Ensign Cast Iron Drainage Systems

UNICLASS L7315		
CI/Sfb		
	(52.6)	
SEPTEMBER 2014		

ENSIGN • **EEZI-FIT** • **VORTX**

PAM SAINT-GOBAIN

Saint-Gobain PAM UK is the leading UK manufacturer of ductile iron pipes and fittings, valves, manhole covers, gullies and grates, as well as being the leading producer of cast iron above and below ground drainage systems.

Ensign meets the requirements of ISO 6594 offering individual cast iron drainage systems for above and below ground applications, and is the only system tested and kitemark approved to the product standard BS EN 877 in the UK. The above ground soil and waste system is red coated with the below ground system coated grey.

The Ensign & EEZI-FIT systems offer the specifier and installer a combination of material and installation savings which has significantly reduced the price differential between cast iron and other drainage materials, offering a premium system at a competitive rate cutting the 'Price of Quality'.

Saint-Gobain PAM UK utilises state-of-the-art equipment and analysis techniques for production and process performance. This along with continual investment in plant and technology, the recruitment of qualified personnel and on going programme of product development, reflects the commitment of Saint-Gobain PAM UK to maintain its position as the premier manufacturer of cast iron pipes and fittings.

Contents

Product ranges 2

Why specify cast iron above ground 3

Why specify cast iron below ground 12

Why specify Ensign & EEZI-FIT 13

Section 1 15
Pipes and Fittings – Above Ground

Section 2 39
Pipes and Fittings – Below Ground

Section 3 51
VortX – Floor, Shower and Roof Drains

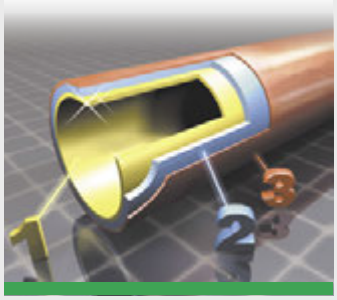
Section 4 65
Couplings – Technical

Section 5 75
Brackets – Technical

Section 6 81
Connections – Technical

Section 7 93
Buried Drainage – Technical

Section 8 103
Technical Specifications



Section 9 111
CAD & BIM

Product ranges

Other soil and drain products manufactured by Saint-Gobain PAM UK:

EPAMS
A complete siphonic rainwater system, consisting of steel siphonic roof outlets and cast iron pipework to BS EN 877 and BBA Approved Cert No. 06/4328.

Timesaver – above ground
Above ground range Kitemarked to BS 416 Part 2. Pipes and fittings 50-150mm in diameter, black coated. Includes a range of push-fit couplings with traditional socket appearance and 1.8m (6ft) pipes – the ideal solution for external soil stacks, on conservation/heritage buildings.

Timesaver – below ground
The below ground range is Kitemarked to BS 437. Pipes and fittings 100-225mm in diameter, black coated. Range includes many fittings of traditional British Standard design-gullies, raising pieces, traps, inspection chambers and anti-flooding valves – the extra section thickness provides superior strength, making Timesaver the ideal solution for under-building drainage.

Classical
The Classical range of traditional cast iron rainwater and gutter systems manufactured in accordance with BS 460. Range offers eight gutter profiles and circular, square and rectangular downpipe systems, supplied in a black primer coat.

Classical Plus
Classical cast iron rainwater systems supplied in a factory applied finish coat for immediate installation. Supplied black as standard, further colours have been introduced – for example blue, green, red, light/dark brown and grey on a made to order basis.

Classical Express
A unique cast iron gutter system in 125mm true half round profile which is installed using simple jointing clips. Higher flow capacity available in Primer and Plus finish.

Technical Advisory Service
In support of Saint-Gobain PAM UK extensive manufacturing resources, an advisory service department is available to customers to provide technical assistance and guidance on soil and drain installations.

Telephone Technical Helpline: **01952 262529**
Email: **technical.soildrain.uk.pam@saint-gobain.com**

Website: **www.saint-gobain-pam.co.uk**

The soil and drain and rainwater sections contain all the product literature for the soil and drain brands Ensign, Timesaver, EPAMS, VortX and Classical including downloadable Ensign CAD drawings.

New BIM ready Product Library
Available to download from the website is the latest BIM ready, fully integrated parametric library of cast iron products from PAM (see page 113).

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		

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

Why specify cast iron above ground

Fire safety and comfort

The following two concepts are applied as regards to fire safety: reaction to fire and fire resistance.

Reaction to fire

For drainage systems, safety in case of fire is the only essential safety requirement.

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 107 or available from our website www.saint-gobain-pam.co.uk.

The Ensign and EEZI-FIT ranges were tested at the Warrington Fire Research Centre to the requirements of BS EN 13501-1 incorporating: BS EN 1182, BS EN 1716, BS EN 13823 and achieved the following results under Euroclass classification:

- Cast iron as a material is classified A1
- BS EN 877 dictates the test is carried out as a system (pipes, fittings and accessories including elastomer gaskets and coatings). As a result it achieved the highest possible rating:
  - o classification: A2-s1, d0
  - o Category A – reserved for non-combustible materials
  - o S1 = lowest smoke, d0 = no droplets

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

- Compliance with all 27 clauses of the standard
- Periodically audited by BSI
- 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 resist the passage of fire and do not feed it.

Fire resistance

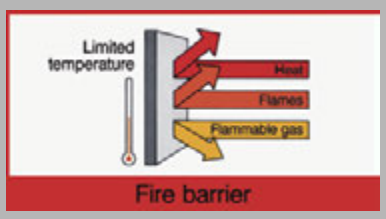
It is a construction component's ability to withstand fire for a given period of time and to retain its serviceability in the event of fire. If a fire breaks out, it is essential to prevent any early collapse of the structure, and then to limit the extent of the damage, so as to ensure that occupants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

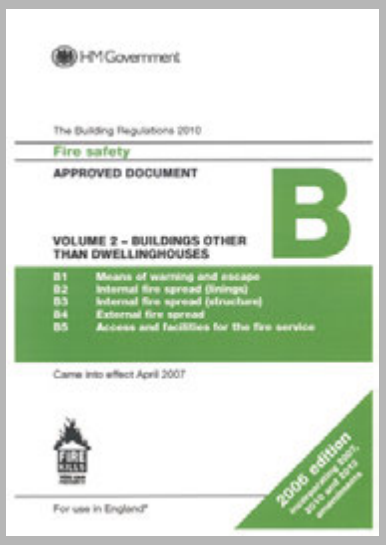
Compartmental principles

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





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 ensured by the 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. If the plastic type material (e.g. HDPE and Polypropylene) is exposed to fire, it results in molten droplets.

Saint-Gobain PAM’s solutions

Ensign and EEZI-FIT systems compliance Building Regs Doc B:

- 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

Fire-stopping:

- 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
  - Gypsum-based plaster

Saint-Gobain PAM has carried out a series of tests at CTiCM test laboratories in Metz – France on their cast iron systems, in order to offer recommendations to achieve levels of insulation rating.

Cast iron systems with the floor/wall penetration sealed with standard mortar will provide:

- 4 hours integrity – E240
- Insulation – EI90, EI120
  - 100mm diameter in excess of 120 minutes (2 hours)
  - 150mm diameter in excess of 90 minutes (1.5 hours)
- Consult ASFP Red book for approved mortar products

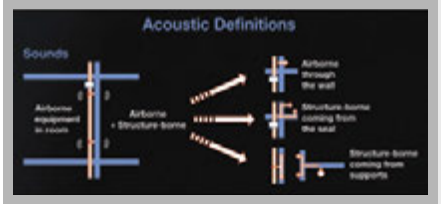
Considerations for building design – to insurers

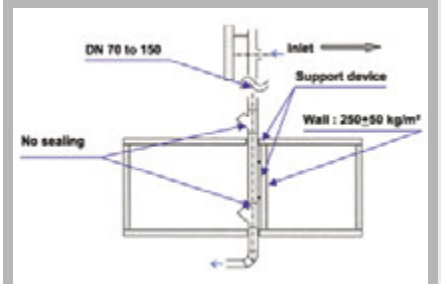
A report published to insurers entitled “Modern Methods of Construction and Fire Protection Considerations” by the FPA (Fire Protection Association) detail design guidance.

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

Some essential principles	Cast Iron
• **Use building materials which will not a make significant contribution to a fire at any stage of its growth**	✓
• **Design a buildings 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**	✓





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.

FOCUS

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 6).

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 (e.g. 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 80.

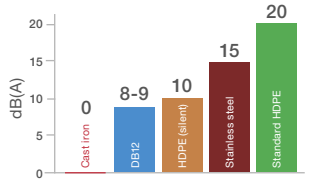
FOCUS

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.

FOCUS

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.

Cast iron is not sensitive to thermal ageing:

- 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

Cast iron does not deform under mechanical strain:

- 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

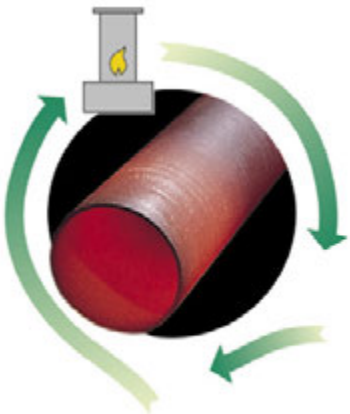
To allow expansion without damaging the drainage network, plastic pipe systems demand specific accessories – expansion collars or joints, brackets allowing axial movement, in general one of the two described.

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 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, i.e. 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 leaktight and stable in such cases calls for high-pressure couplings able to withstand a pressure up to 10 bars

FOCUS

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 74

For full installation details, see the coupling section, page 65.

Environment

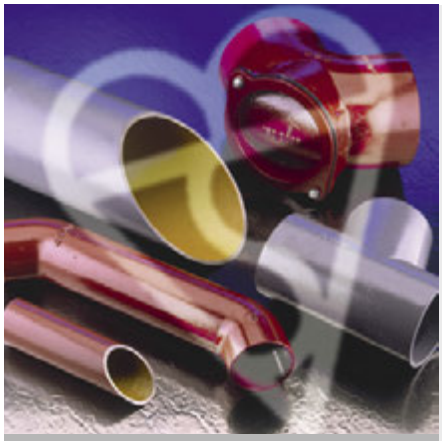
100% recyclable indefinitely without losing any of its properties

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 above ground

Environment Standard BS EN ISO 14001:2004

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 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.

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.

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 96).

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

Ensign fully meets the requirements of Product Standard BS EN 877 providing the complete drainage solution to a building needs. Ensign is an above and below ground drainage system, transporting fluid waste, through the building, out and beyond.

Ductile iron couplings with electrical continuity

The Ensign systems are jointed by unique two piece ductile iron couplings, that are high performance, quick and easy to install. For above ground applications, the coupling design incorporates iron 'nibs' which will provide built in electrical continuity. Couplings destined for below ground use do not include this continuity feature. The coupling naturally meets the requirements of BS EN 877, fully satisfying the requirements of IEE Regulations. The couplings incorporate a set screw design utilising hexagonal socket cap screws reducing the threat of wanton dismantling of couplings by vandals.

Push-fit drain couplings

Cast iron push-fit joints, that utilise two EPDM rubber gaskets, simplifying installation, providing a flexible alternative to mechanical couplings, when there is opportunity for fast pipe laying (i.e. long straight runs). (See page 72).

Ductile iron brackets

Included within the range is an all purpose ductile iron bracket, versatile and lightweight, the bracket incorporates an elongated slot at the fixing point allowing adjustment without dismantling the pipe system.

Quietest drainage system

Ensign has been tested to the new standard BS EN 14366:2004 (laboratory measurement of noise from water waste systems) and has achieved exceptionally low levels recording 11dB(A) at 4 litres/second for structure-borne measurement and 47dB(A) for airborne measurement, when installed using the ductile iron bracket fitted with the acoustic dampener. Ensign is the quietest cast iron system and as a material is quieter than the best plastic system by up to 10dB(A) and up to 20dB(A) quieter than standard HDPE for structure-borne noise. All materials, twinwall PVC, HDPE, and stainless steel require substantial insulation to match the performance of Ensign (see pages 5 and 6).

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.

Economical connections to waste pipes

Ensign provides a number of alternative methods to connect to plastic and copper waste, including 'compression fit' boss pipes, that utilise 'O' ring rubber compression gaskets to connect to waste pipes without the need for conventional threaded male adaptors.

Also the popular multi-waste manifold which accommodates up to three waste pipes from various sources such as bath, bidets, and showers to one internal point (see photo to the left). Now available in 100 and 150mm diameters.

Superior internal coating for pipes

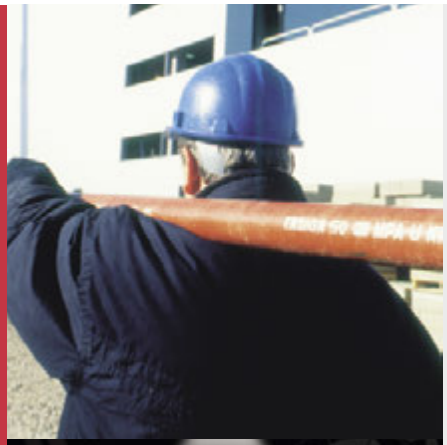
Ensign pipes for above and below ground applications, are now internally lined with a new two part epoxy (ochre in colour). The coating has been developed to provide greater performance against exposure to aggressive substances or high temperature waste, far exceeding the requirements stipulated in BS EN 877 (see coating – page 108). The epoxy coated fittings match the performance of the pipes.

Lightweight

The Ensign system is considerably lighter in weight compared to previous cast iron systems making it much easier to handle, whilst retaining the inherent strength qualities of cast iron. The system has been designed to comply with European above and below ground applications, which have been well proven over many years.

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.



Why specify Ensign

Flexible system
The Ensign systems consist of pipes and fittings from 50-600mm diameter for above ground applications, and 100, 150-600mm diameter for below ground. Ensign can be connected by cast iron mechanical joints or push-fit joints, for above and below ground applications. Allowing total interchangeability, making Ensign the most versatile cast iron system on the market.

Cost effective
Independent research involving on-site measurement studies to BS 3138, resulted in the calculation of labour constants for the BS EN 877 systems, such as Ensign, considerably lower to those quoted in the price guides for many years.

These labour constants are reflected in the leading price guides (such as Spons, Griffiths etc), identifying the fact that it is actually quicker to install cast iron systems like Ensign than UPVC solvent weld systems a fact confirmed in the labour hours/charge calculations.

With the additional savings on fire collars, sound insulation, bracketing, expansion joints, on-site damage, and longevity of the system, cast iron has never been so competitive against lesser materials –'cutting the price of quality'.

New Ensign EEZI-FIT

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 68).

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.

A new manifold connector with 2 x 50mm waste connections with an extended spigot which avoids the need for a joint in the floor slab, to further ease installation.

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 6).

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
Pipes Double Spigot 17

Couplings
Couplings 17
Transitional Couplings 18

Brackets
Brackets 18
Acoustic Brackets 19

Support Pipe/Bracket
Stack Support Pipe 20
Stack Support Bracket 20
Consoles Support Brackets 20

Bends
Bends Short 21
Bends Medium, Long Radius 22
Bends Medium, Long Radius Door Back 22
88° Bends With Ventilation 23
Bends Long Tail 24

Branches
Branches Single And Unequal 24
Branches Single 26
Branches Single Long Arm 26
Branches Double 27
Branches Corner 28

Access Pipes
Access Pipes 29

Offsets
Offsets 29

Tapered Pipes
Tapered Pipes 29

Traps
Traps 30

Connectors
Connectors Movement 31
Connectors And Pipes – Transitional 31
Connectors Universal 32
Roof 32

Roof Penetration Flange Fitting And Gasket
Roof Penetration Flange Fitting And Gasket 32

Blank Ends
Blank Ends 33

Expansion Plugs
Expansion Plugs 33

Boss Pipes
Boss Pipes 34

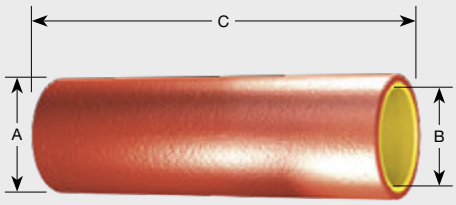
Multi-Manifold
Multi-Manifold 35

Strap-On Boss Fitting
Strap-On Boss Fitting 35

EEZI-FIT Push-Fit Range
Coupling 36
Bends Short Radius 36
Bends with Access 36
Bends Long Radius 37
Single Branches 37
Double Branch 38
Boss Pipes 38
Manifold Connector 38

Pipes Double Spigot

EP000

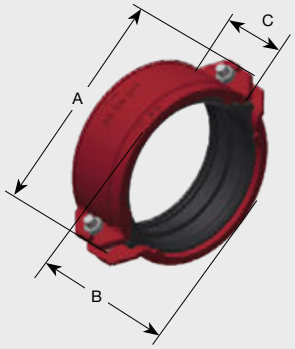


Product code	Dia	A Max O/dia	B Min I/dia	Min section	C Metre lengths available	Nominal wt/kg
156363	50	60	47.5	3	3	12.5
156455	70	80	68.25	3	3	17.0
156563	100	112	97.5	3	3	24.5
156736	125	137	121.87	3.5	3	34.3
156827	150	162	146.25	3.5	3	41.0
156951	200	212	195	4	3	67.4
157049	250	276.5	243.75	4.5	3	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 108).

Couplings

EC002
Two-piece iron coupling

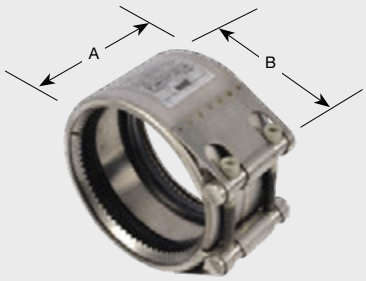


Ductile iron coupling with built-in electrical continuity

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

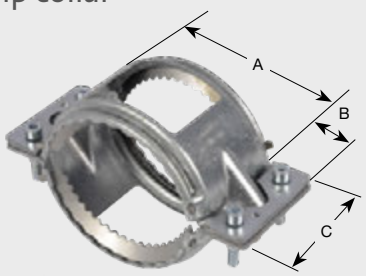


Product code	Dia	A	B	Nominal wt/kg
227336	100	94	154	1.3
227338	150	95	211	2.1
227339	200	140	270	5.3
227340	250	140	330	8.7
227351	300	140	470	9.9
228629*	400	142	520	7.1
228630*	500	142	576	6.7
228631*	600	142	635	7.6

Couplings technical section for applications (see page 69).
Capable of withstanding high pressure (>5 bar).
*Without claw teeth grip.

EC002GC
New grip collar

NEW

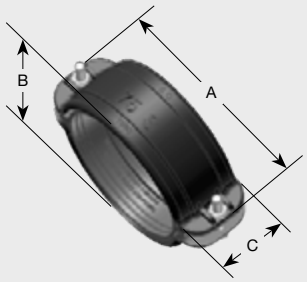


Product code	Dia	A	B	C	Nominal wt/kg
220750	100	145	33	93	0.9
221270	150	192	32	102	1.2
221271	200	252	32	118	1.7

To overclamp the ductile iron coupling EC002 to give 5 bar pressure unrestrained.
See page 74 for assembly instructions.

Transitional Couplings

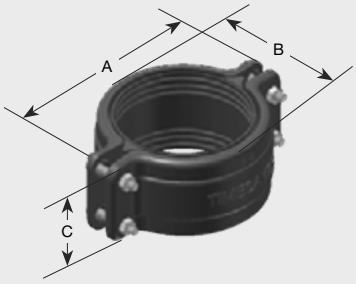
BS416 – GT12 – Ductile iron transitional coupling – Ensign to Timesaver



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

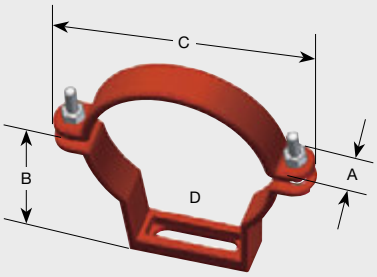


Product code	Dia	A	B	C	Nominal wt/kg
191297	100	203	140	75	2.8
191298	150	252	195	75	3.6

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

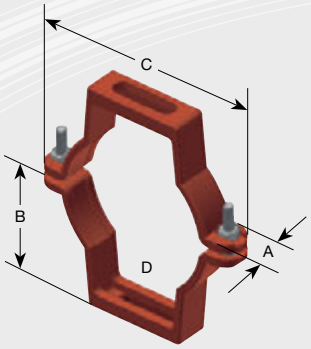
EF048 – Ductile iron bracket



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 19).

EF049 – Ductile iron bracket

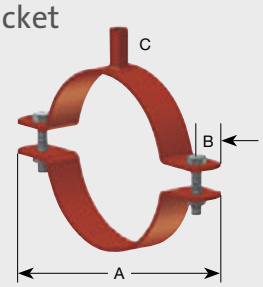


Product code	Dia	A	B	C	Nominal wt/kg
177744	100	27	90	166	0.8

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

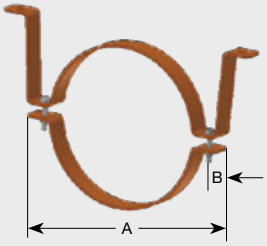
Brackets

EF048MS – Vertical mild steel bracket



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

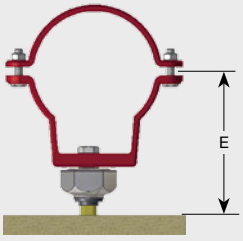
EF048MS – Stand-off mild steel bracket



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

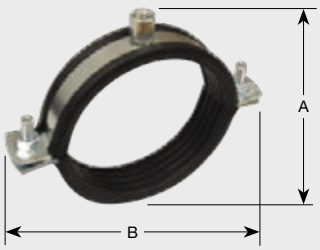
EF048AD – Ductile iron bracket with acoustic dampener



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 80 and applications pages 5-6.

EF048MSL – Rubber lined steel bracket

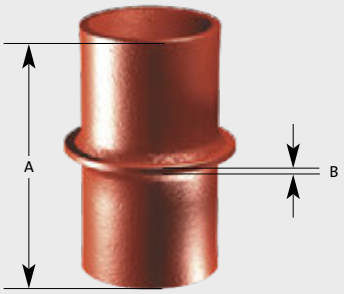


Product code	Dia	A	B	Fixing bolt	Nominal wt/kg
173628	50	84-88	108	M6 x 20	0.1
173630	100	137-141	158	M8 x 35	0.3
173642	150	193-347	219	M8 x 45	0.6
173643	200	250-256	292	M10 x 40	1.2
173644	250	316-347	356	M10 x 40	1.4
173645	300	362	410	M12 x 40	2.9

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

Stack Support Pipe

EF050

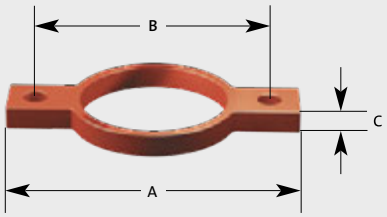


Product code	Dia	A	B	Nominal wt/kg
191856	70	220	8	1.6
191562	100	220	8	2.4
191563	125	220	8	3.2
191564	150	220	8	4.0
157014*	200	220	8	5.9
157097*	250	300	8	12.4
157160*	300	300	8	16.8

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

Stack Support Bracket

EF051 – Stack support bracket

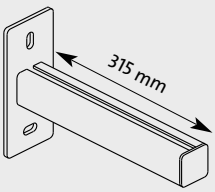


Product code	Dia	A	B	C	Nominal wt/kg
191857	70	215	170	20	1.1
191843	100	259	214	20	1.5
191844	125	275	228	20	1.7
191845	150	300	255	22	2.6
157014	200	362	310	22	3.5
157097	250	444	394	40	6.1
157160	300	498	448	40	14.0

Supplied with rubber sound deadening seal.
See page 79 for typical application.

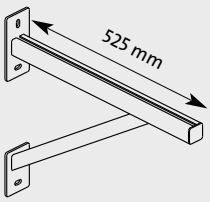
Consoles Support Brackets

EF052 – Cantilever arm



Product code	wt/kg
192329	2.0

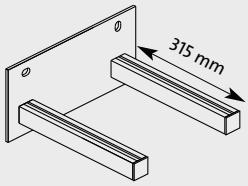
EF052 – Cantilever arm with support



For stack support pipes 200-300mm dia.

Product code	wt/kg
192330	4.3

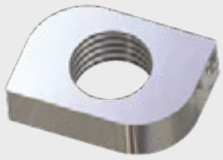
EF052 – Stack support console



To suit 100mm stack support bracket and pipe only.

Product code	wt/kg
192331	4.6

EF052 – 10mm retaining nut – to suit

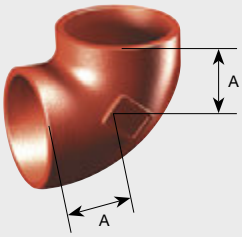


To be used with a 10mm set screw, to secure the stack support bracket to the cantilever arm.

Product code	wt/kg
192332	0.02

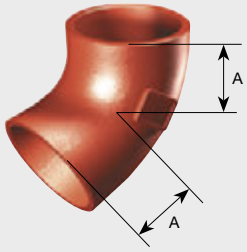
Bends Short

EF002 – 88° bend • Short radius



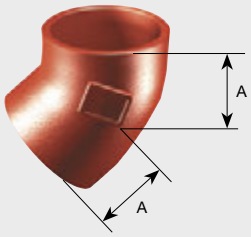
Product code	Dia	A	Nominal wt/kg
191437	50	75	0.7
191442	70	90	1.3
191447	100	110	2.2
191454	125	125	3.2
191459	150	145	3.9
191462	200	180	9.6
191463	250	220	17.3
191431	300	260	27.4

EF002 – 69° bend • Short radius



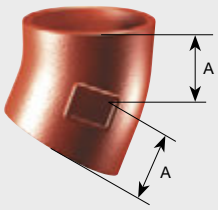
Product code	Dia	A	Nominal wt/kg
191436	50	65	0.6
191441	70	75	1.2
191446	100	90	2.1
191453	125	105	2.9
191458	150	120	4.2
† 156968	200	145	7.8
† 157067	250	170	14.7
† 157132	300	200	20.0

EF002 – 45° bend • Short radius



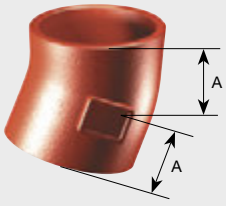
Product code	Dia	A	Nominal wt/kg
191435	50	50	0.6
191440	70	60	0.9
191445	100	70	1.6
191452	125	80	2.3
191457	150	90	3.0
191461	200	110	7.0
191464	250	130	10.9
191432	300	155	18.7
192335	400	247	35.0
† 192376	500	318	53.0
† 192377	600	350	92.0

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
191451	125	70	2.0
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

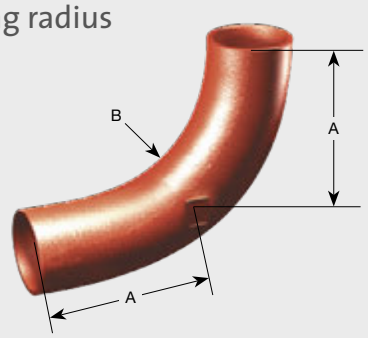


Product code	Dia	A	Nominal wt/kg
191433	50	40	0.4
191438	70	45	0.7
191443	100	50	1.3
191855	125	60	1.7
191455	150	65	2.7
155932	200	80	4.6

† Available to order.

Bends Medium, Long Radius

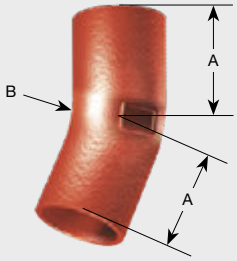
EF02L – 88° bend • Medium and long radius



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 page 44).

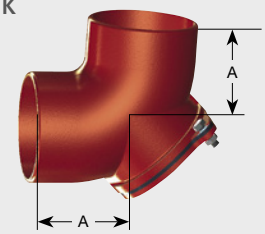
EF02L – 22° bend • Long radius



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

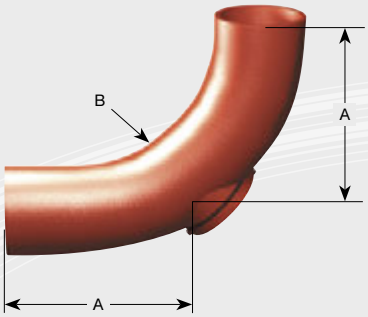
Bends Medium, Long Radius Door Back

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 • Long radius door back



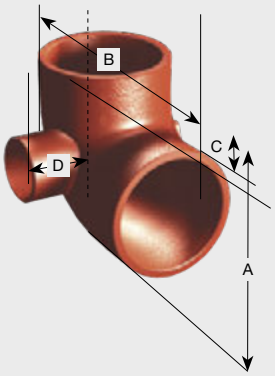
Product code	Dia	A	B	Nominal wt/kg
156607	100	269	180	5.5

EF05M – 88° bend • MR radius door back

Product code	Dia	A	B	Nominal wt/kg
192357	150	274	150	11.4

88° Bends With Ventilation

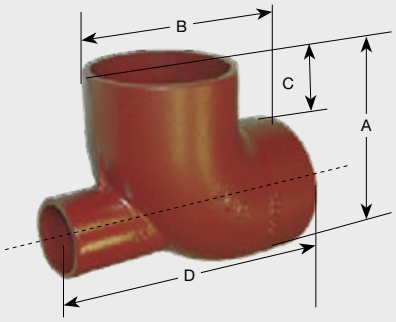
NEW EF002 RB – 88° bends with ventilation • Radial



Product code	A	B	C	D	Nominal wt/kg
157581	169	166	59	95	2.2

For typical application see page 92. †Available to order.

NEW EF002 AB – 88° bends with ventilation • Axial

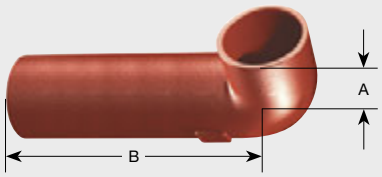


Product code	A	B	C	D	Nominal wt/kg
156585	169	166	59	200	2.2

†Available to order.

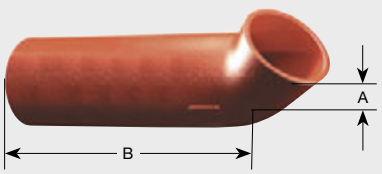
Bends Long Tail

EF055 – 88° bend • Long tail



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

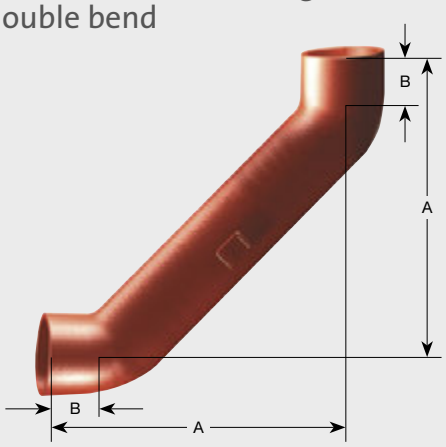
EF055 – 45° bend • Long tail



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

Bends Long Tail

EF054 – 88° bend • Long tail double bend

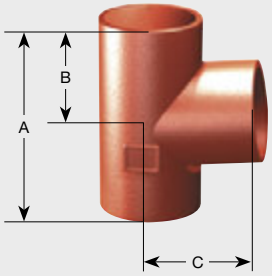


Product code	Dia	A	B	Nominal wt/kg
191837	70	273	60	3.1
191838	100	291	70	4.4

88° bend – short double bend available on request.

Branches Single Equal And Unequal

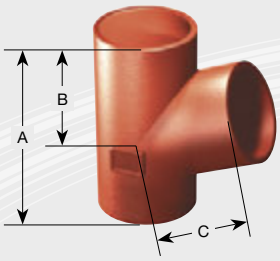
EF006 – 88° branch tee



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
191497	150 x 100	245	115	145	4.4
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 BS EN 12056-2:2000 for applications.

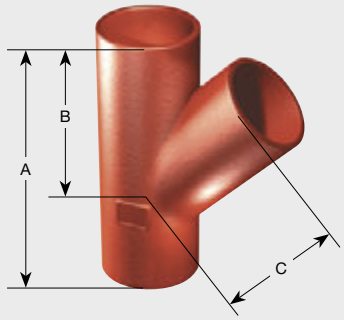
EF006 – 69° branch



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 Equal And Unequal

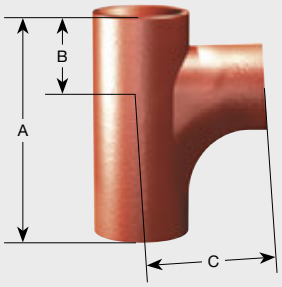
EF006 – 45° branch



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.

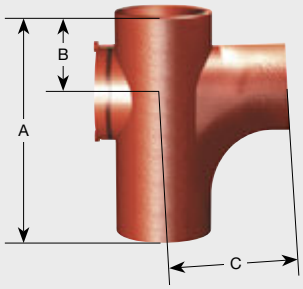
EF06R – 88° single branch
• Radius curve



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 BS EN 12056-2:2000 for applications.

EF07R – 88° branch with access
• Radius curve

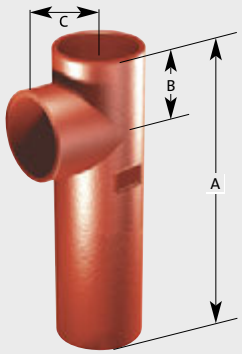


Product code	Dia	A	B	C	Nominal wt/kg
156540	70 x 70	210	80	130	2.5
156614	100 x 50	204	90	120	3.0
156621	100 x 70	221	90	142	3.5
156697	100 x 100	270	102	150	4.3
156875	150 x 100	300	117	202	10.4
156927	150 x 150	400	140	260	13.9

See BS EN 12056-2:2000 for applications.

Branches Single

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

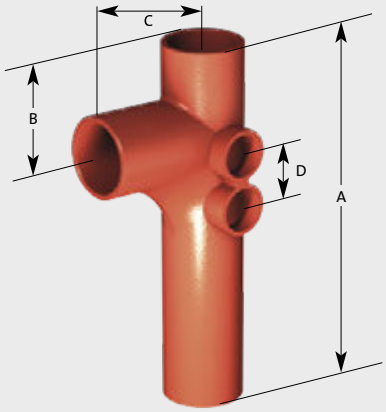
69° branch • Long tail – EF056

Product code	Dia	A	B	C	Nominal wt/kg
156721	100 x 100	460	130	130	5.2

45° branch • Long tail – EF056

Product code	Dia	A	B	C	Nominal wt/kg
156723	100 x 100	445	205	205	5.5
156938	150 x 150	705	265	265	18.5

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

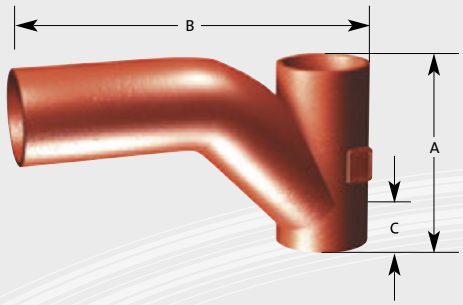


Product code	Dia	A	B	C	D	Nominal wt/kg
208644	100 x 100	500	100	172	75	9.9

4 x 50mm push-fit boss positions.
To make boss connections see page 87.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).

Branches Single Long Arm

EF008 – 45° branch • Single long arm

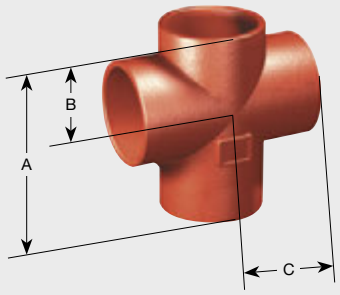


Product code	Dia	A	B	C	Nominal wt/kg
156726	100 x 100	260	450	70	6.3

Typical application (see page 88).

Branches Double

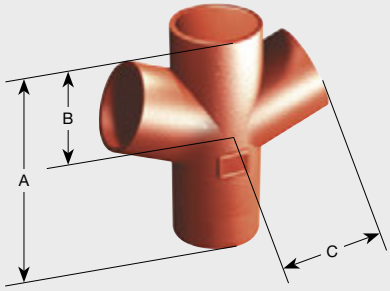
EF010 – 88° double branch tee



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

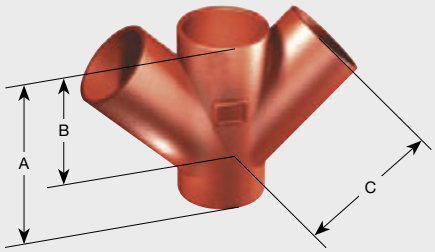
† Available to order.

EF010 – 69° double branch



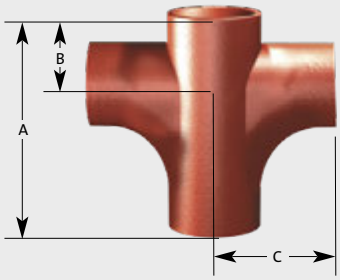
Product code	Dia	A	B	C	Nominal wt/kg
191510	100 x 100	215	130	130	3.4

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

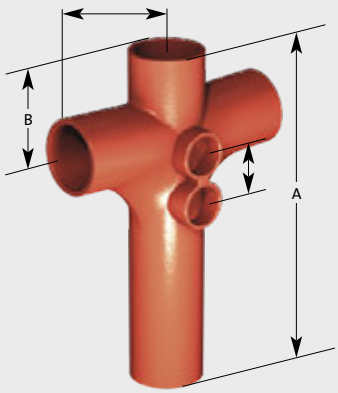
EF010R – 88° double branch
• Radius curve



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 BS EN 12056-2:2000 for applications.

EF097 – 88° branch • Long tail
• Radius curve

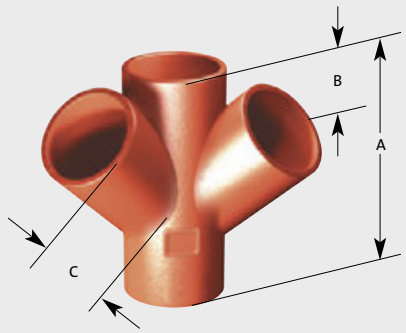


Product code	Dia	A	B	C	D	Nominal wt/kg
208653	100 x 100	500	100	172	75	10.2

4 x 50mm push-fit boss positions.
To make boss connections see page 87.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).

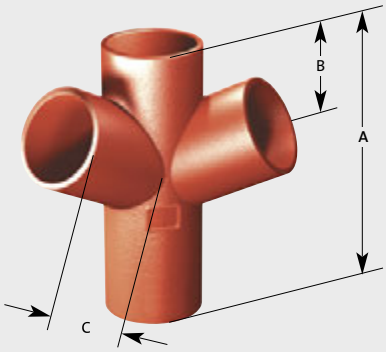
Branches Corner

EF035 – 45° corner branch



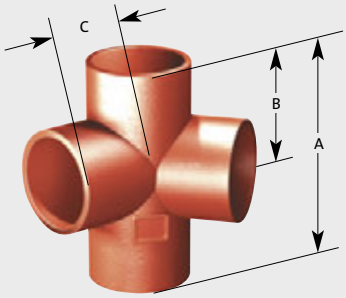
Product code	Dia	A	B	C	Nominal wt/kg
156716	100 x 100	260	190	190	5.2

EF035 – 69° corner branch



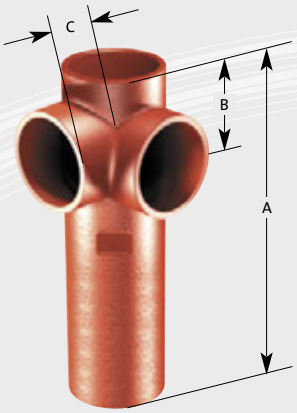
Product code	Dia	A	B	C	Nominal wt/kg
156714	100 x 100	220	130	130	2.3

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

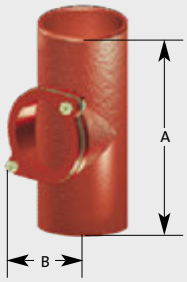
EF036 – 88° corner branch tee
• Long tail



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

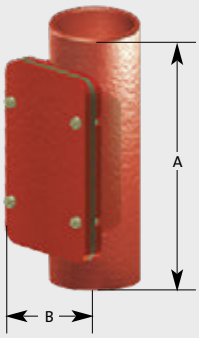
Access Pipes

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

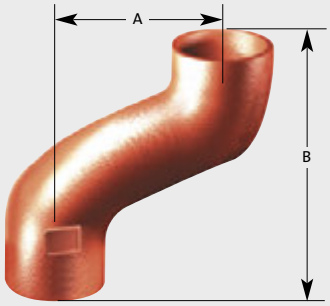
EF015 – Rect door



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

Offsets

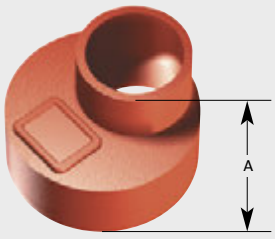
EF024 – Offsets



Product code	Dia	A	B	Nominal wt/kg
191526	100	75	215	2.9
191524	50	130	230	1.5
191525	70	130	250	2.2
191527	100	130	270	3.1
191528	125	130	290	5.3

Tapered Pipes

EF028 – Tapered



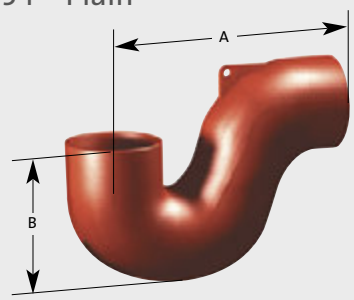
To connect 250mm and 200mm to 225 Timesaver Drain, use TD41 (consult Timesaver catalogue or contact technical department 01952 262529).

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
191842	125 x 50	85	1.2
191536	125 x 70	90	1.5
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
129337	400 x 300	200	20.0
157184	500 x 400	–	–
–	600 x 500	–	–

500mm and 600mm tapers will be considered on request.

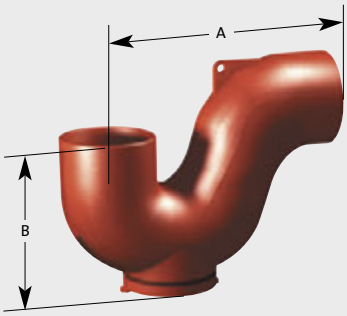
Traps

EF034 – Plain



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

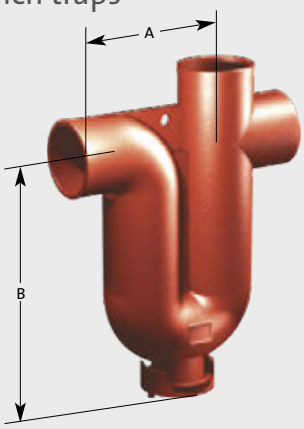
EF037 – Plain with access bottom



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.

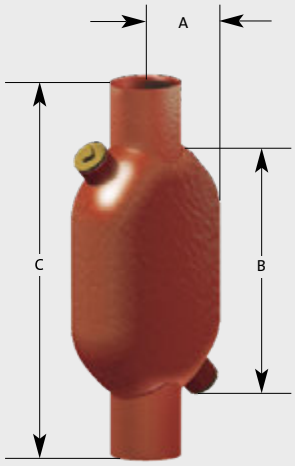
EF080 – Branch traps



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

Traps

EF081 – Stench trap

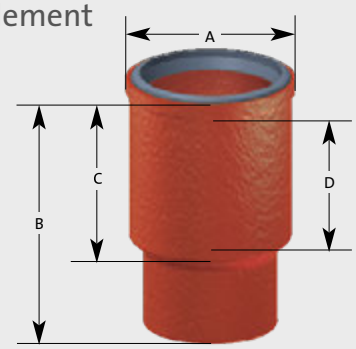


Product code	Dia	A	B	C	Nominal wt/kg
155841	100	138	408	588	18.5
155921	150	187	522	742	38.0

Typical application (see page 90).

Connectors Movement

EF058 – Push-fit connectors which accommodate building settlement

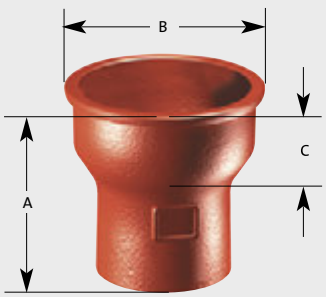


Product code	Dia	A	B	C	D	Nominal wt/kg
192304	100	145	300	200	170	4.3
192306	150	202	310	200	170	8.2

200mm diameter available upon request.
Allows total 170mm movement.
See page 88 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

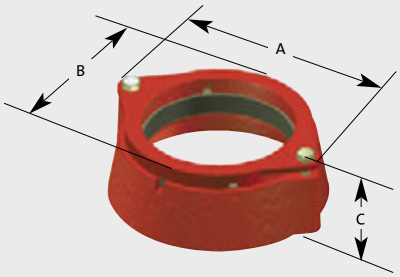
Accommodates 56/48/40 OD waste connections.

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 89 for typical design applications.

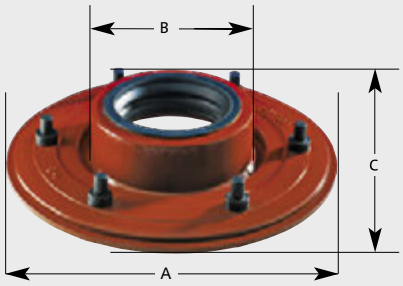


Roof Penetration Flange Fitting And Gasket

NEW EF079 – Ductile iron flange

Product code	Dia	A	B	C	Nominal wt/kg
205924	100	324	158	246	6.6

For typical application see page 89. Available to order.

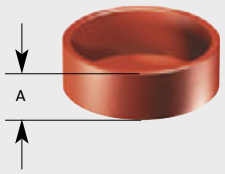


EF079 – Gasket

Product code	Dia	Nominal wt/kg
207320	100	0.3

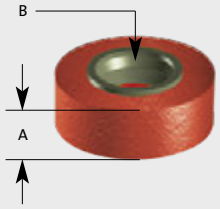
Blank Ends

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

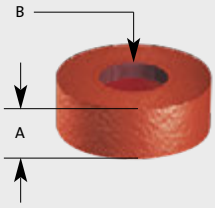


B = rubber grommet which accommodates 50mm waste UPVC or copper.

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 32).

EF071T – Drilled and taped

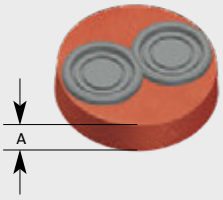


B = D/T 50mm BSPT

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 – Push-fit connection



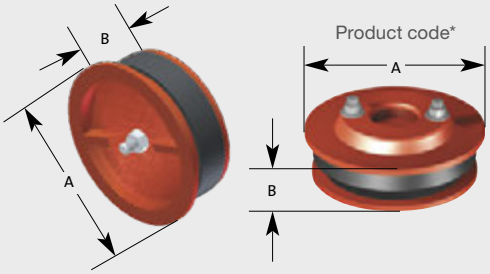
Replacement plugs can be supplied on request.

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.

Expansion Plugs

EF074

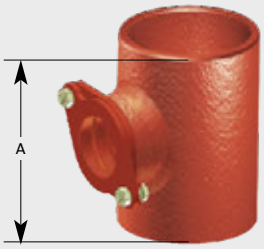


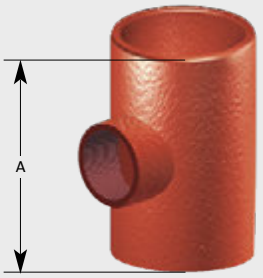
Product code	Dia	A	B	Nominal wt/kg
156374*	50	64	48	0.4
191582	70	78	40	0.4
191583	100	110	42	0.7
191584	150	156	42	1.5
156961*	200	218	100	4.1
157060*	250	284	93	6.0
157125*	300	336	100	9.1

* Depicts product design type.

Boss Pipes

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





50mm BSPT bosses.

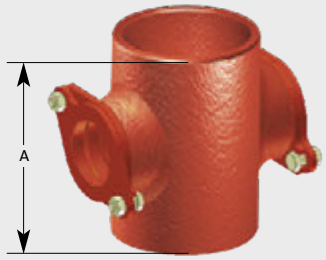
Product code	Dia	A	Nominal wt/kg
156371	50	150	1.2
156460	70	146	1.6
156573	100	155	2.1
156836	150	175	3.8

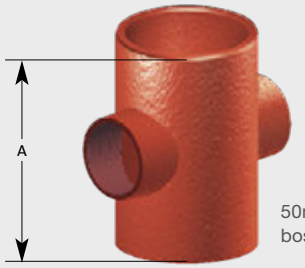
'O' Ring rubber compression fit.
Connects 50mm copper or UPVC waste. To connect 32/38mm waste pipes (see page 84).
Plastic moulded protection caps EF093, for blanking off push-fit boss connections.
Size 50mm x 30mm. Order product code 192255.

Single boss with drilled/tapped 2"/50mm BSPT boss – EF090T

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

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





50mm BSPT bosses.

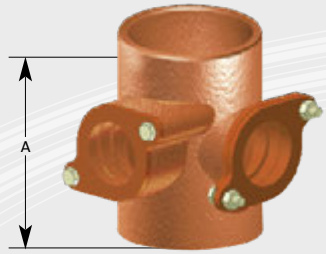
Product code	Dia	A	Nominal wt/kg
156575	100	155	2.5
192359	150	175	4.4

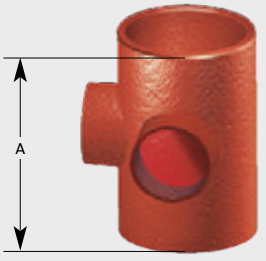
'O' Ring rubber compression fit.
Connects 50mm copper or UPVC waste. To connect 32/38mm waste pipes (see page 84).
Plastic moulded protection caps EF093, for blanking off push-fit boss connections.
Size 50mm x 30mm. Order product code 192255.

Double boss with drilled/tapped 2"/50mm BSPT bosses – EF091T

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

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 84).
Plastic moulded protection caps EF093, for blanking off push-fit boss connections.
Size 50mm x 30mm. Order product code 192255.

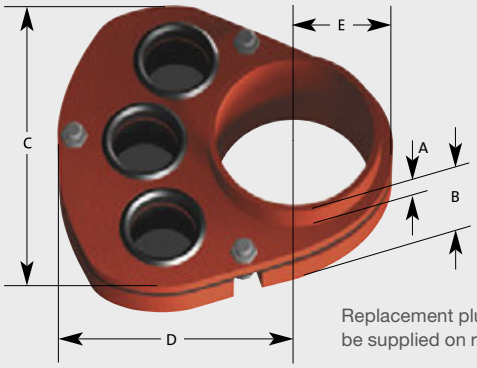
Double Boss with drilled/tapped 2"/50mm BSPT bosses – EF092T

Product code	Dia	A	Nominal wt/kg
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



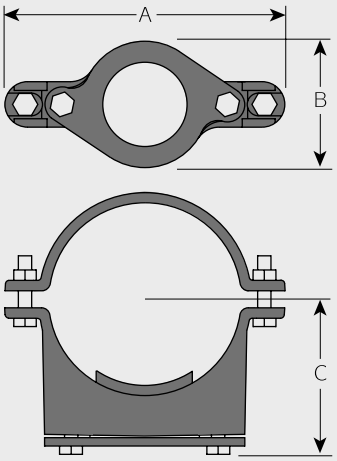
Replacement plugs can be supplied on request.

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 85.

Strap-On Boss Fitting

GT133 – 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
192323	100	166	76	100	1.4

Strap-on boss is a Timesaver product and is supplied black coated.

Ensign EEZI-FIT

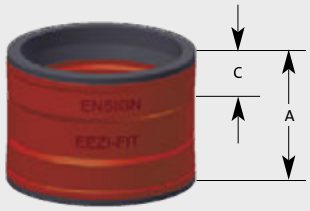
A question of time? The answer's EEZI

Ensign EEZI-FIT is a new push-fit range of socketed fittings and couplings in 100mm and now 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.

Ensign EEZI-FIT utilises a new gasket design that makes the joint simple to install and is completed in seconds. Fully compatible with all products within the Ensign range. Ensign EEZI-FIT is designed to meet product standard BS EN 877.

Coupling

EZ001 – EEZI-FIT coupling

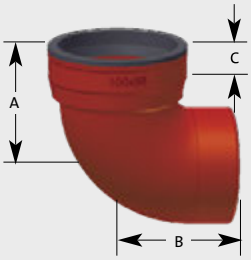


Product code	Dia	A	C	Nominal wt/kg
208191	100	85	40	1.3
216312	150	114	55	2.0

Assembly instructions (see page 73).
Gasket spare are available in bags of 10 – Product code 208204.
For electrical continuity see page 68.

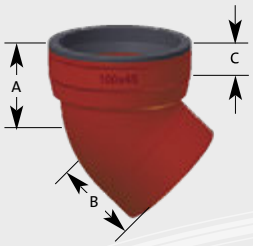
Bends Short Radius

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

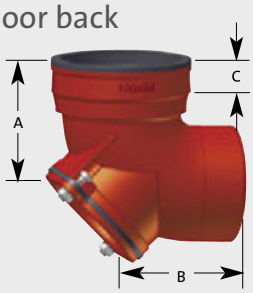
EZ002 – 45° EEZI-FIT bend



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

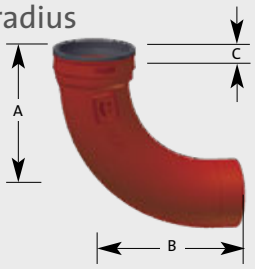
EZ005 – 88° EEZI-FIT bend • Short radius door back



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

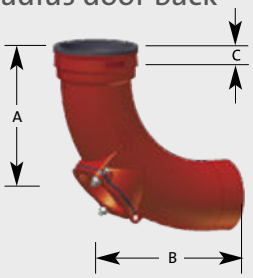
Bends Long Radius

EZ02L – 88° EEZI-FIT bend
• Long radius



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

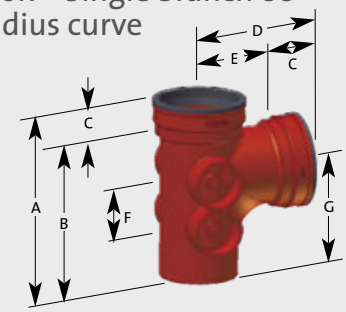
EZ05L – 88° EEZI-FIT bend
• Long radius door back



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

Single Branches

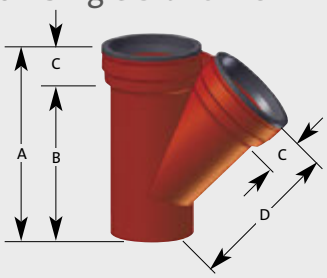
EZ06R – Single branch 88°
• Radius curve



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

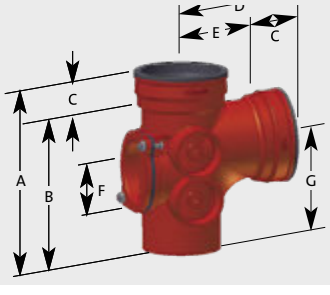
To make boss connections see page 87.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).

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 • Radius curve

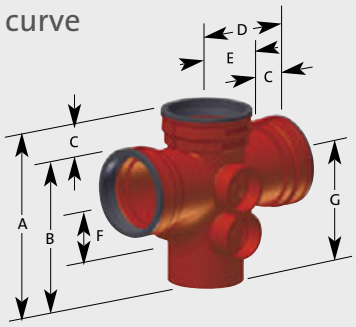


Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
208197	100 x 100	250	210	40	145	105	68	148	6.7
216314	150 x 100	292	237	50	185	130	68	185	8.0

To make boss connections see page 87.
Rubber grommets to connect to 54mm OD copper or 56mm OD UPVC waste are supplied separately in bags of 10. (Product code 208205).

Double Branch

EZ010R – Double branch 88°
• Radius curve

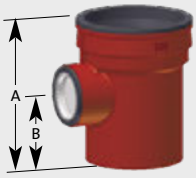


Product code	Dia	A	B	C	D	E	F	G	Nominal wt/kg
208198	100 x 100	250	210	40	145	105	68	148	6.0

If 45° double branch is required, use ENSIGN EF010 code 03009 with EEZI-FIT couplings.
To make boss connections see page 87.
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



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 86.

EZ091 – Double boss pipe 2 x 50mm

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 86.

EZ092 – Double boss pipe 2 x 50mm at 90°

Product code	Dia	A	B	Nominal wt/kg
208201	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 86.

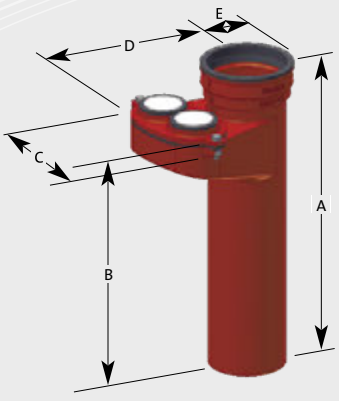
EZ093 – Triple boss pipe 3 x 50mm

Product code	Dia	A	B	Nominal wt/kg
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 86.

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.
See typical applications on page 86.

Section 2

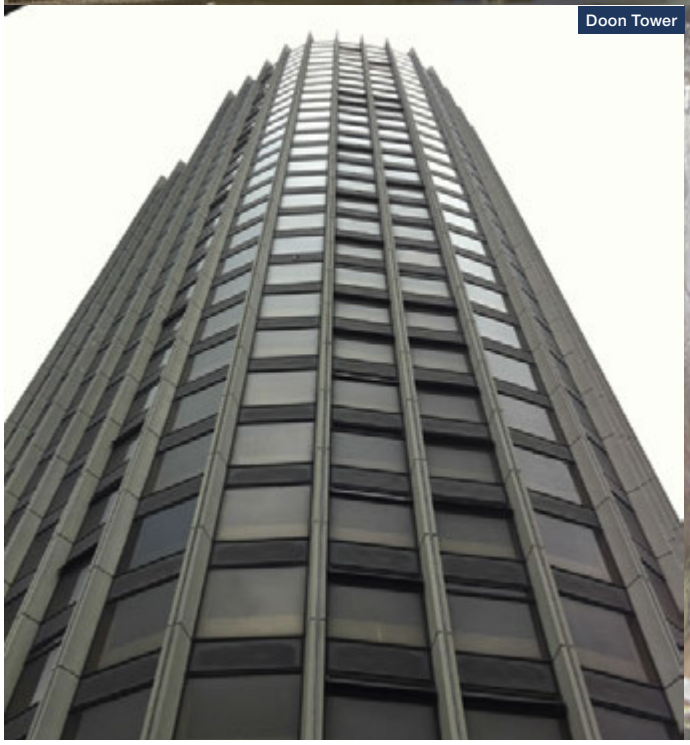
Pipes and Fittings Below Ground

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
Pipes Double Spigot 41

Couplings
Couplings 42

Brackets
Brackets 42

Bends
Bends – Short Radius 43
Bends – Medium, Long Radius Door Back 43
Bends – Medium, Long Radius 44

Branches
Branches Single 45
Branches Double 46

Tapered Pipes
Branches Double 46

Access Pipes
Access Pipes 47

Traps
Traps 47

Blank Ends
Blank Ends 48

Expansion Plugs
Expansion Plugs 48

Connectors
Connectors 48

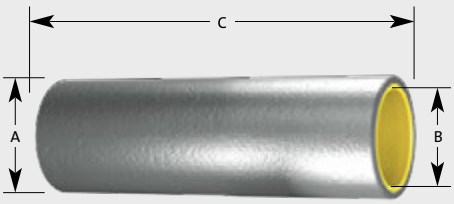
Gully Inlets
Gully Inlets 49

Puddle Flanges
Puddle Flanges 50

Inspection Chambers
Inspection Chambers 50

Pipes Double Spigot

ED000 – Pipe

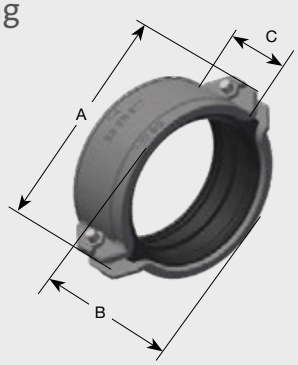


Product code	Dia	A Max O/ dia	B Min I/dia	Min Section	C Metre Lengths Available	Nom. wt kg
155349	100	112	97.5	3	3	24.5
155414	150	162	146.25	3.5	3	41
155448	200	212	195	4	3	67.4
155476	250	276.5	243.75	4.5	3	97.3
155493	300	328.5	292.50	5	3	126.8
155508	400	431	390	5	3	177.7
155511	500	534	487.5	5.2	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 108).

Couplings

ED001 – Two-piece ductile iron coupling



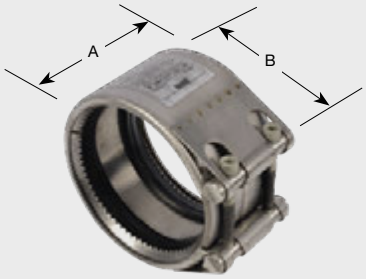
Product code	Dia	A	B	C	Nominal wt/kg
155369	100	170	137	58	0.8
155433	150*	217	183	80	1.7
155462	200*	278	243	82	3.5
175591	250*	343	308	82	4.4
175592	300*	395	360	82	5.4

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	Dia	A	B	Nominal wt/kg
227336	100	94	154	1.3
227338	150	95	211	2.1
227339	200	140	270	5.3
227340	250	140	330	8.7
227351	300	140	470	9.9
228629*	400	139	449	7.1
228630*	500	139	551	6.7
228631*	600	139	653	7.6

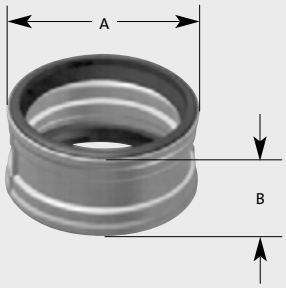
Couplings technical section for applications (see page 10).

Capable of withstanding high pressure (>5 bar).

*Without claw teeth grip.

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

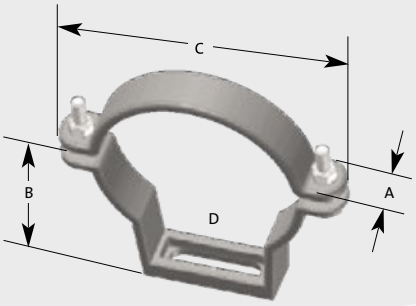
BS 437 – Ductile iron transitional coupling – TD02. Transitional coupling Ensign to Timesaver

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

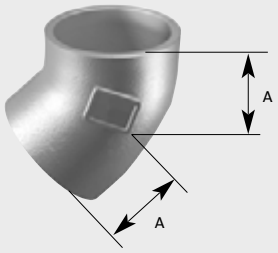


Product code	Dia	A	B	C	Nominal wt/kg
175593	100	27	90	166	0.6
175594	150	30	115	214	0.8
177743	200	35	150	266	1.6

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

Bends – Short Radius

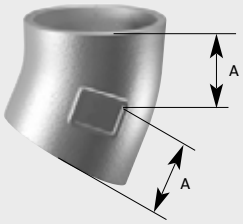
ED002 – 45° bend • Short radius



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

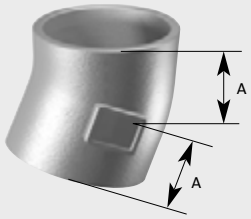
† Available to order.

ED002 – 30° bend • Short radius



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

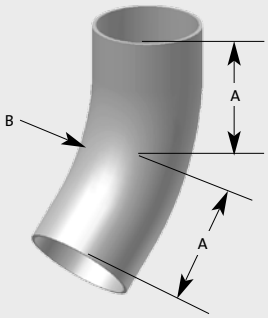
ED002 – 15° bend • Short radius



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

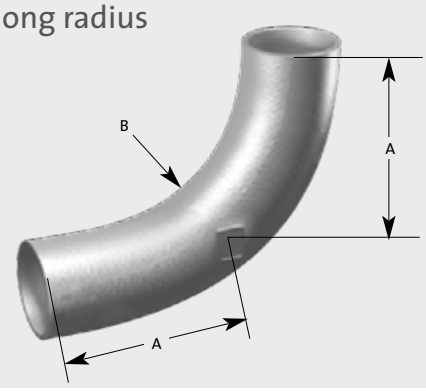
Bends – Medium, Long Radius Door Back

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

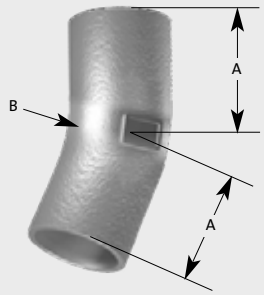
ED02L – 88° Bend • Medium & long radius



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

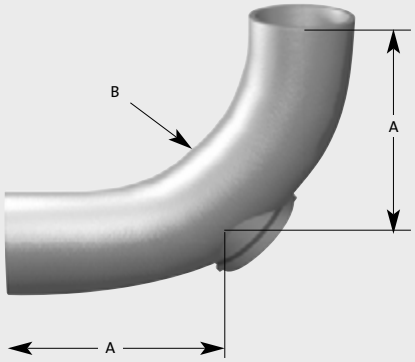
Bends – Medium, Long Radius

ED02L – 22° bend • Long radius



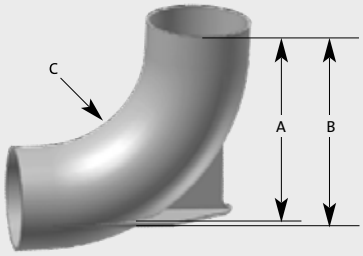
Product code	Dia	A	B	Nominal wt/kg
191776	100	90	180	1.7

ED05L – 88° bend • Long radius door back



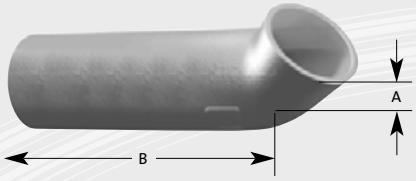
Product code	Dia	A	B	Nominal wt/kg
191777	100	269	180	5.5

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

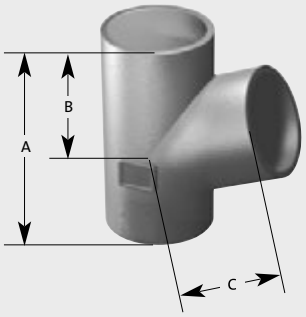
ED055 – 45° bend • Long tail



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

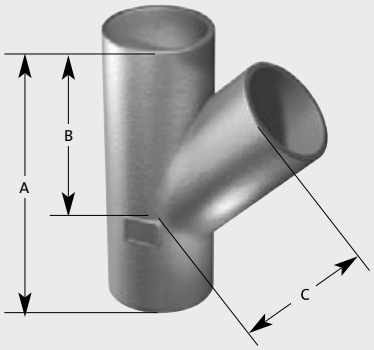
Branches Single

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

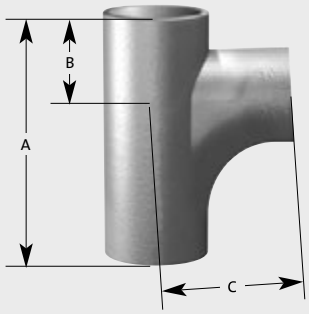
ED006 – 45° branch • Equal and unequal



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

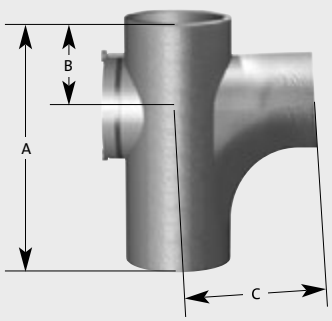
† Available to order.

ED06R – 88° Single branch • 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

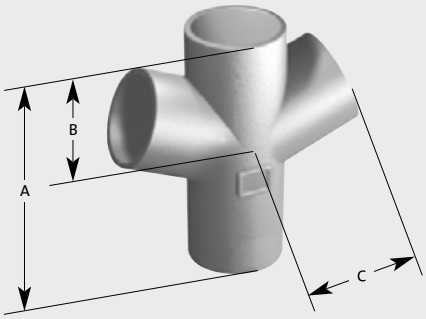
ED07R – 88° Branch with access • Radius curve



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

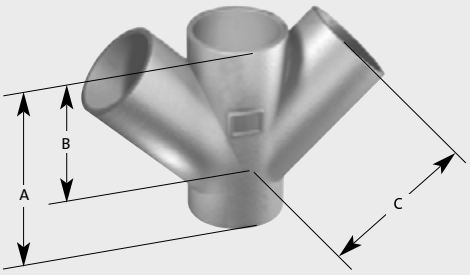
Branches Double

ED010 – 69° Double branch



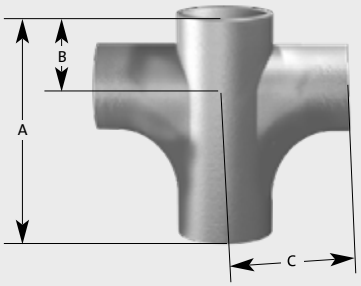
Product code	Dia	A	B	C	Nominal wt/kg
191796	100 x 100	215	130	130	3.4

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

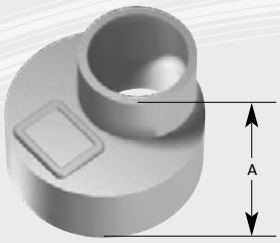
ED10R – 88° Double branch
• Radius curve



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



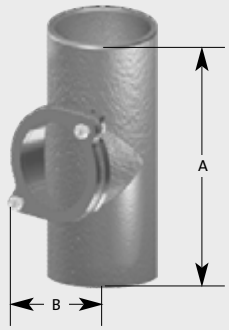
To connect 250 and 200 Ensign to 225 Timesaver Drain, use TD41 (consult Timesaver catalogue or contact technical department 01952 262529).

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
	500 x 400		
	600 x 500		

500 and 600 tapers will be considered on request.

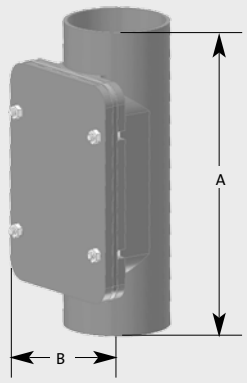
Access Pipes

ED014 – Round door



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

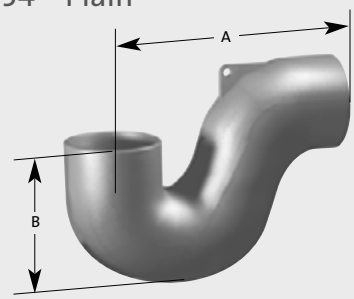
ED015 – Rect door



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

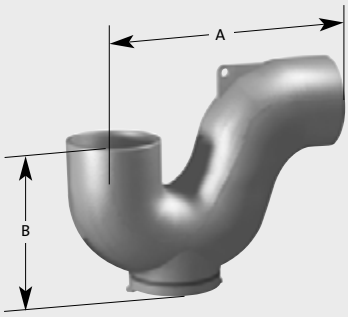
Traps

ED034 – Plain



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

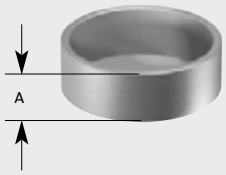
ED037 – Plain with access bottom



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

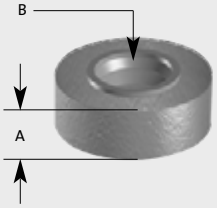
Blank Ends

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

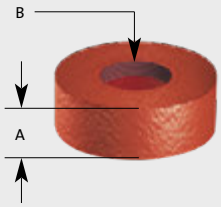
ED071 – Push-fit connection



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

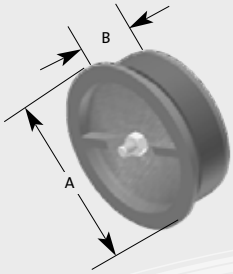


Product code	Dia	A	Nominal wt/kg
191579	100	40	1.0

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

Expansion Plugs

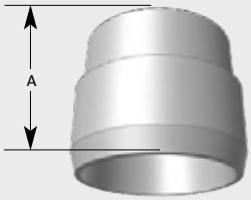
ED074 – Expansion plug



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

Connectors

ED076 – Transitional connector

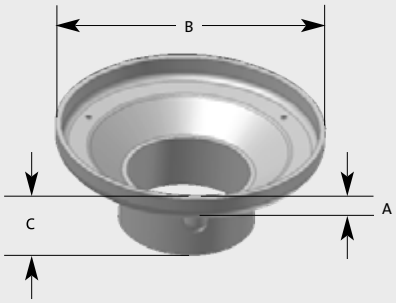


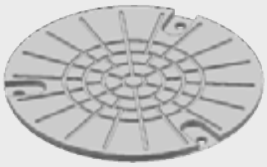
Product code	Dia	A	Nominal wt/kg
191813	100	100	1.8
191814	150	125	4.2

Adaptor from Ensign to Supersleve.

Gully Inlets

ED060 – Gully inlet



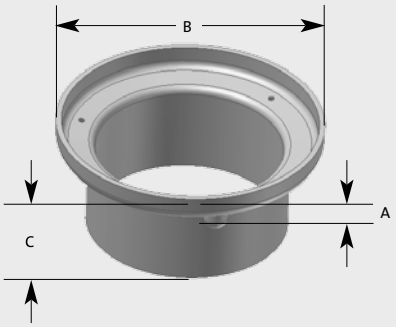


Solid cover

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

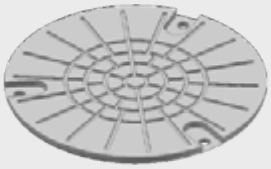
Can be supplied fitted with solid cover order ED066 (Product Code 191852).

ED060 – Bellmouth



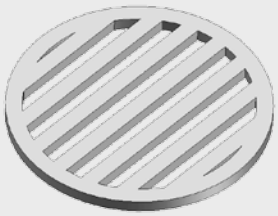
Product code	Dia	A	B	C	Nominal wt/kg
191826	150	20	215	95	2.9

Can be supplied fitted with solid cover order ED066 (Product Code 191853).



Solid cover

ED065 – Grating plain

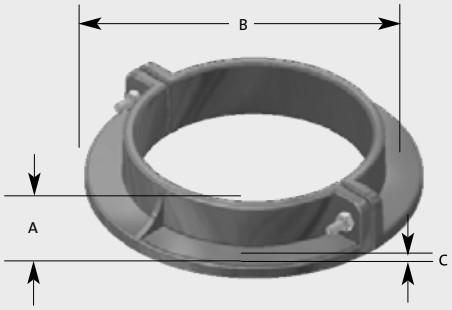


Product code	Dia	Nominal wt/kg
191828	200	1.8

Loose grating for ED060. Maximum load 2.0 tonnes.

Puddle Flanges

ED078 – Flange



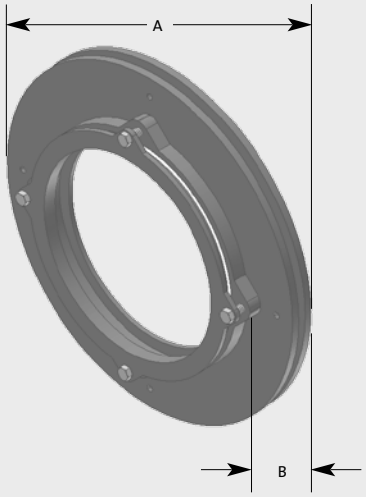
Product code	Dia	A	B	C	Nominal wt/kg
191829	100	50	220	12	4.6
191830	150	65	275	12	6.6
192318*	250	70	405	12	57.9
192319*	300	75	460	12	71.2

*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



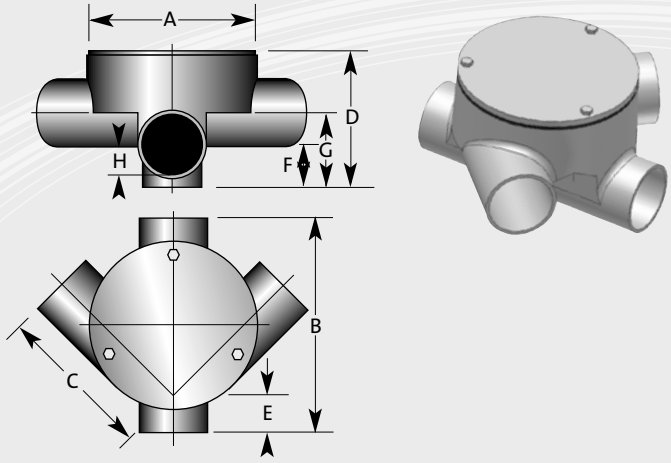
Product code	Dia	A	B	Nominal wt/kg
191831	200	370	35	6.3

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.



Section 3

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 3
Contents

Gratings
150mm Circular Grating 53
150 x 150mm Square Grating 53
200 x 200mm Square Grating 53

Rodding Eyes
150mm Circular Rodding Eyes 54
150 x 150mm Square Rodding Eyes 54
200 x 200mm Square Rodding Eyes 54

Gratings for Vinyl Floors
150mm Circular Grating 55

Rodding Eyes for Vinyl Floors
150mm Rodding Eye 55
Airtight Bung 55

Gully Bodies
Gully Bodies (Non-Trapped) 55
Gully Bodies (Trapped) 56

Accessories
Cast Iron Raising Pieces 58
Spigot Adaptor 58
Reducing Bushes 58
Oval Funnel 59
Circular Funnel 59
Security Screws 59

Shower Drain Bodies
Cast Iron Vertical Shower Drain 60
Cast Iron Horizontal Shower Drain 60
50mm Removable Bottle Trap 60
Filter Basket 60

Shower Drain Gratings
150mm Circular Grating for Vinyl Floor 61
150mm Circular Decorative Grating for Vinyl Floor 61
150 x 150mm Square Grating for Tiled Floor 61
150 x 150mm Square Decorative Grating for Tiled Floor 61
Shower Drain Kits 61

Roof Outlets
Vertical 62
Balcony Spigot – Flat Grating 63
Balcony Spigot – Notched Grating 63
Balcony Threaded – Flat Grating 63
Balcony Threaded – Notched Grating 63
Two-Way Outlet 64

Raising Pieces
Vertical Outlet 64
Balcony Outlet 64

Adaptors
Spigot Adaptor 64

Gratings

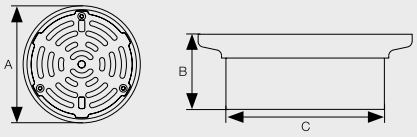
Height Adjustable

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 60).

Direct Fit

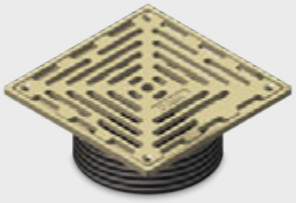
All VortX gratings and rodding eyes in both nickel bronze and stainless steel are available for direct fit connection to pipework when a gully body is not required. Ideal for connection to Ensign cast iron pipework to BS EN 877, however, the direct fit VortX gratings will connect to all pipe materials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

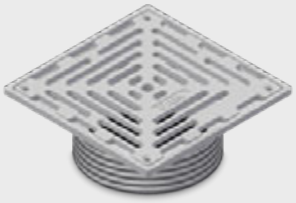


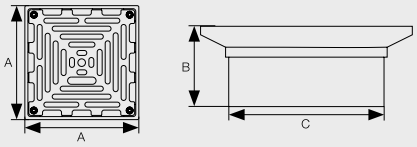
150mm Circular Grating (NPSM threaded or Direct Fit)

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 60.



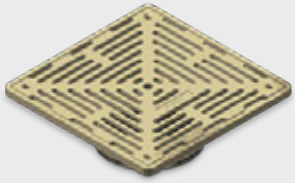


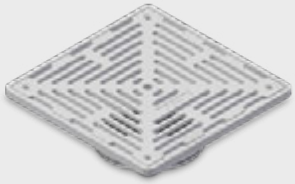


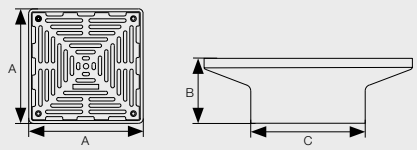
150 x 150mm Square Grating (NPSM threaded or Direct Fit)

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 60.





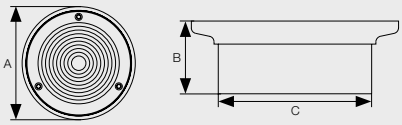


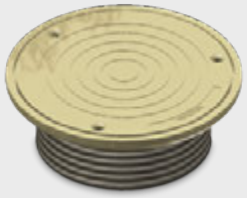
200 x 200mm Square Grating (NPSM threaded or Direct Fit)

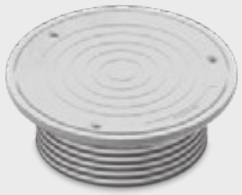
GEN code	Material	FIT	Finish		A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F050	Nickel Bronze	NPSM	Standard 227103	Polished 234178	200	62	110	3.1	148	K3
VX-F050	Nickel Bronze	Direct Fit	Standard 233423	Polished 234179	200	62	110	3.1	148	K3
VX-F060	Stainless Steel	NPSM	Standard 227104	Polished 234180	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 60.

Rodding Eyes

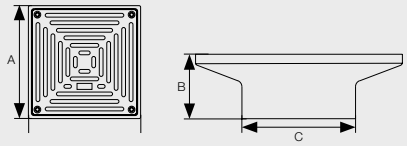


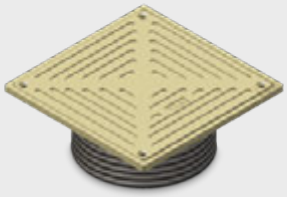


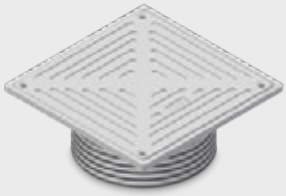


150mm Circular Rodding Eyes (NPSM threaded or Direct Fit)

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

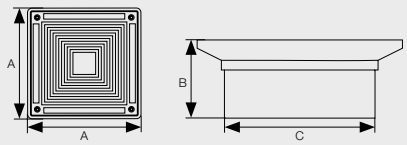


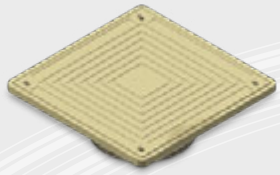


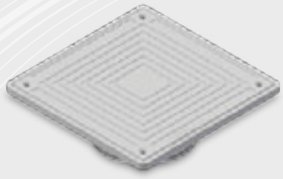


150 x 150mm Square Rodding Eyes (NPSM threaded or Direct Fit)

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



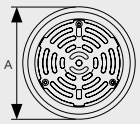


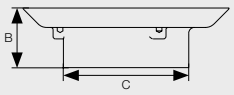


200 x 200mm Square Rodding Eyes (NPSM threaded or Direct Fit)

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



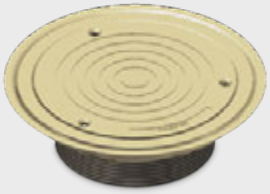


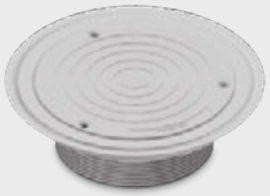
150mm Circular Grating (NPSM threaded or Direct Fit)

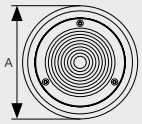
GEN code	Material	FIT	Finish		A	B	C	wt/kg	Grating free area (cm²)	Load class
VX-F070	Nickel Bronze	NPSM	Standard 227111	Polished 234195	170	53	110	2.3	72	K3
VX-F070	Nickel Bronze	Direct Fit	Standard 233434	Polished 234196	170	53	110	2.3	72	K3
VX-F080	Stainless Steel	NPSM	Standard 227112	Polished 234197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

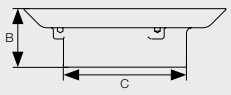
If bottle trap® required, see page 60.

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

Airtight Bung

GEN code	Material	Code	Size	wt/kg
VX-F420	ABS	210mm	210	2.4

To fit all rodding eyes to make double seal.

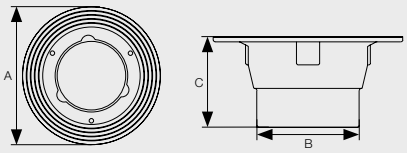
Gully Bodies (Non-Trapped)

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.

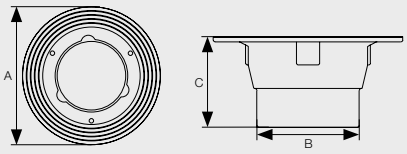
The VortX bodies have been designed to reduce the chance of build up of debris and provide improved flow. The unique flange design has 4 identification rings that give an excellent key to the waterproofing membrane or final floor finish and has dimples to assist drill location for fixing to the structural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

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



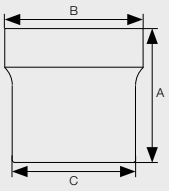
Medium Sump Body (110mm Outlet)

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



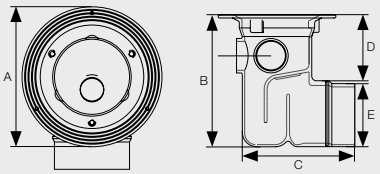
Sumpless Body (110mm outlet)

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)

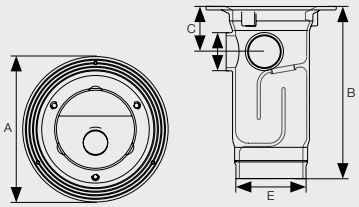
New innovative “P” and “S” trap designs are lighter in weight and minimise the space required that is needed by the more traditional products on the market. Supplied with 110mm spigot outlets, three plugged 2" BSP inlets incorporating the same flange design features and can be installed with the standard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

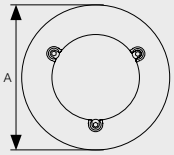
Registered Design 1345789-0001



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



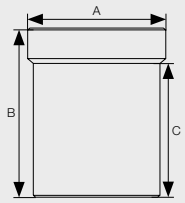
Clamping Ring (to suit all gullies)

GEN code	SAP code	Material	A	B	wt/kg
VX-F205	233440	Cast Iron	205	12	0.9

Accessories

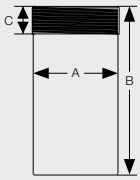
Raising Pieces
Supplied in grey epoxy coated cast iron, NPSM threaded and in three standard height sizes to provide additional adjustment for the gratings and rodding eyes.

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.



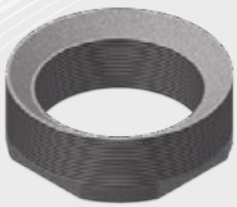
Cast Iron Raising Pieces (NPSM threaded)

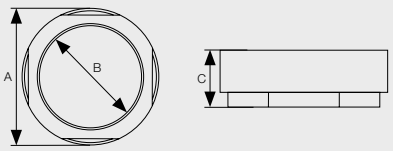
GEN code	SAP code	Size	A	B	C	wt/kg
VX-F350	227123	95-140	120	155	120	2.0
VX-F350	227122	40-95	120	117	80	1.5
VX-F350	227121	20-40	120	62	25	0.8



Spigot Adaptor (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	234204	80 to 3" (BSP)	80	215	27	2.1
VX-F500	234205	60 to 2" (BSP)	60	215	27	1.3
VX-F500	234206	56 to 2" (BSP)	56	215	27	1.1

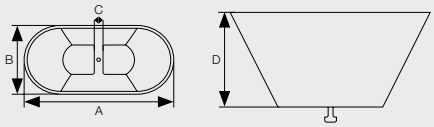




Reducing Bushes (BSP)

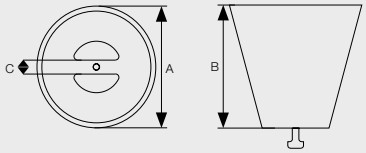
GEN code	SAP code	Size	A	B	C	wt/kg
VX-F510	227136	4" x 3" (BSP)	103	75	39	1.1
VX-F510	227137	4" x 2" (BSP)	103	50	40	1.9

Accessories



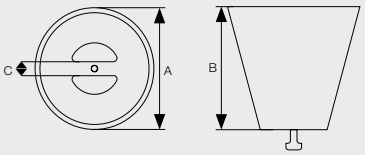
Oval Funnel/VX-F305

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

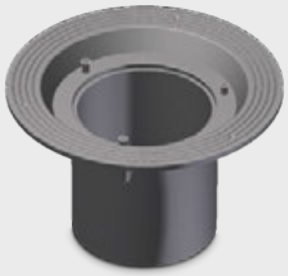
SAP code	Material	A	B	C	wt/kg
233455	Stainless Steel	–	–	–	0.1

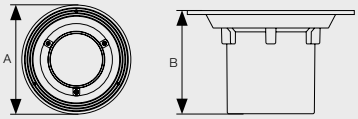
For securing gratings/rodding eyes.

Shower Drain Bodies

Shower Drain Bodies

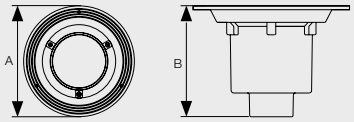
Manufactured in cast iron with grey epoxy coating incorporating the VortX styling flange design. The shower gullies are available in 110mm O.D. and 60mm O.D. horizontal spigots and 60mm O.D. vertical spigots. The shower gullies should be fitted with the VortX removable bottle trap®.





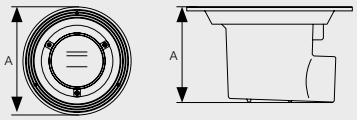
Cast Iron Vertical Shower Drain

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



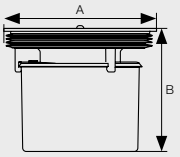
Cast Iron Vertical Shower Drain

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



Cast Iron Horizontal Shower Drain

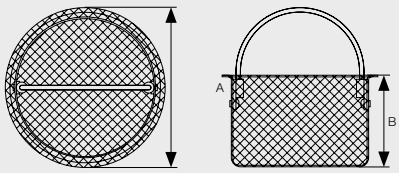
GEN code	SAP code	Size	A	B	wt/kg
VX-S261	227127	60mm	210	121	2.5



50mm Removable Bottle Trap (Registered design)

GEN code	SAP code	Material	A	B	wt/kg
VX-F400	227128	ABS	111	92	0.1

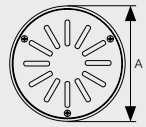
Registered design number 1285415 – 0001-0005. Can be fitted to gratings nickel bronze/ stainless steel.



Filter Basket

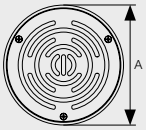
GEN code	SAP code	Material	A	B	wt/kg
VX-F410	227138	Stainless Steel	102	60	0.2

Shower Drain Gratings



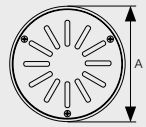
150mm Circular Grating for Vinyl Floor

GEN code	Material	Finish		A	wt/kg	Grating free area (cm^2)	Load class
VX-S270	Stainless Steel	Standard 227132	Polished 234208	150	0.8	21	K3



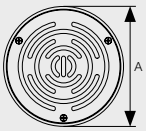
150mm Circular Decorative Grating for Vinyl Floor

GEN code	Material	Finish		A	wt/kg	Grating free area (cm^2)	Load class
VX-S270	Stainless Steel	Standard 227133	Polished 234209	150	0.7	41	K3



150 x 150mm Square Grating for Tiled Floor

GEN code	Material	Finish		A	wt/kg	Grating free area (cm^2)	Load class
VX-S271	Stainless Steel	Standard 227134	Polished 234210	150	1.0	21	K3



150 x 150mm Square Decorative Grating for Tiled Floor

GEN code	Material	Finish		A	wt/kg	Grating free area (cm^2)	Load class
VX-S271	Stainless Steel	Standard 227135	Polished 234211	150	0.9	41	K3

Example: 50 vertical shower drain with trap and square grating (polished) = 239743

Shower Drain Kits

Kits	Circ Grating VX-S270		Circ Dec Grating VX-S270		Square Grating VX-S271		Square Dec Grating VX-S271	
	Standard 227132	Polished 234208	Standard 227133	Polished 234209	Standard 227134	Polished 234210	Standard 227135	Polished 234211
100 VX-S260/ VX-F400	239376	239733	239736	239737	239734	239735	239738	239739
50 VX-S260/ VX-F400	239740	239741	239744	239745	239742	239743	239746	239747
50 VX-S261/ VX-F400	239748	239749	239752	239753	239750	239751	239754	239755

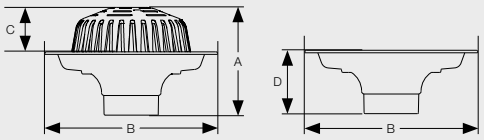
The VortX shower drain range is available in complete kits:
- Shower body
- Bottle trap®
- Grating of choice (see table)

Supplied boxed, please contact customer service on 0115 930 0681 or visit www.saint-gobain-pam.co.uk for more information.

Roof Outlets

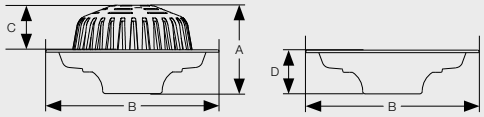
VortX Roof Outlets

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.



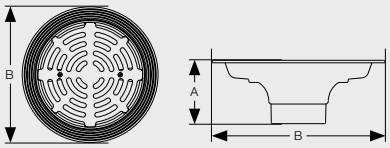
Vertical

GEN code	SAP code	Dia	A	B	C	D	wt/kg
VX-R105	241181	110	220	350	91	89	8.9



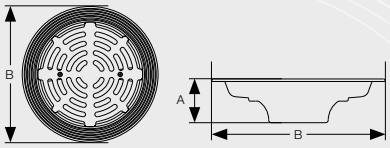
Vertical

GEN code	SAP code	Dia	A	B	C	D	wt/kg
VX-R155	241183	4" (BSP)	180	350	91	89	8.4



Vertical

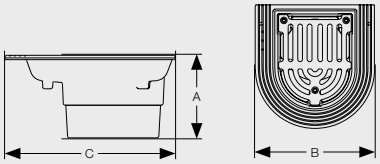
GEN code	SAP code	Dia	A	B	wt/kg	Load Class
VX-R100	241180	110	129	350	10.5	L15



Vertical

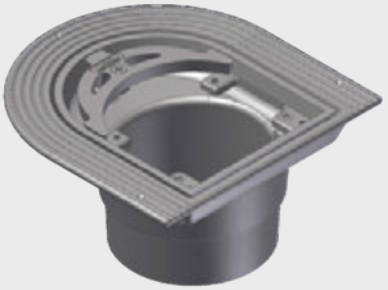
GEN code	SAP code	Dia	A	B	wt/kg	Load Class
VX-R150	241182	4" (BSP)	89	350	10.0	L15

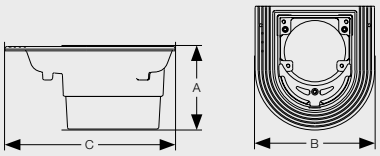
Roof Outlets



Balcony Spigot – Flat Grating

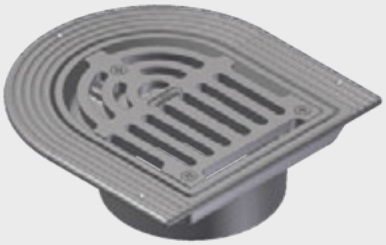
GEN code	SAP code	Spigot Dia	A	B	C	wt/kg
VX-R300	241184	110	100	200	210	3.6

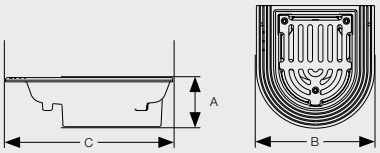




Balcony Spigot – Notched Grating

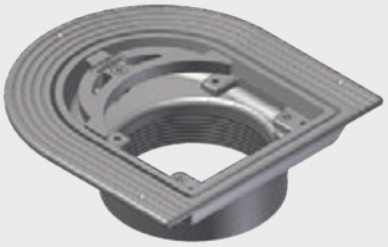
GEN code	SAP code	Spigot Dia	Pipework Dia	A	B	C	wt/kg
VX-R305	241187	110	100	100	200	210	3.2
VX-R305	241186	110	70	100	200	210	3.4
VX-R305	241185	110	50	100	200	210	3.5

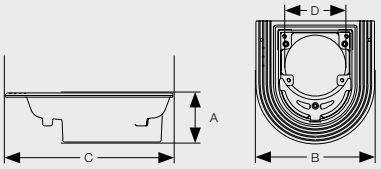




Balcony Threaded – Flat Grating

GEN code	SAP code	Spigot BSP	A	B	C	wt/kg
VX-R350	241188	4"	60	200	210	3.0

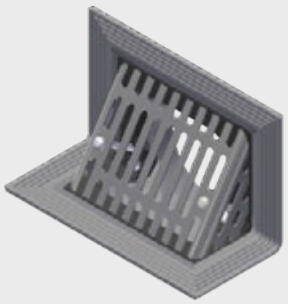


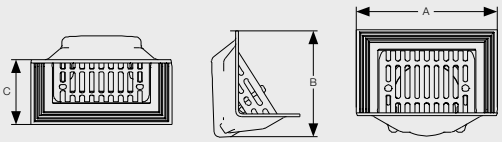


Balcony Threaded – Notched Grating

GEN code	SAP code	Spigot Dia	Pipework Dia	A	B	C	wt/kg
VX-R355	241191	4"	100	60	200	210	2.3
VX-R355	241190	4"	70	60	200	210	2.8
VX-R355	241189	4"	50	60	200	210	2.9

Roof Outlets



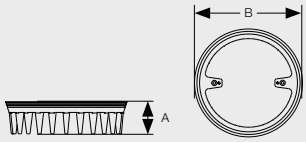


Two-Way Outlet BSP Threaded

GEN code	SAP code	BSP	A	B	C	wt/kg
VX-R500	241192	4"	234	172	111	6.2
VX-R500	241314	3"	234	172	111	6.2
VX-R500	241315	2"	234	172	111	6.2

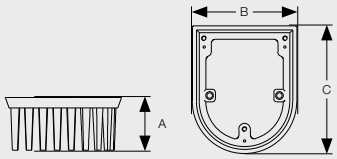
Stainless steel grating.

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

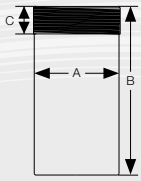


Raising Piece for Balcony Outlet VX-R300/350

GEN code	SAP code	A	B	C	wt/kg
VX-R720	241194	73 (63 effective)	134	165	0.9

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.



Spigot Adaptor (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*	234204	80 to 3" (BSP)	80	215	27	2.1
VX-F500*	234205	60 to 2" (BSP)	60	215	27	1.3
VX-F500*	234207	56 to 2" (BSP)	56	215	27	1.1

*Also use VortX Reducing Bushes VX-F510

Section 4

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
  - Up to 10dB(a) quieter than acoustic plastic systems

Tower Block International Way – Southampton

EEZI-FIT jointing

Section 4
Contents

Coupling Specification
Coupling Specification 67
Ensign/Timesaver Connecting Couplings 67

Ensign Electrical Continuity
Ensign Electrical Continuity 68
Ensign EEZI-FIT Electrical Continuity 68

High Performance Installation
High Performance Steel Couplings 69

Jointing Method
Jointing Method 70

Installation Modifications
Installation Modifications 71

Installation PFJ Drain Coupling
Installation PFJ Drain Coupling 72

Ensign EEZI-FIT Jointing Method
Ensign EEZI-FIT Jointing Method 73
Ensign Push-Fit Couplings Performance 73

PAM Ensign Grip Collars
Fitting grip collars over Ensign ductile iron couplings 74

Coupling Specification

Above ground

50mm to 125mm two-piece couplings EC002 utilise two socket cap set screws and nuts (M8). 150mm to 300mm couplings utilise four socket cap set screws and nuts (M8), 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 68). The couplings are manufactured in ductile iron and incorporate an elastomer seal. The above ground couplings are coated in a red epoxy coating (see page 108).

Nitrile gaskets are available on request.

For 400-600 above ground and below ground (see high performance couplings, pages 17 and 41).

Below ground

100, 150-300mm two-piece 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 a new push-fit coupling is available, ideal for fast pipe laying (see page 72).

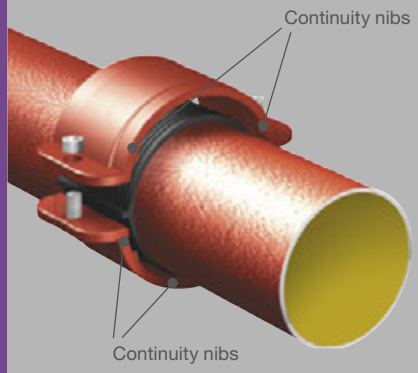
System	Coupling	Material	Type	Diameter	Accidental static water pressure (bar)	
					Unrestrained	Restrained*
Ensign Soil	EC002	Ductile Iron	Mechanical	50mm to 100mm	Up to 1 bar	Up to 5 bar
Ensign Soil	EC002	Ductile Iron	Mechanical	125mm to 150mm	Up to 0.5 bar	Up to 5 bar
Ensign Soil	EC002	Ductile Iron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

*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 856087 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.

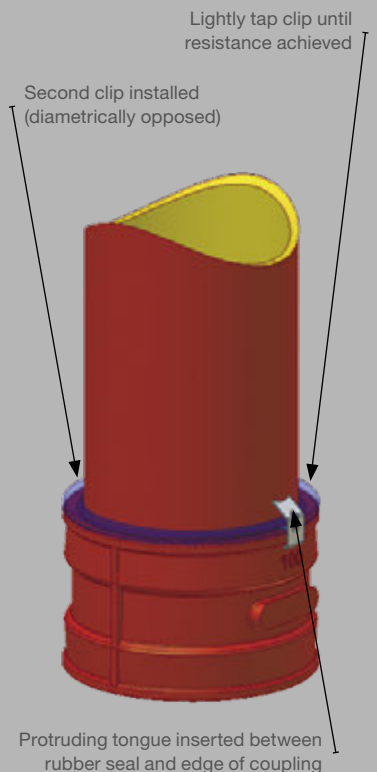
Ensign EEZI-FIT Electrical Continuity

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

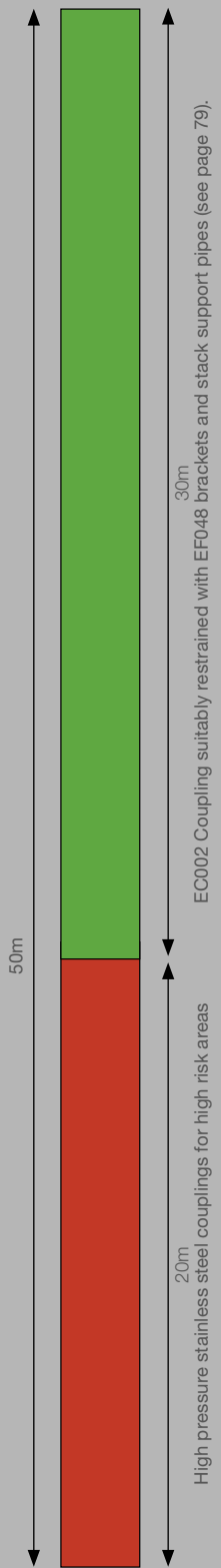
1. Locate clips by inserting the protruding tongue in between the edge of the coupling and the rubber seal.
2. Lightly tap each clip (in line with the pipe/fitting) until resistance is established.

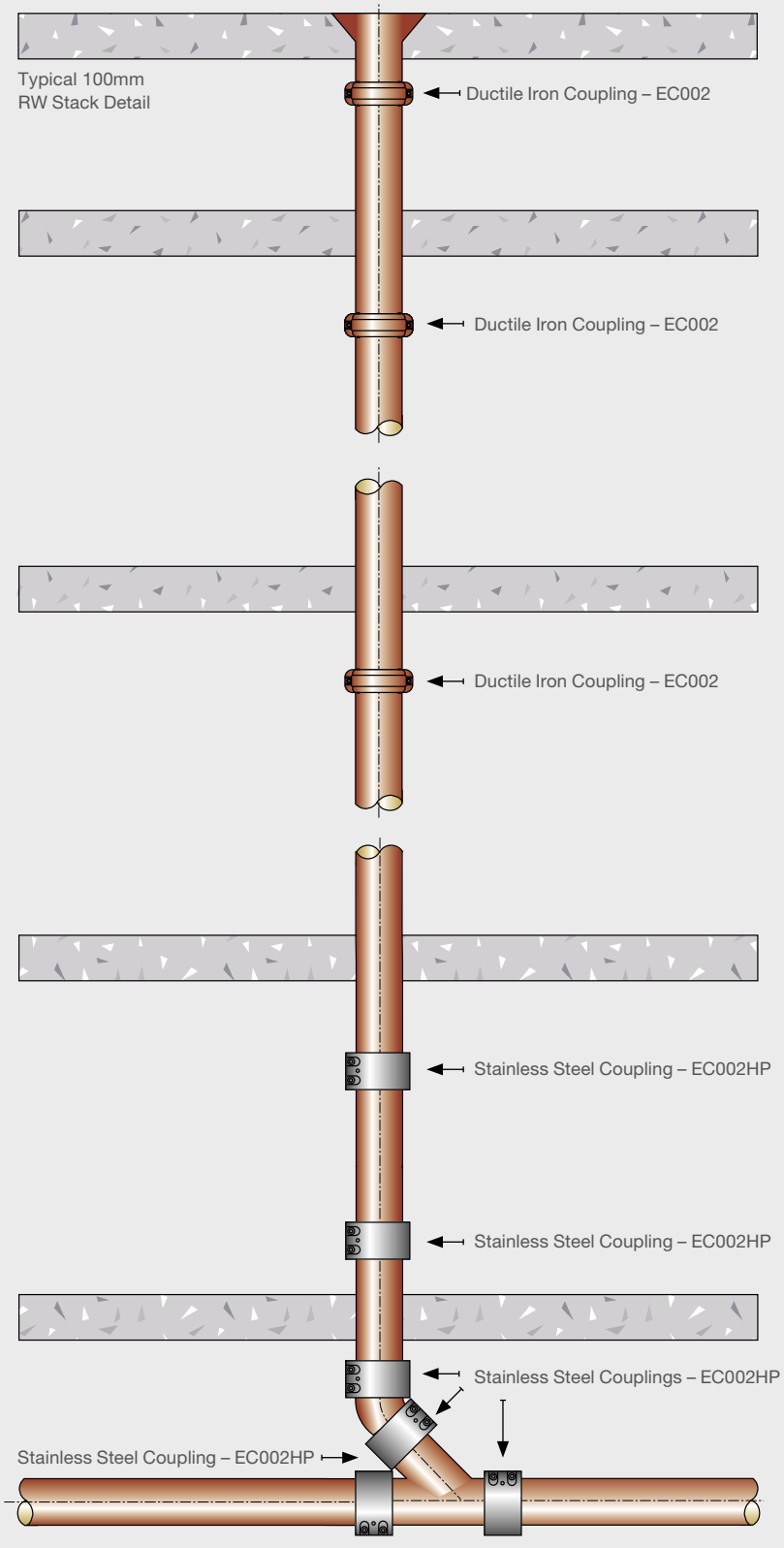
The electrical continuity clips are supplied separately in bags of 30. Product Code 208462. Testing should be carried out in accordance with BS 6087 Amendment 2.



High Performance Installation

Typical installation for high performance stainless steel couplings (EC002HP)





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

Jointing Method

Couplings are supplied pre-assembled. The new Ensign coupling has been designed to allow assembly without dismantling the coupling.*

*Applies to 100 and 150mm coupling at time of print. 50mm and 70mm couplings will be replaced later 2014 onwards.

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 minimum setting 20Nm.

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

Overtightening the couplings can apply excessive stress to the coupling bolts.

Tools

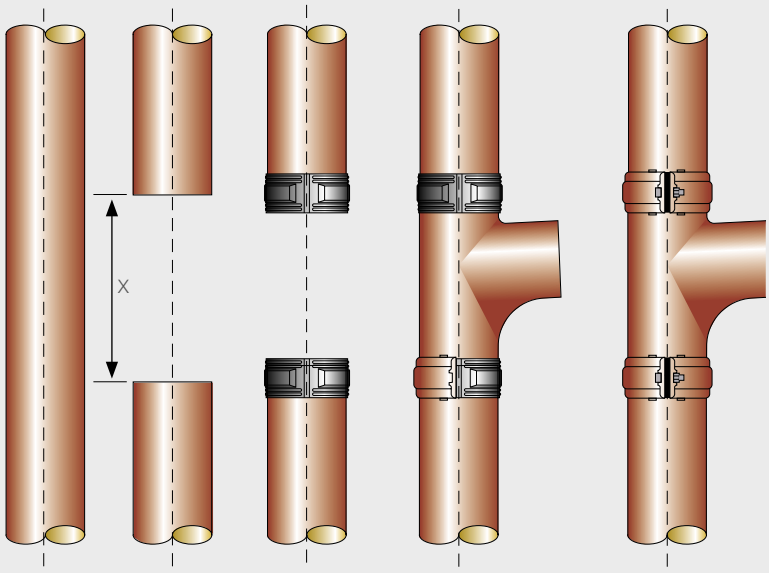
	Product code
A – Lubricant for EEZI-FIT push-fit assembly joints (0.5 litre tub)	199037
B – 13mm A/F 'T' Box Spanner EF098 For use with nuts on fixing brackets and on access door fittings	191200
C – 13mm A/F ½" Square-drive EF101 Deep Socket (use with ratchet B) For use with nuts on fixing brackets and 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

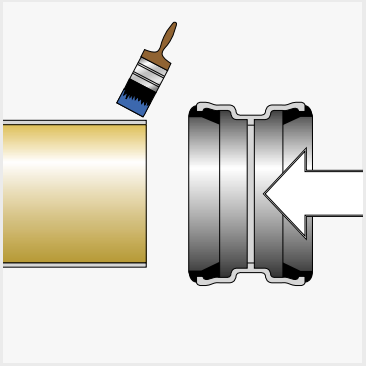
Typical example

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.

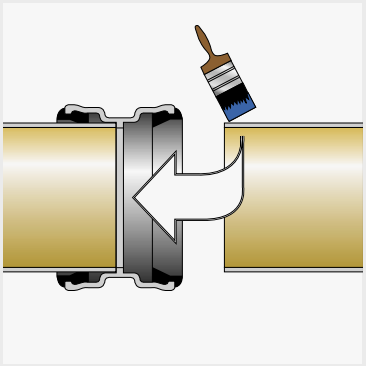


Typical example
X = fitting + 15mm

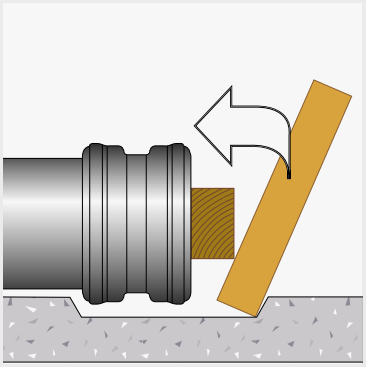
Installation PFJ Drain Coupling



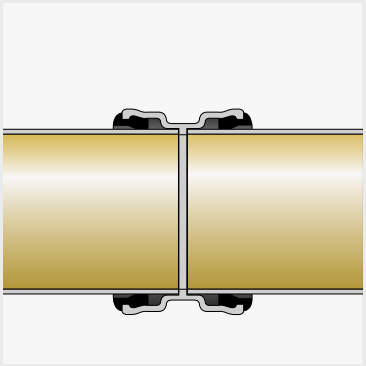
1. Apply lubricant (i.e. silicone) to spigot end of drain pipe (remove any burrs etc. if previously cut).



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 with a brush 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.

Section 5

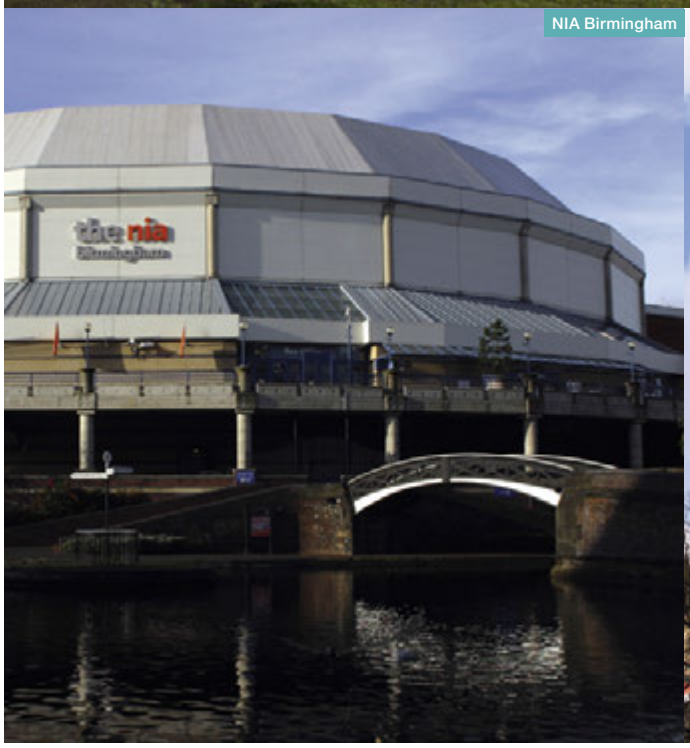
Brackets – Technical

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 5
Contents

Pipe Support Brackets
Pipe Support Brackets 77

Support For Vertical Pipework
Support For Vertical Pipework 77

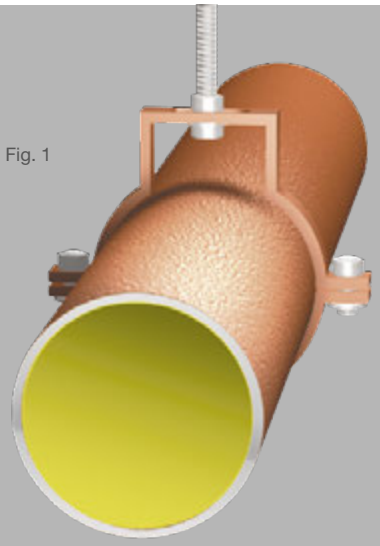
Support For Low Gradient Pipework
Support For Low Gradient Pipework 78

Stack Support Pipe
Stack Support Pipe 79

Acoustic Bracket Features
Acoustic Bracket Features 80

Acoustic Bracket Installation
Acoustic Bracket Installation 80

Fig. 1

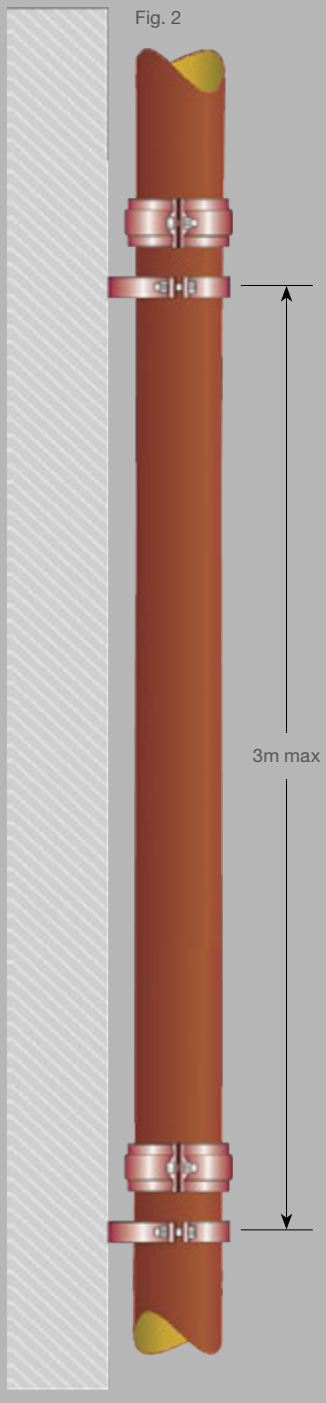


Pipe Support Brackets

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

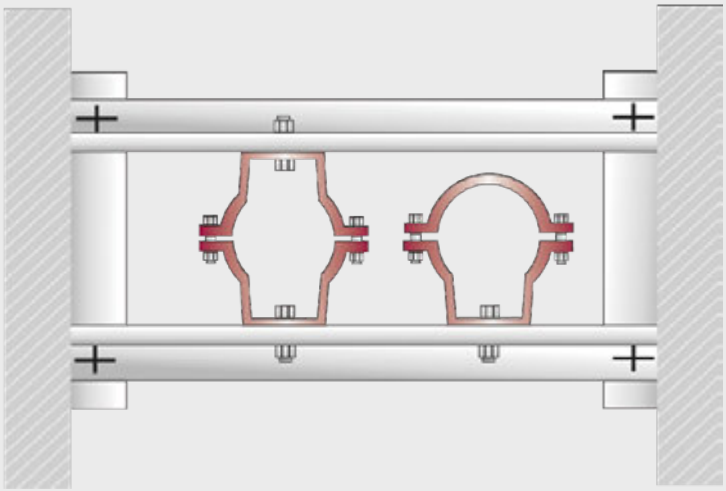
For vertical waste or rainwater stacks, it is recommended that a load-bearing bracket be fitted to each floor level, to carry the weight of the pipe and its contents. This is of particular importance on multi-storey applications.

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

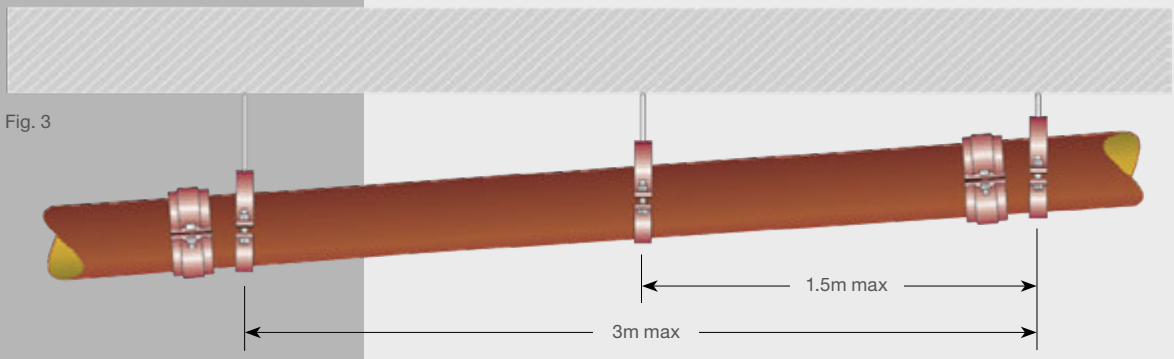
Additional brackets may be required where fittings are installed within the vertical stack, at the discretion of the designer.



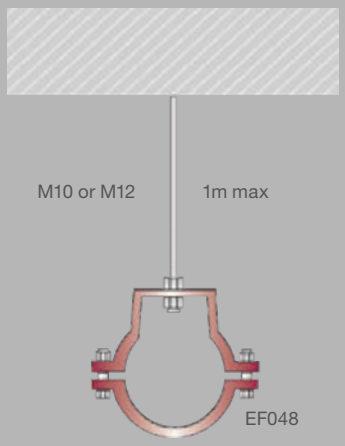
Typical support arrangement for vertical pipework.

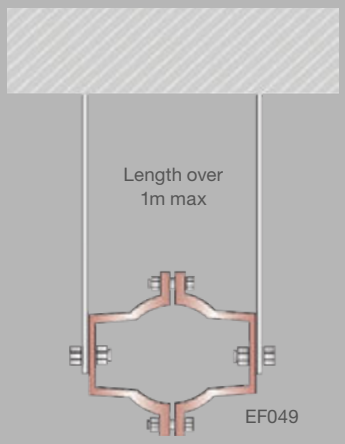
Support For Low Gradient Pipework

Fig. 3



Typical support arrangement for horizontal pipework





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	YES
If using new acoustic brackets EF048AD	YES
If using mild steel fixing brackets	YES

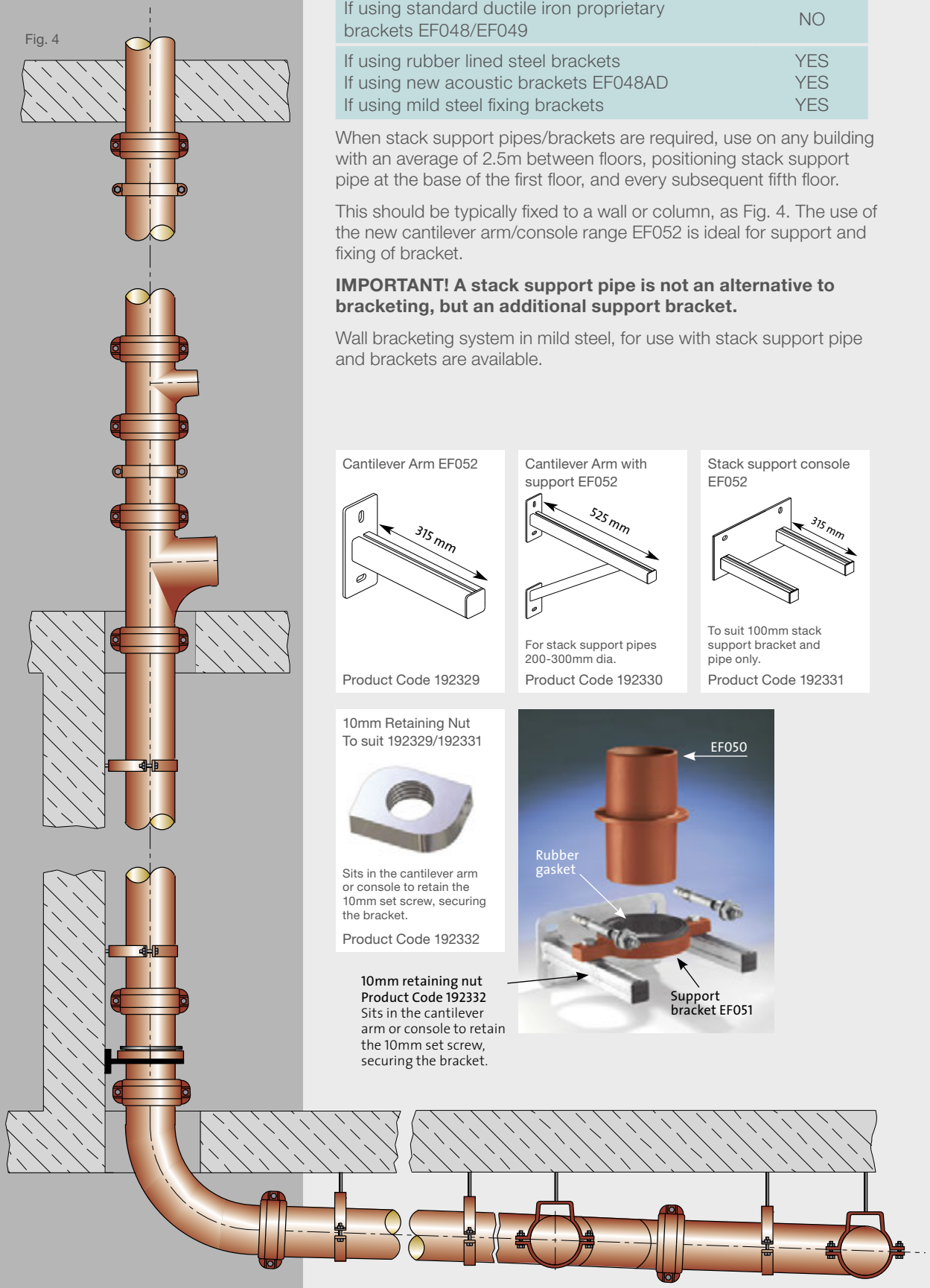
When stack support pipes/brackets are required, use on any building with an average of 2.5m between floors, positioning stack support pipe at the base of the first floor, and every subsequent fifth floor.

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

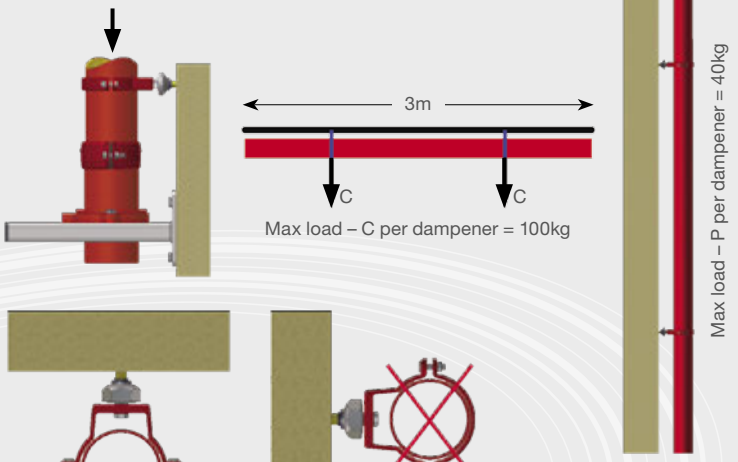
1. Dampener – elastomer EPDM
2. M8-M10 nut – galvanised-bichromated steel (will accept both threaded options)
3. Retainer cup – AISI 304 stainless steel
4. Small dish – AISI 304 stainless steel
5. M8-M10 tapped base – galvanised-bichromated steel

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.

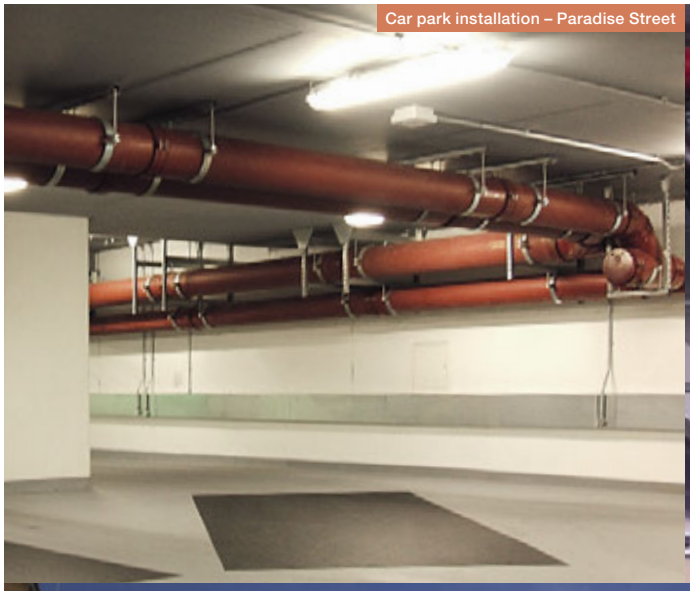
In every case of fixing – to obtain the best noise reduction, the elastomeric dampener must not be deformed or compressed!

Section 6

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 6
Contents

Connection To Other Systems
Connection To Other Systems 83

Boss Pipes Compression Fit
Boss Pipes Compression Fit 84

Multi-Waste Manifold Connector
Multi-Waste Manifold Connector 85

Typical Manifold Application
Typical EEZI-FIT Manifold Application 85

EEZI-FIT Manifold Application
EEZI-FIT Manifold Application 86

EEZI-FIT Boss Pipe Connections
EEZI-FIT Boss Pipe Connections 86

EEZI-FIT Boss Branch
EEZI-FIT Boss Branch 87

Ensign Long-Tail Branches
Ensign Long-Tail Branches 87

Typical Applications – Long Arm Branch
Typical Applications – Long Arm Branch 88

Typical Applications – Movement Connector
Typical Applications – Movement Connector 88

Roof Penetration device
Roof Penetration device 89

Typical Applications – Asphalt Roof Adaptor
Typical Applications – Asphalt Roof Adaptor 89

Vented Traps – Typical layouts
Vented Traps – Typical layouts 90

Applications – Stench Trap
Applications – Stench Trap 90

Installation Best Practice Guide
Pipe cutting 91
Coupling and assembluy 91
Cordless impact wrench 92
Ratchet spanner 92
Cricket pipe carrier 92

Connection To Other Systems

Fig. 5

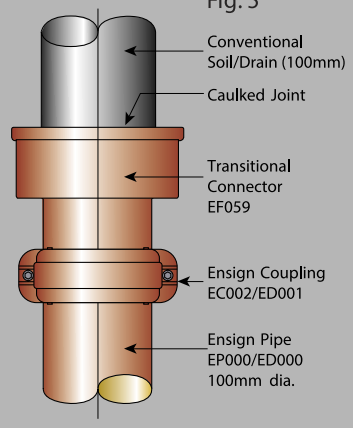


Fig. 6

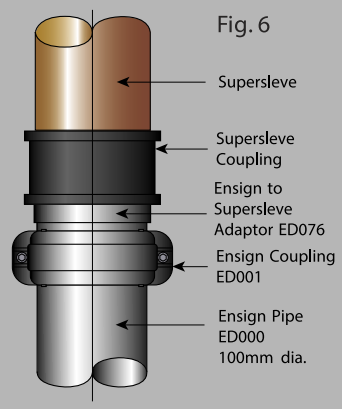


Fig. 7

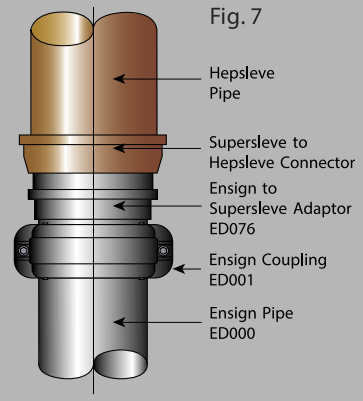
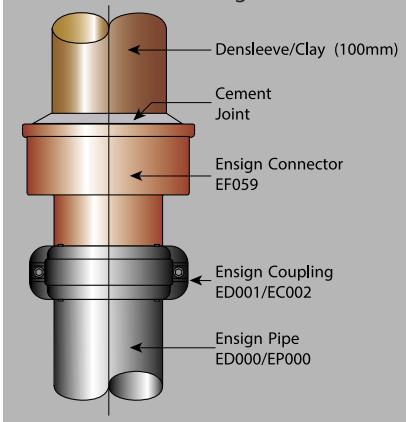


Fig. 8



WC connection

The Ensign range will accommodate 'push-fit' type, flexible connectors (i.e. 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						

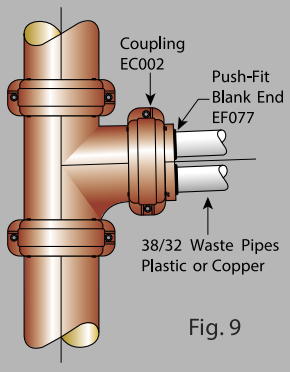


Fig. 9

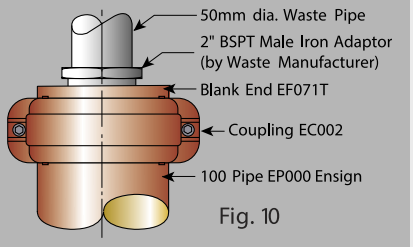


Fig. 10

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.

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 34).

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 25).

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 32).

PVC below ground systems

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

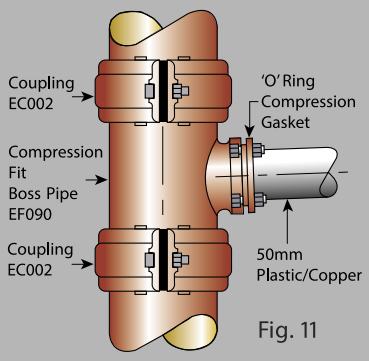


Fig. 11

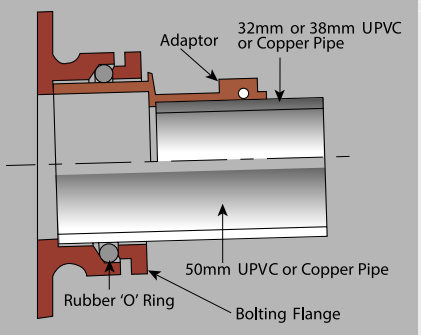


Fig. 12

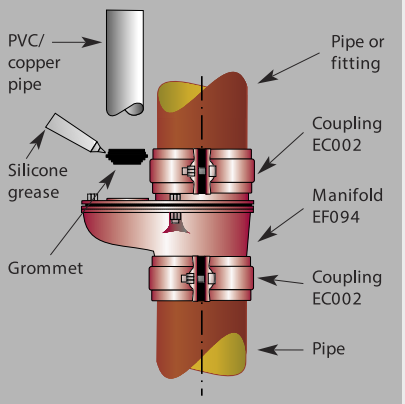
Boss Pipes Compression Fit

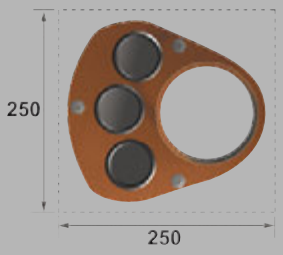
The boss pipes incorporate 'O' ring compression gaskets that will accept 54-56mm O/D pipe, and is supplied assembled with the following for each boss (see Fig. 11).

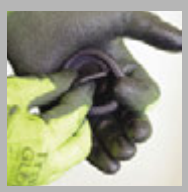
1. 6mm 'O' ring rubber (EPDM).
2. M8 x 30 zinc and clear coated steel screw x 2.
3. M8 coated steel nuts x 2.

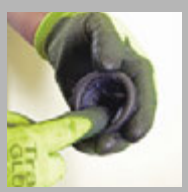
To connect 32mm and 38mm waste pipes fit the appropriate reducing adaptors onto the pipe before inserting through the clamp flange (see Fig. 12).

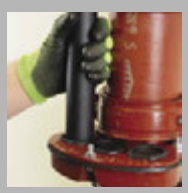
The 'compression fit' boss pipes have been introduced to reduce the cost of connecting to waste pipes, eliminating the need for expensive conventional threaded male adaptors, and subsequently reducing the overall installation costs.

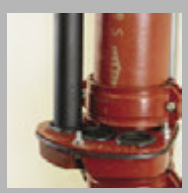












Multi-Waste Manifold Connector

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.

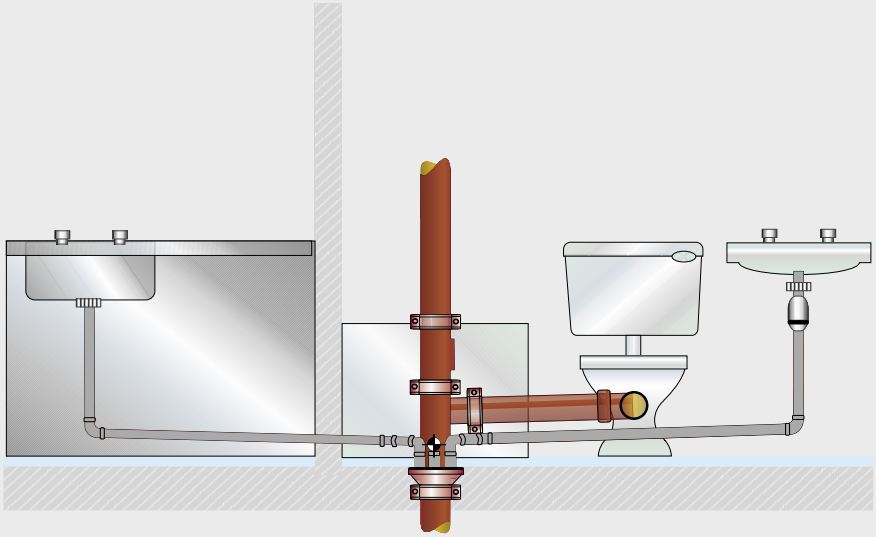
On the 100mm manifold to achieve a 32mm waste connection, remove the inner rubber ring, 38mm utilising the outer ring (for waste pipe maximum lengths see BS EN 12056-2).

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

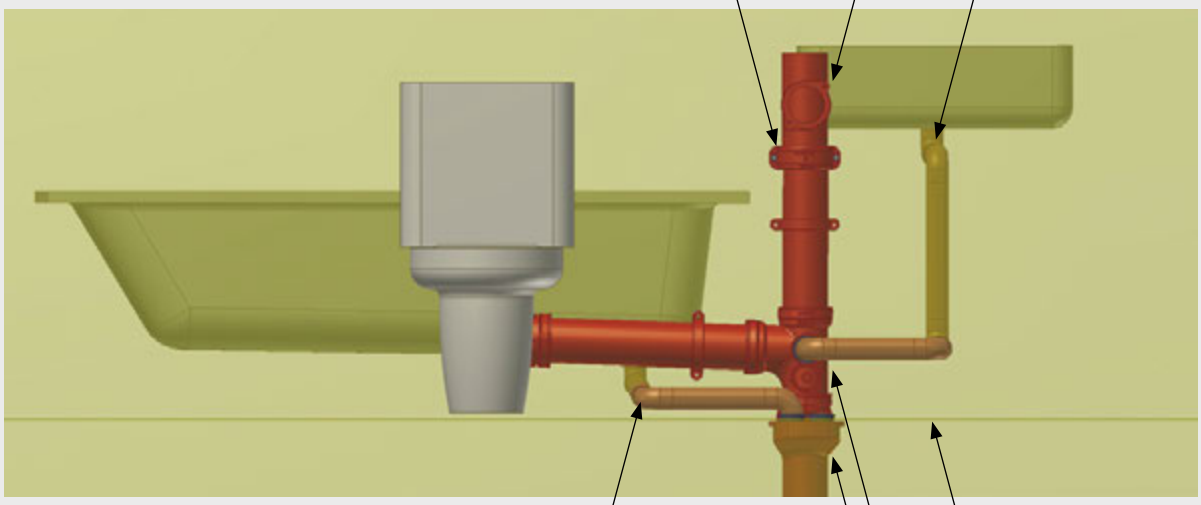
Fixing instructions

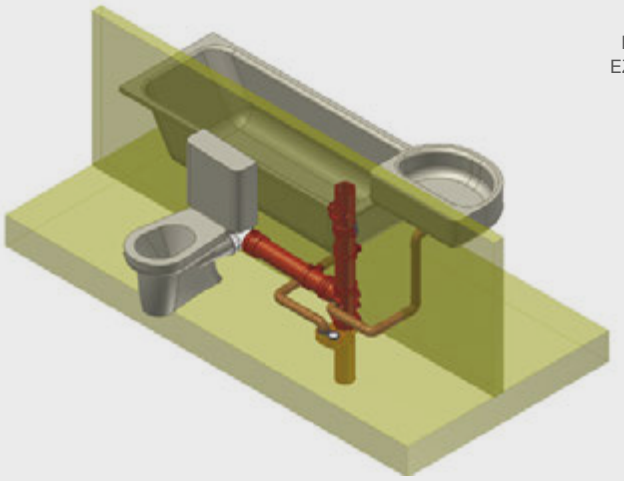
1. Remove grommets, pierce the appropriate groove for 32mm or 38mm waste (100mm manifold only) connections and tear out centre disc where required.
2. Apply an appropriate silicone grease (not provided) to the outside of the grommet and re-fit into manifold ensuring that the retaining groove of the grommet 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.

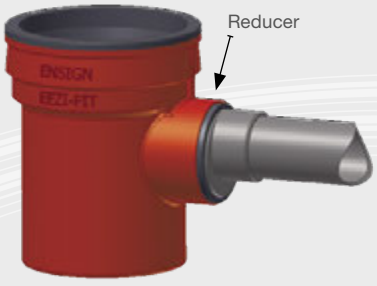
Typical Manifold Application



EEZI-FIT Manifold Application







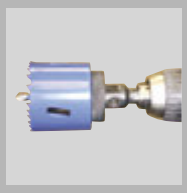
EEZI-FIT Boss Pipe Connections

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

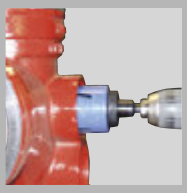
To connect to 38/32mm waste simply use a reducer as shown (supplied by waste manufacturers).

EEZI-FIT 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

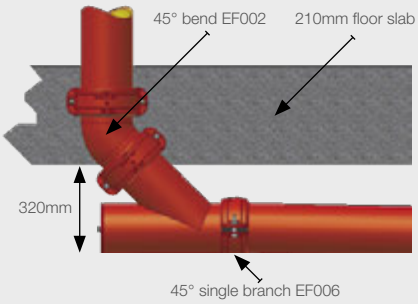
Ensign Long-Tail Branches

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

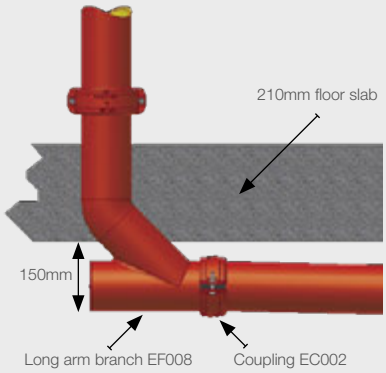
Typical Applications – Long Arm Branch

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

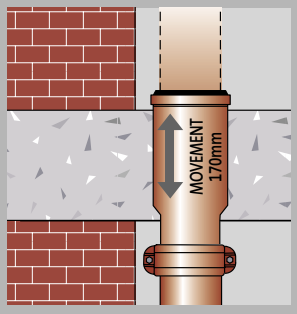
This allows for pipe movement without buckling during limited building settlement or pipework settlement.

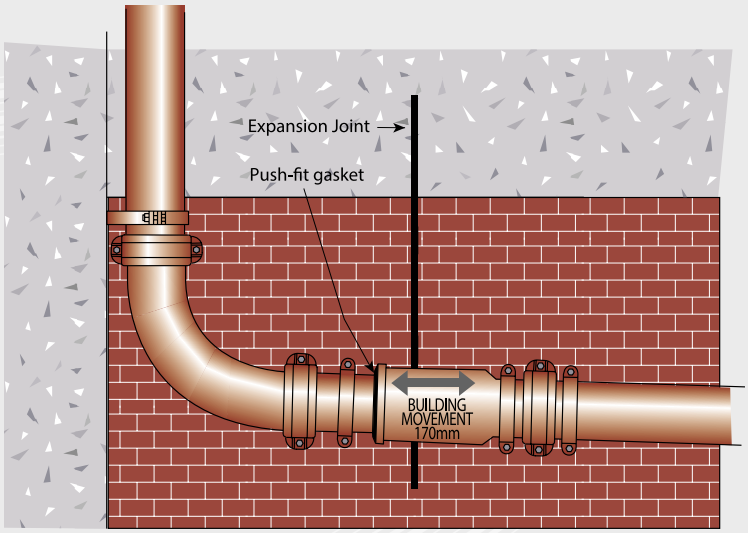
Pipe movements of approximately 170mm are allowed for within the EF058.

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.



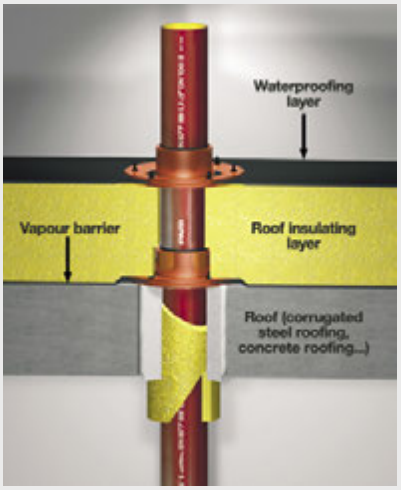


NEW Roof Penetration Device EF079

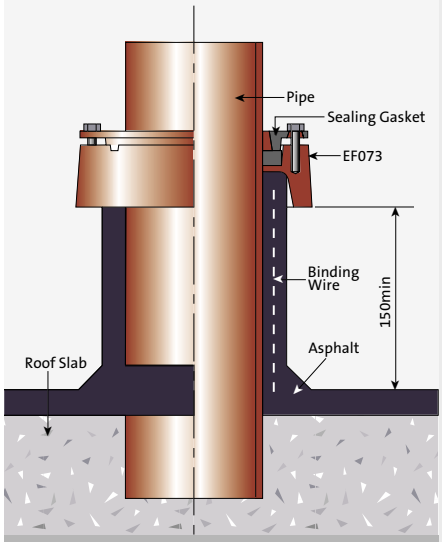
To secure roof watertightness, which is of crucial importance, the number of roof penetrations should be limited. Saint-Gobain PAM UK designed for its pipe systems, a roof penetration device that is watertight and quick to install.

The system was developed to ease installation of a perfectly watertight roof penetration for cast iron primary ventilation pipes or vent pipes. The flanged fittings clamp both the vapour barrier and the waterproofing layer.

The roof penetration device EF079 is a set of two ductile iron flanged fittings. One of the flanges is fixed, the second is moveable, equipped with rubber gaskets. Rubber gaskets are EPDM.



The first flange fitting, installed above the roof, clamps the vapour barrier under the roof insulating layer, the second, above the insulating layer clamps the waterproofing layer, be it polymer or bituminous.



Typical Applications – Asphalt Roof Adaptor

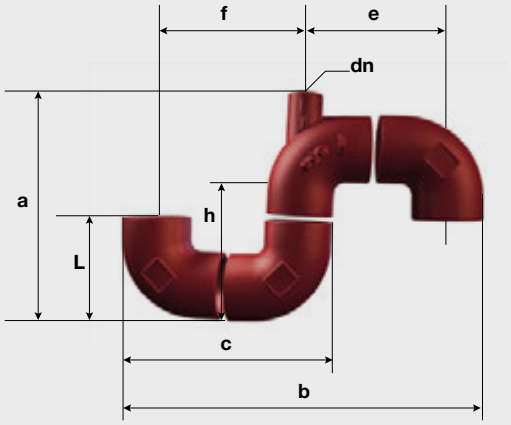
For use where soil pipes pass through a roof with an asphalt covering without the use of a sleeve.

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.

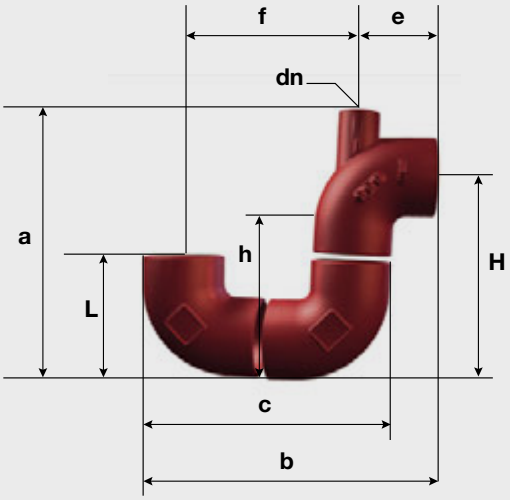
Vented Traps – Typical Layouts

GEN Code	DN	dn	Outlet	L	a	b	c	H	h	e	f	Total weight
156588	100	50	Vertical	177	373	571	343		218	223	238	8.81
156585	100	50	Horizontal	177	373	405	343	271	218	113	238	6.55

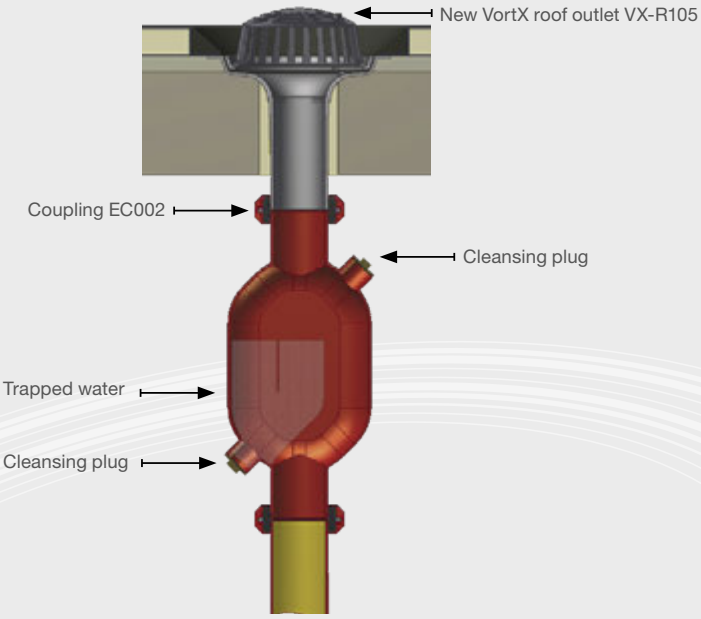
Vertical outlet



Horizontal outlet



Applications – Stench Trap



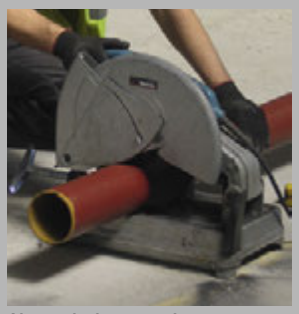
- Installed in a 100mm or 150mm diameter rainwater system
- Prevents odours emanating on to balconies and flat roofs

Installation Best Practice Guide

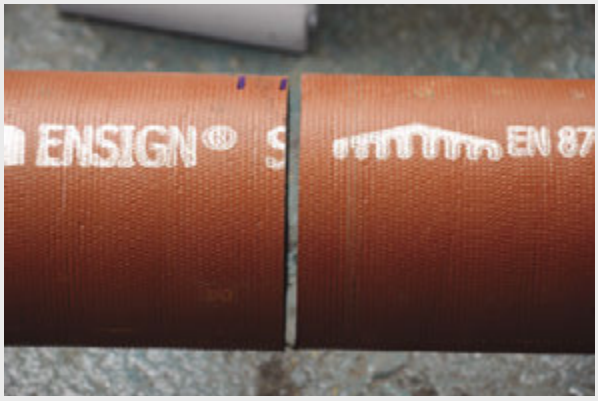
Pipe cutting

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 7

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 7
Contents

Buried Pipe Systems
Buried Pipe Systems 95

Design Recommendations
Design Recommendations 97
Testing 97

Puddle Flanges Installation Details
Puddle Flanges Installation Details 101

Timesaver British Standard Fittings
Timesaver British Standard Fittings 102

BS 437 Anti-Flooding Traps
BS 437 Anti-Flooding Traps 102

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 (e.g. groundwater table)

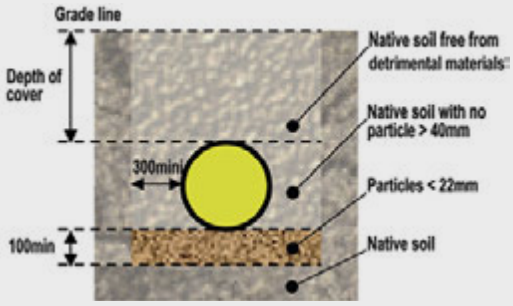
Backfilling recommendations

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

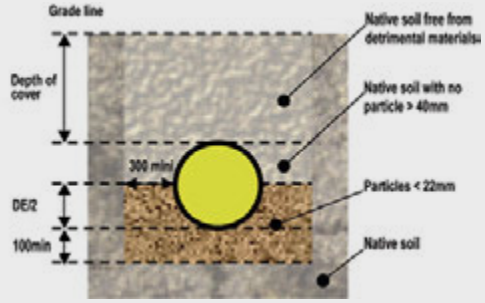
Two main solutions have been retained out of the EN 1610 recommendations: taking into account both ease of installation and knowledge from experience of rigid pipe systems. For compaction, the more adverse hypothesis was retained.

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 Section13.

Systems embedded in concrete

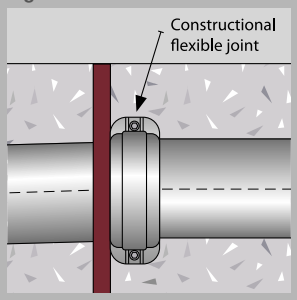
Where Ensign pipe systems are to be set in concrete, a minimum 2.5cm width of concrete on every side has to be respected because during its curing and after, the concrete will be subject to shrinkage and carbonation.

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 (e.g. 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 (e.g. 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 (e.g. 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'. 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).

Fig. 14

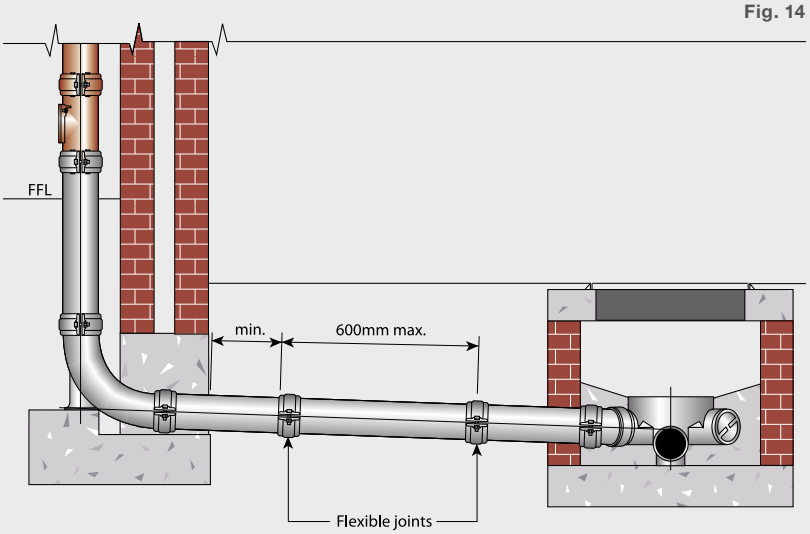


Fig. 15

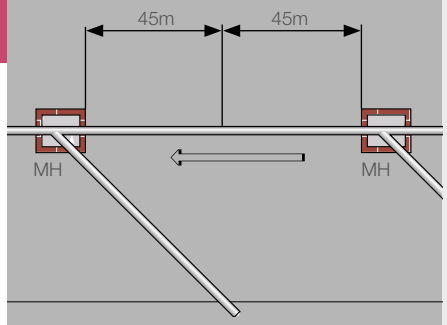


Fig. 16

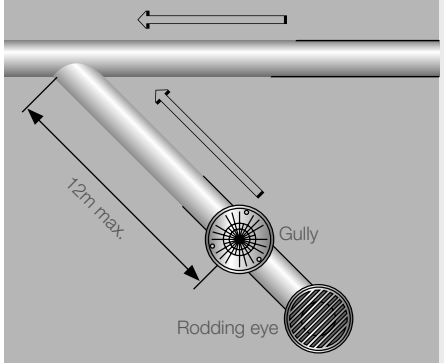
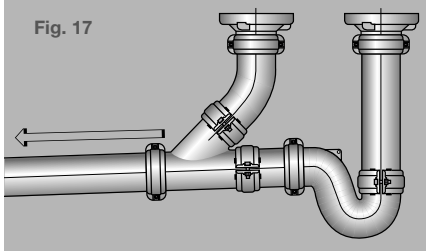


Fig. 17



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.

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. 18

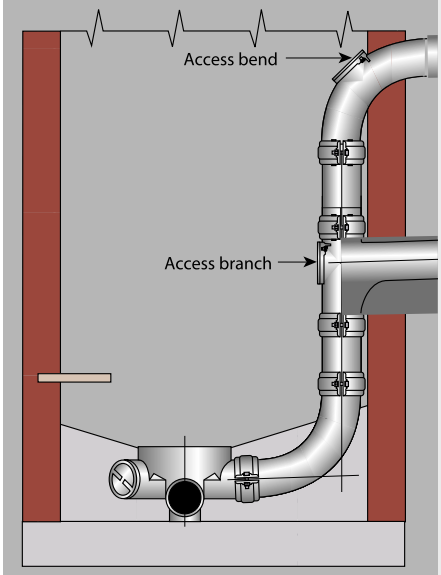


Fig. 19

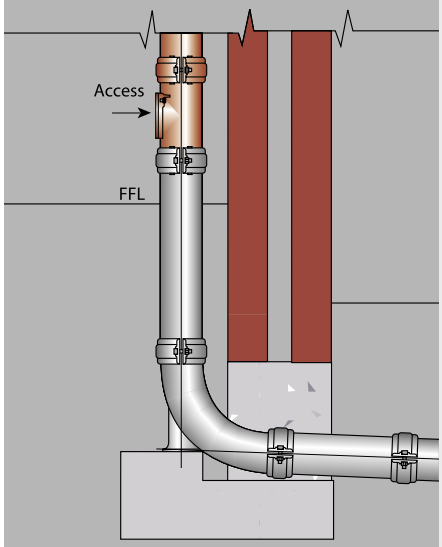
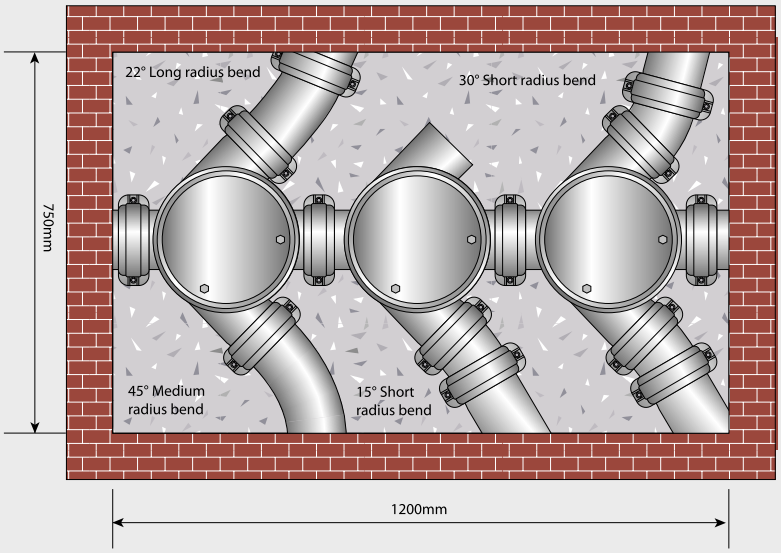


Fig. 20

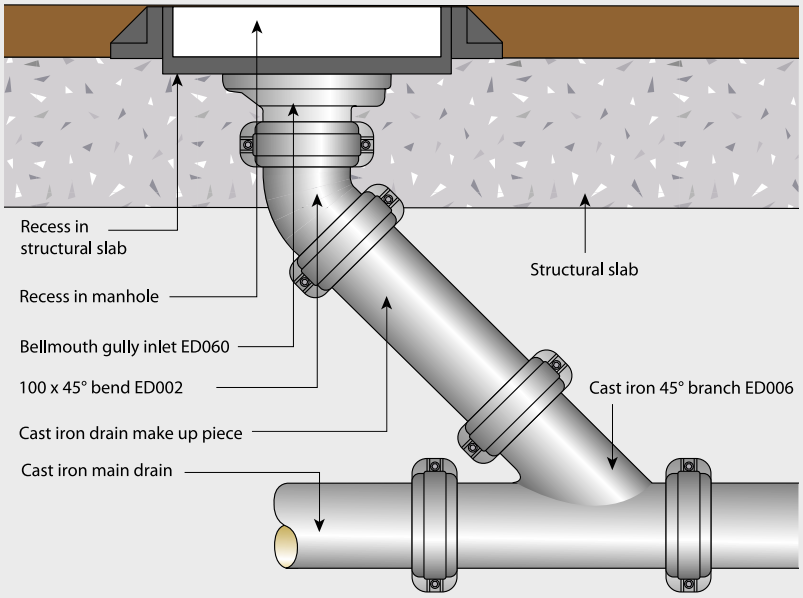


Design Recommendations

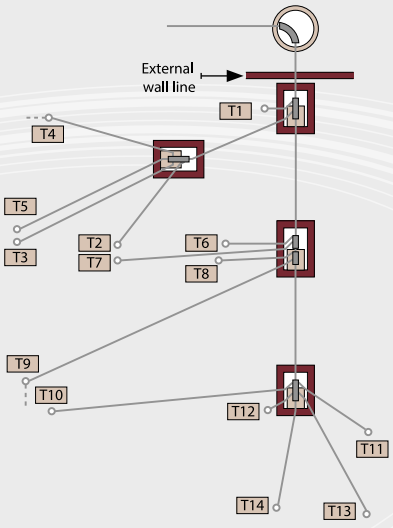
Benefits of rodding point system

- 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

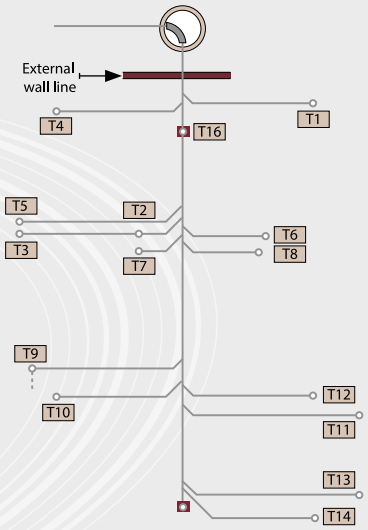
Rodding point with floor cover



Traditional British drainage system



Rodding point system



Puddle Flanges Installation Details

Fig. 21

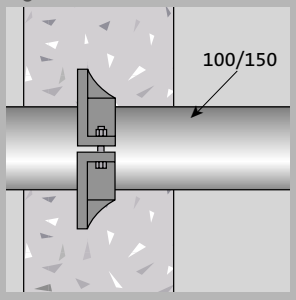


Fig. 22

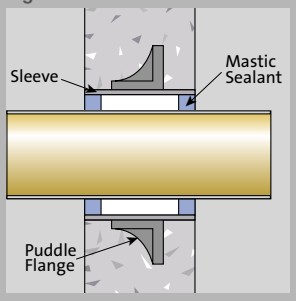


Fig. 23

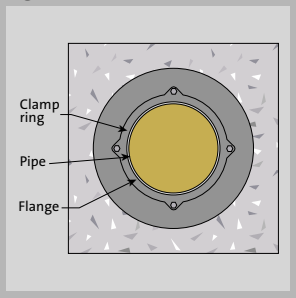


Fig. 24

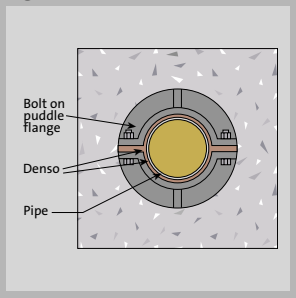
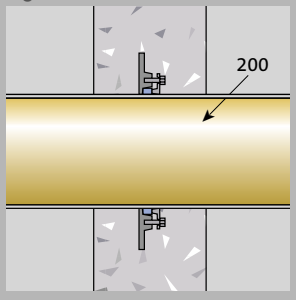


Fig. 25



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.

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 42).

Transitional coupling TD02

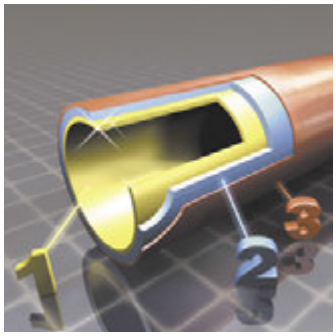
BS 437 Anti-Flooding Traps

Saint-Gobain PAM UK manufacture a range of traditional BS 437 fittings – please consult latest Timesaver catalogue for 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 8

Technical Specifications

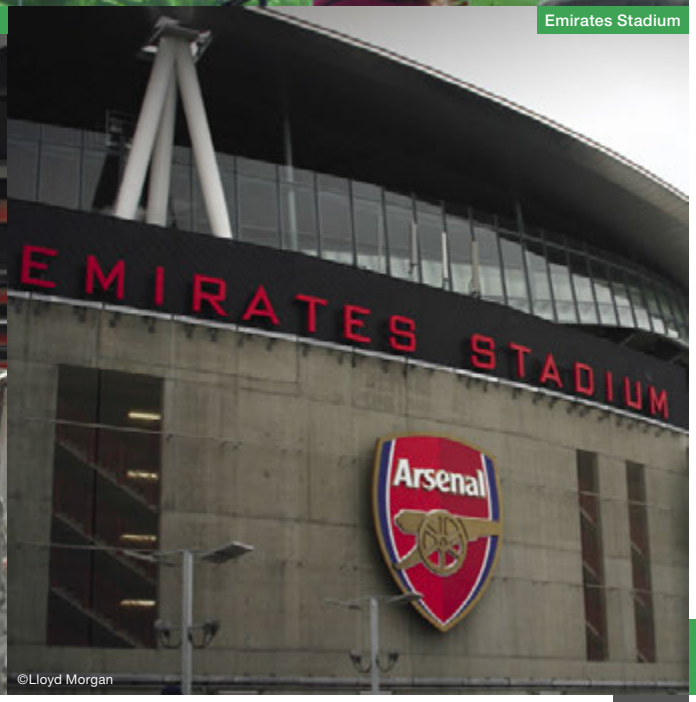
Ensign cast iron drainage – 1st choice for stadia

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
Technical Specifications 105

Product Identification
Product Identification 106

CE Mark
CE Mark 107

Coating Specification
Coating Specification 108

Chemical Resistance
Chemical Resistance 109

Pipe Dimensions
Chemical Resistance 110

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		

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

A2-s1, d0

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 Warrington Fire Research 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. For both of these criteria the Saint-Gobain PAM UK Ensign and EEZI-FIT ranges achieved the highest possible scores: 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 cast iron material alone is classified A1 in the Euroclass classification of reaction to fire, without prior tests.

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

The tests carried out to determine the ranking for 'burning droplets' and 'smokes' included in the assembly elastomer gaskets and coatings. The excellent ranking was obtained: A2-s1, d0.

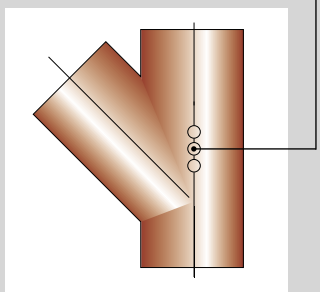
Check the reaction to fire classification of the products you specify, and be sure that the tests were undertaken by an accredited testing centre.

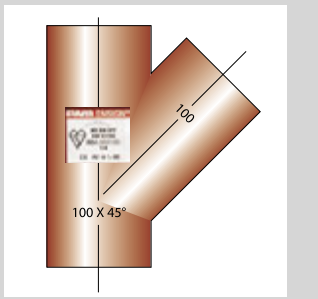
Product Identification

Ensign above ground

Product name
Above ground
Standard conformity
Euroclass conformity
CE Mark
Country of origin (manufacturing)
Third party certification
Diameter

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





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.

Example: Soil fittings

CE Mark

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 + A2-s1, d0

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 the Warrington Fire Research Laboratory.

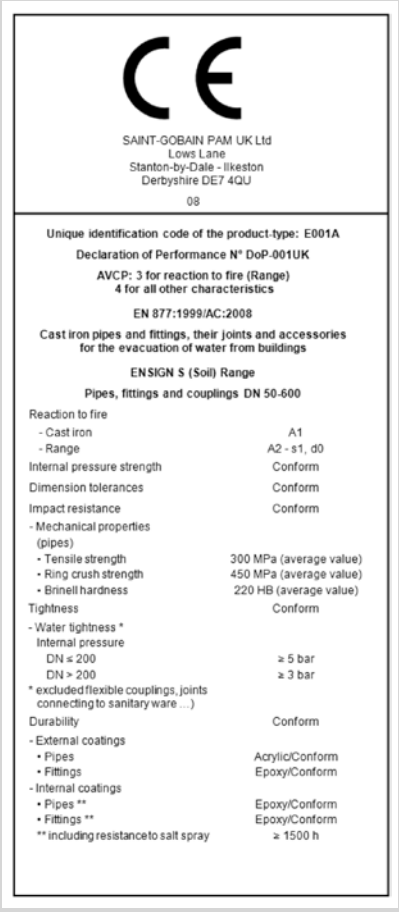
CE marking is not a Quality mark or label – it is something very different

A2-s1, d0

The CE Mark is NOT a quality mark but a self declaration of product performance 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.



CE

SAINT-GOBAIN PAM UK Ltd
Lows Lane
Stanton-by-Dale - Ilkeston
Derbyshire DE7 4QU
08

Unique identification code of the product-type: E001A

Declaration of Performance N° DoP-001UK

AVCP: 3 for reaction to fire (Range)
4 for all other characteristics

EN 877:1999/AC:2008

Cast iron pipes and fittings, their joints and accessories for the evacuation of water from buildings

ENSIGN S (Soil) Range

Pipes, fittings and couplings DN 50-600

Reaction to fire	
- Cast iron	A1
- Range	A2 - s1, d0
Internal pressure strength	Conform
Dimension tolerances	Conform
Impact resistance	Conform
- Mechanical properties (pipes)	
• Tensile strength	300 MPa (average value)
• Ring crush strength	450 MPa (average value)
• Brinell hardness	220 HB (average value)
Tightness	Conform
- Water tightness *	
Internal pressure	
DN ≤ 200	≥ 5 bar
DN > 200	≥ 3 bar
* excluded flexible couplings, joints connecting to sanitary ware ...)	
Durability	Conform
- External coatings	
• Pipes	Acrylic/Conform
• Fittings	Epoxy/Conform
- Internal coatings	
• Pipes **	Epoxy/Conform
• Fittings **	Epoxy/Conform
** including resistance to salt spray	≥ 1500 h

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)	A2-s1, d0	●
Internal pressure strength	●	●
Dimension tolerances	●	●
Mechanical resistance	●	●
Tightness	●	●
Durability (internal coating)	●	●
Durability (external coating)	●	●

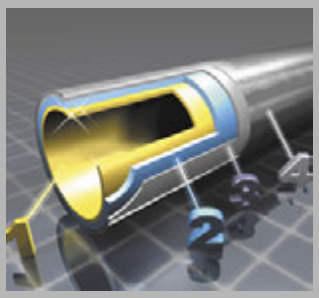
● Third party certification not made compulsory by EN 877
● Third party certified

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 (i.e. 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

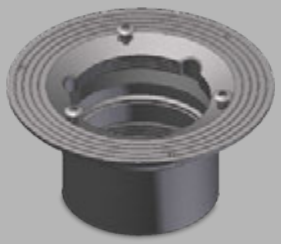
Chemical resistance of the ochre pipe coating

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 9
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
Computer Aided Design 113

BIM Library
BIM Library 113

Ensign Above Ground Specification
Ensign Above Ground Specification 114

Ensign Below Ground Specification
Ensign Below Ground Specification 115

Ensign EEZI-FIT Specification
Ensign EEZI-FIT Specification 116

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.

FastrackCAD Database AutoCAD users
Identify the drawing file that you require from the product listing or product catalogue. To insert the CAD drawing in AutoCAD, use the drag and drop facility as follows.

Place the cursor over the drawing preview, then hold down the control key and the left mouse button. You can now drag the CAD drawing into your working drawing before releasing the control key and the left mouse button. Alternatively use the Insert into AutoCAD button. AutoCAD LT users must use the drag and drop facility to insert the CAD drawings.

The previewer has a useful file search facility. Simply type the file name you are searching for in the field next to Find then hit the Find button, the file will be displayed in the window below. To return to product headings hit the close Find button. If you wish to close the viewer
rather than minimise it, click on Close at the bottom of the viewer.

Ensign (FastrackCAD) Database supplied by:
Saint-Gobain PAM UK, Lows Lane, Stanton-by-Dale, Ilkeston, Derbyshire, DE7 4QU. Tel: 0115 930 5000. Fax: 0115 932 9513.

FastrackCAD Database prepared by:
Koru Media Ltd, Unit 1 Sugarbrook Court, Aston Road, Bromsgrove, B60 3EX.

FastTrackCAD Database User helpline:
Tel: 020 8668 4646 Email: fastrackcad-help@techgraf.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 UK has launched the first phase of its fully integrated parametric BIM library which includes:

- Ensign soil and drain products – most popular components
- Ensign EEZI-FIT
- VortX floor drain range

The Saint-Gobain PAM BIM library has been produced on the guidelines and frameworks defined by the UK standards documents, including BS 1192:2007, PAS1192-2, and BS8541-1 & BS8541-2:2011

The BIM Library of components has been designed up to LOD Specification level 350. Compatibility:

- From 2012 Autodesk REVIT (.rvt)

Access to the BIM library will be available through the Saint-Gobain website **www.saint-gobain-pam.co.uk** or contact the PAM BIM technical consultant on 01952 262561.

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 (27 clauses) 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 A2, s1,d0**

Brackets

e) 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.

f) 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

g) 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.

Push-fit Couplings

h) Pipes and fittings 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

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 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.

Cutting Pipes

m) 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 (i.e. Coca-Cola; acid rain; acids or strong alkaline 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

n) 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.

o) 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.

p) 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 (i.e. Coca-Cola; acid rain; acids or strong alkaline 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 (27 clauses) 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 A2, s1, d0**

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) Where possible all 88 degree branches shall be 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.

Electrical Continuity

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

Cutting Pipes

m) 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 (i.e. Coca-Cola; acid rain; acids or strong alkaline 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

n) 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.

o) 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.

p) 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.

Please visit our website:
www.saint-gobain-pam.co.uk
to download electronic versions or to request hard copies of any of our brochures.

Technical Enquiries
Tel: +44 (0)1952 262529
Fax: +44 (0)1952 262592
Email: technical.soildrain.uk.pam@saint-gobain.com

Sales Enquiries
Tel: +44 (0)115 930 0681
Fax: +44 (0)115 930 0648
Email: sales.uk.pam@saint-gobain.com

Head Office
Lows Lane
Stanton-by-Dale
Ilkeston
Derbyshire
DE7 4QU
Tel: +44 (0)115 930 5000
Fax: +44 (0)115 932 9513

Quality Assurance
Quality Management Systems
BS EN ISO 9001:2008
(Registered firm: 12908)

Environmental Standard
Environmental Management Systems
BS EN ISO 14001:2004

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

Other products and services available from Saint-Gobain PAM UK:

Access Covers and Gratings

UK-manufacturered high performing and innovative ductile iron access covers and grating solutions.

Classical Rainwater

Traditional range of cast iron rainwater and gutter systems to BS 460.

VortX Floor Drainage

A new generation of roof and floor drainage products designed in accordance with BS EN 1253.

Water and Sewer

Ductile iron pipes & fittings for potable water and sewerage applications.

Blutop

Innovative ductile iron pipeline system dedicated to small diameter potable water distribution.

Valves & Hydrants

Valves, hydrants couplings and adaptors for potable water and sewerage applications.

Local Distributor