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# Introduction to the company



Saint-Gobain Pipelines 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. Its markets include water and sewerage, telecommunications, highways, civil engineering construction and housing. Saint-Gobain Pipelines specialises in the manufacture of cast iron above and below ground drainage systems and rainwater and gutter 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 system offers 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 Pipelines 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 Pipelines to maintain its position as the premier manufacturer of cast iron pipes and fittings.

## Product ranges

Other soil and drain products manufactured by Saint-Gobain Pipelines:

### EPAMS

A complete syphonic rainwater system, consisting of steel syphonic roof outlets and cast iron pipework to BS EN 877 BBA certified. 06/4328

### Timesaver

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.

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, is the only cast iron system to be awarded British Board of Agrément (BBA Cert No. 97/3434) for its standard ranges. Range offers eight gutter profiles and circular and rectangular downpipe systems, supplied in a black water-based primer coat.

### Classical Plus

Classical cast iron rainwater systems supplied in a tough polymer powder coated finish for immediate installation. Supplied black as standard, a further six colours have been introduced in 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 Pipelines 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.

### Website: [www.saint-gobain-pipelines.co.uk](http://www.saint-gobain-pipelines.co.uk)

The Soil and Drain and Rainwater sections contains all the product literature for the soil and drain brands Ensign, Timesaver, EPAMS and Classical including downloadable Ensign CAD drawings.

# Quality commitment



## Environment Standard BS EN ISO 14001:2004

Saint-Gobain Pipelines 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 Pipelines operates Integrated Pollution and Preventative Control (IPPC) regulations and have implemented comprehensive environmental management systems throughout the manufacturing sites.

## Quality assurance

### BS EN ISO 9001:2000 – Registered No: FM12908

The Ensign System is manufactured under the BS EN ISO 9001: 2000 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 has 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. Test report P-BA 99/2006e.



## Summary of applicable standards

### STANDARDS

#### European Standard BS EN 877:1999

This new 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



## 1 – Fire safety (The Burning Question)

The Ensign cast iron drainage system answered the burning question through tests carried out by the MPA North-Rhine Westphalia laboratory in Germany. The tests were set up over three floors with the objective to examine the reaction to fire on a number of materials and to measure their ability to contain the fire within the compartment, preventing the spread of fire to another floor.

The test results highlighted the limitations of the standard fire collars used on the plastic-based systems tested – in the floor below ALL collars remained inactive. In the case of HDPE, dripping molten droplets passed through the fire collar to the floor below which generated a further fire outbreak.

In the fire compartment – all plastic type systems tested generated dense, dangerous smoke (the biggest killer in any fire).

Ensign cast iron is non-combustible, does not require any fire protection (approved document B), will not propagate fire and will not emit toxic gases like PVC-based systems, or sooty smog like HDPE.

## 2 – Acoustic performance (Hearing is Believing)

The Ensign system has been tested to the new standard BS EN 14366:2004 (laboratory measurement of noise from waste water installations).

Its surface mass and density results in unquestionable superior performance over UPVC and stainless steel.

Ensign also significantly outperforms the latest acoustic-lined plastic systems and HDPE acoustic systems by up to 10dB(A) for structure-borne noise and 4-5dB(A) for airborne-noise. (See page 59).

Therefore, ALL alternative systems to Ensign will require significant levels of acoustic insulation to match its performance. An allowance of £10 per metre is not untypical for acoustic pipework insulation, which can develop into a substantial cost on multi-storey flats and apartments, a factor often not considered during the selection process in deciding which material best suits the application.





# Why specify cast iron



## 3 – No expansion joints

The co-efficients of linear expansion for cast iron and concrete are almost identical. This makes cast iron a highly suitable material where drainage systems are required to pierce concrete floor slabs.

No special jointing to allow for differential expansion is needed. In contrast HDPE and UPVC piping requires an expansion joint every 3 metres, as well as expensive thermal limiters.



## Strength

Cast iron is renowned for its strength and robustness in resisting impact damage and mishandling on site. It is the perfect solution for car parks, shopping centres, schools or generally any exposed areas that are liable to damage.

## Less maintenance

The strength of modern cast iron and improved coatings means that cast iron drainage needs minimal maintenance during the lifetime of the building in normal conditions. This makes cast iron the first choice for concealed, built-in or otherwise inaccessible systems where access for repair or maintenance would cause a high degree of inconvenience to the occupants. This benefit of minimal maintenance and long life service makes cast iron the first choice material for PFI projects.



## 4 – Resistance to damage

The strength of cast iron means that accessible parts of the drainage system, ie. basement car parks are more resistant to damage than other drainage materials – whether from vandalism or accidental impact.



## 5 – 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.



## 6 – 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.



## 7 – Less fixings

Besides the fixings required by fittings, modern cast iron drainage systems usually need only one load bearing support only every 3 metres in vertical stacks – UPVC and HDPE usually requires supporting brackets at every metre, and stainless steel every 2 metres. (See BS EN 12056-2 Guidelines Table NF.1). Therefore cast iron can save considerable time, labour and components in construction and steel every 2 metres.



## 8 – 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.

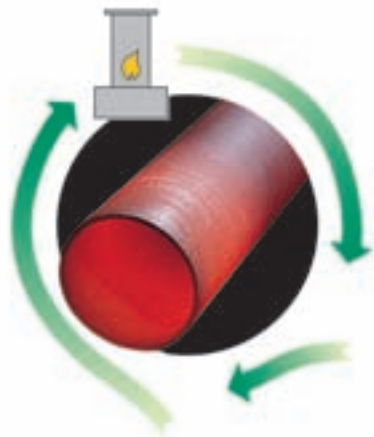
But if the main stacks are to be specified to last the lifetime of a building, perhaps 50-70 years or more, the appropriate material is mechanical jointed cast iron, for it is one of few materials you can reasonably fit and forget, as recognised by specifiers on many of the new PFI-type projects.

## 9 – Resistance to extreme temperatures

Faulty or incorrect bracketing could lead to UPVC and HDPE demonstrating excessive distortion when subjected to extreme temperatures. Consequently hot environments, or handling hot wastes can cause damage to the UPVC drainage system. Cast iron's low co-efficient of expansion means it does not have this disadvantage.



# Why specify cast iron



## Sustainable environment

The environmental concerns of building materials is becoming a major issue for all involved in the construction industry. But, those specifying, installing and supplying cast iron pipes, fittings and accessories, are working with a material that is not only recyclable, but made from almost 100% recycled scrap metals and therefore should not be disposed of in landfill. The extended life span of the system – proven to be over 50 years in many buildings, and extremely longer than other materials – reduces the use of natural resources and protects the environment.

## 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, and 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, to name a few.

## Risk assessment – damage to buried pipe

To decide which of the three main types of material for below building use, cast iron, vitrified clay and plastic is appropriate, 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*



# Why specify Ensign

Internal/external  
rainwater system

Soil and waste  
system

Suspended  
drainage system

Red coated

Buried drainage  
system

Bridge drainage

Grey coated



## 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 (ie. long straight runs). (See page 53).

## 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, twin-wall PVC, HDPE, stainless steel require substantial insulation to match the performance of Ensign. (Full test report available). (See pages 59-60).

## 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 to unobstruct 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 new 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 82-84). 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).

## 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 retro-fit.

## 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).

