information contained in this table has been extracted with permission from Robert Jenkins Systems Ltd. Corrosion Chart.

		COUPLING GASKETS IN EPDM RUBBER			CAST IRON			COUPLING GASKETS IN NITRILE RUBBER		
CHEMICAL	TEMPERATURE°C	20°	60°	100°	20°	60°	100°	20°	60°	100°
HYDROCHLORIC ACID (10%)		A	A	A	X	X	X	A	A	X
HYDROCHLORIC ACID (CONC)		A	X	X	X	X	X	X	X	X
HYDROCYANIC ACID		A	A	A	X	X	X	A	X	X
HYDROFLUORIC ACID (75%)		X	X	X	X	X	X	X	X	X
HYDROGEN PEROXIDE (30%)		X	X	X	X	X	X	A	X	X
HYDROGEN SULPHIDE		A	A	A	A	X	X	X	X	X
HYPOCHLORITES		A	A	ND	X	X	X	X	X	X
LACTIC ACID		A	A	ND	X	X	X	A	A	X
LIME (CaO)		A	A	A	A	A	A	A	A	A
MEAT JUICES		A	A	A	ND	ND	ND	A	A	A
MERCURIC CHLORIDE		A	A	A	X	X	X	A	A	A
MERCURY		A	A	A	A	A	A	A	A	A
METHANOL		X	X	X	A	A	A	A	A	A
MILK AND ITS PRODUCTS		X	X	X	ND	ND	ND	A	A	A
MOLASSES		ND	ND	ND	A	A	A	A	ND	ND
NITRIC ACID (>25%)		X	X	X	X	X	X	A	X	X
NITROBENZENE		A	A	ND	A	A	A	X	X	X
OILS, DIESEL		X	X	X	A	A	A	A	A	A
OILS, LUBRICATING		X	X	X	A	A	A	A	A	A
OIL, MINERAL		X	X	X	A	A	A	A	A	A
OILS, VEGETABLE & ANIMAL		X	X	X	A	A	A	A	A	A
OXALIC ACID		ND	ND	ND	X	X	X	A	A	X
PARAFFIN		A	A	ND	A	A	A	A	A	A
PETROLEUM SPIRIT		X	X	X	A	A	A	A	A	A
PHOSPHORIC ACID (20%)		A	A	A	X	X	X	A	A	ND
SEA WATER		A	A	A	A	X	X	A	A	A
SILICONE FLUIDS		ND	ND	ND	A	A	A	A	A	A
SODIUM PEROXIDE (10%)		A	A	ND	A	A	A	A	X	X
STARCH		A	A	A	A	A	A	A	A	A
SUGAR, SYRUP, JAMS		X	X	X	A	A	ND	A	A	A
SULPHATES (Na, K Mg. Ca)		A	A	A	A	A	A	A	A	A
SULPHURIC ACID (>50%)		A	A	A	X	X	X	A	X	X
SULPHURIC ACID (70%)		X	X	X	A	X	X	X	X	X
SULPHURIC ACID (90%)		X	X	X	A	A	X	X	X	X
TANNIC ACID (10%)		A	A	A	X	X	X	A	A	X
TARTARIC ACID		A	A	A	X	X	X	A	A	X
TRICHLORETHYLENE		X	X	X	A	A	X	X	X	X
VINEGAR		X	X	X	X	X	X	A	A	A
WATER		A	A	A	A	A	A	A	A	A
WETTING AGENTS (UP TO 5%)		X	X	X	X	X	X	A	A	A
YEAST		ND	ND	ND	A	A	X	A	ND	ND
ZINC CHLORIDE		A	A	A	X	X	X	A	A	ND

The information given is intended as a guide only and in every case we would wish to know detailed working conditions before advising the suitability of cast iron or our Timesaver coupling gasket.

Care must be taken when more than one of these chemicals is being discharged as interaction may occur and it is the customer's own responsibility to ensure that the application is suitable. Most of the above should be treated as dangerous wastes and should either be treated before discharging into a sewer or disposed of by other means.

Please note: nitrile gaskets are available to order.

It is recommended that nitrile rubber gaskets be used when the installation is in contact with petrol and oil-based waste substances eg. garages, petrol stations etc.

SAINT-GOBAIN

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