



Section 7

Technical Specifications

Ensign cast iron drainage – 1st choice for stadia

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

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



Olympic Stadium



Ensign on the Olympic Stadium



Emirates Stadium

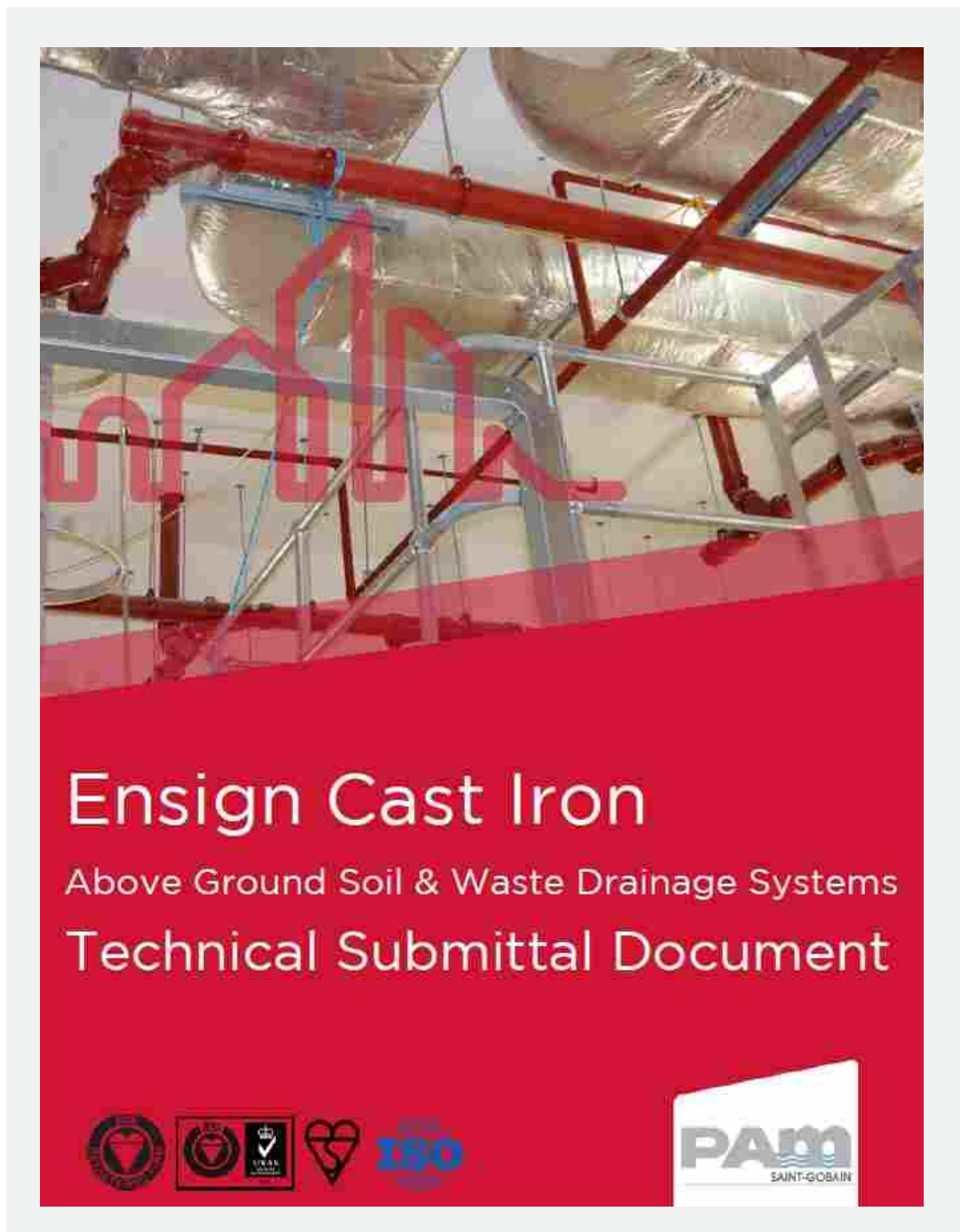
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Section 8

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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
70	1 in 70	3.1	1 in 35	4.6
100	1 in 100	5.9	1 in 50	8.3
125	1 in 125	15	1 in 62.5	13
150	1 in 150	19	1 in 75	20
200	1 in 200	26	1 in 100	37
250	1 in 250	43	1 in 125	60
300	1 in 300	63	1 in 150	89
400	1 in 400	118	1 in 200	167
500	1 in 500	191	1 in 250	270
600	1 in 600	284	1 in 300	401
Ensign Drain Products				
100	1 in 100	5.9	1 in 50	8.3
150	1 in 150	19	1 in 75	20
200	1 in 200	26	1 in 100	37
250	1 in 250	43	1 in 125	60
300	1 in 300	63	1 in 150	89
400	1 in 400	118	1 in 200	167
500	1 in 500	191	1 in 250	270
600	1 in 600	284	1 in 300	401

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/mm².

Weights/masses

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

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

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

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

Euroclasses		
A1	-	-
A2	s1	d0
A2	s1	d1
A2	s2 s3	
B	s1 s2 s3	d0 d1
C	s1 s2 s3	d0 d1
D	s1 s2 s3	d0 d1

Classes other than E-d2 and F

ENSIGN SOIL EEZI-FIT

A1

Ensign Drain

A2, s1, d0

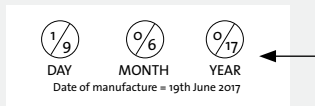
Sub-Class SMOKE production

- s1 : Low smoke production
- s2 : Medium smoke production
- s3 : High smoke production

FLAMING DROPLETS sub-classification

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

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



Technical Specifications

Cast iron remains one of the best materials when it comes to fire safety.

The Euroclasses are based on test methods and establish a reaction to fire classification that are harmonised throughout Europe. This means that they can be used to compare materials and product performances.

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

Safety

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

Scope

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

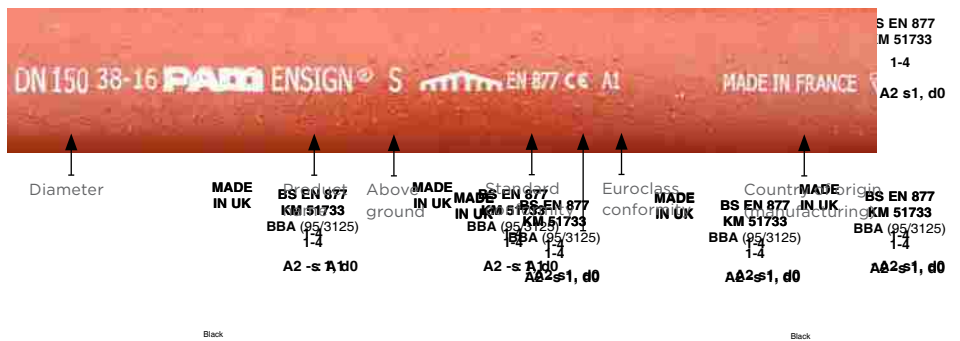
The classification obtained by Saint-Gobain PAM UK covers complete ranges – pipes, fittings, couplings and accessories, components of a waste water pipe system.

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

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

Product Identification

Ensign above ground



Fittings

The identification marking for Ensign fittings is a label.

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



CE Mark DoP



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

CE Marking: why is it required?

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

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

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

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

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

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

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

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

Applicable SG PAM products:

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

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



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

● Third party certification not made compulsory by EN 877

● Third party certified

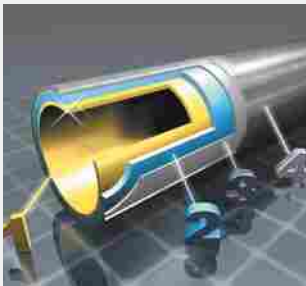
Kitemark Certification

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



Above ground pipe

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



Below ground pipe

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



Coating Specification

Above ground soil, vent and rainwater pipework

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

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

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

Couplings/brackets

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

Below ground drain pipework

Externally - initial flame applied anti-corrosive zinc coating at 130gr/m², then painted using a grey acrylic primer with an average dry thickness of 40 microns.

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

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

Ensign touch-up paint

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

Extrem 1K Touch-up Paint

SAP Code: 226962

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

Products	Min ID	Min OD	Max OD	Section
VortX				
56				
60	47.5	58	60	3 (+3.25/-0.5)
80	68.25	77	80	3.5 (+2.375/-0.5)
110	97.5	109	112	3.5 (+3.75/-0.5)



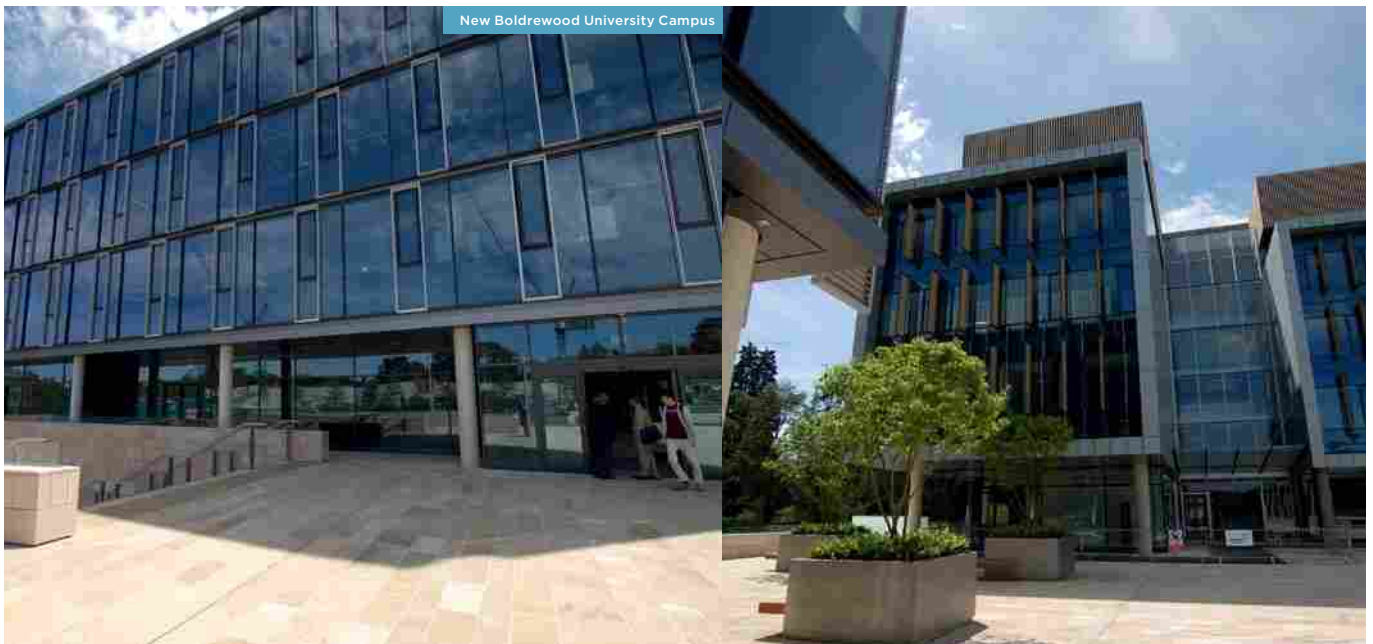
Section 8

CAD & BIM

Ensign cast iron drainage the learned choice for education

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

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



New Boldrewood University Campus



Section 9

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Ensign EEZI-FIT Specification 108



**SAINT-GOBAIN PAM UK
RELEASES ITS v2.3
ENSIGN SOIL & EEZI-FIT BIM LIBRARY**

PLEASE GO TO www.saint-gobain-pam.co.uk
TO UPDATE THE LIBRARY TO THE LATEST V2.3 UPDATE.




**ENSIGN SOIL & EEZI-FIT
Cast Iron Pipe Template**

Before the use of BIM object, please read the User license agreement.
Made by SO PAM UK. Version 2.3 EN

Version 2.3 Update:

- EF095 & EZ095 New Multi-Waste Manifold Families have been added
- EF133 New Strap-on-Boss families have been added
- Coupling Rotation for all individual couplings have been added
- Minor fixes to some of the families to ensure they work properly.
- All families now have 'Shared' parameters for ease of Scheduling fittings.
- All symbols added and visible in course/medium view
- All files have been Purged and decreased file sizes.

Any questions or further support please contact,
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@: matthew.hassall@saint-gobain.com





Computer Aided Design

FastrackCAD Architect

www.fastrackcad.com

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

FastTrackCAD Database User helpline:

Tel: 020 8668 4646 Email: info@korumedia.co.uk

For Web users

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

BIM Library

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

Riba Stages 1 and 2

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

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

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

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

Riba Stages 4

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

- From 2016 Autodesk Revit (.rvt)

Automatic "Plug-In"

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

Ensign Above Ground Specification

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

1.2 Cast iron pipes and fittings

- a) The systems shall be designed and installed in accordance with BS EN 12056 code of practice for gravity drainage systems inside buildings and the relevant sections of the Building Regulations.
- b) Soil, vent and rainwater pipework of nominal diameters, 50mm to 600mm shall be installed using lightweight cast iron socketless pipe and fittings which fully comply with all requirements of product standard BS EN 877:1999 with Kitemark third party approval.
- c) Soil, vent and rainwater pipework shall have been tested to BS EN 14366:2004 (laboratory measurement of noise of waste water installations) by a recognised certified laboratory. The results to be made available for review if required.
- d) Soil, vent and rainwater pipework shall have a fire rating **A1.****
- e) Pipes and fittings manufactured to BS EN877 shall be CE marked in compliance with the European Directive for Construction products.

Brackets

- f) Pipework shall be supported true to line by methods strictly in accordance with the manufacturer's recommendations. Proprietary adjustable ductile iron hanging brackets such as EFO48 or EFO49 or EFO48AD shall be used or brackets as recommended by the manufacturer's standard guidelines.
- g) Soil, vent and rainwater pipework shall be supported by acoustic brackets that ensure the pipework will not exceed 47dB (A) airborne noise and 11dB (A) structure-borne noise at 4 l/s (litres per second), without insulation as recommended by the manufacturer's standard guidelines.

Jointing

Standard Couplings

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

High Pressure Couplings with Integral Grip

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

Fittings

- j) Where required to connect to low level soil pipework passing through the floor slab, use long tail radius curve branches at 88 degrees (conforming to BS EN 12056-2:2000) to connect to 100mm soil and waste pipes where applicable, thereby avoiding a joint in the floor slab.
- k) Where possible all 88 degree branches shall be 'swept' radius curve entry (conforming to BS EN 12056-2:2000).
- l) Small diameter waste pipes in plastic or copper to be connected to the main soil pipework using either mechanical compression-fit or BSP threaded boss pipes, or push-fit manifolds with grommets or blank ends.
- m) Low level waste pipes shall connect to the main stack by means of a multi-waste manifold connector. The manifold will have 2" (50mm) inlets, will ensure no cross flow can occur and have a spigot that will penetrate the floor slab without the need for a joint in the slab.

Cutting Pipes

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

Coating

- o) Pipes shall be externally coated with an acrylic, anti-corrosion primer coating, red-brown in colour, average dry thickness of 40 microns. Internally coated with a two-part epoxy coating, ochre colour, with an average thickness of 130 microns.
- p) Fittings shall be protected internally with a red powder epoxy resin electrostatically applied to an average thickness of 150 microns. Externally coated to an average thickness of 70 microns.
- q) Couplings/brackets shall be protected with a red powder epoxy resin applied to an average thickness of 70 microns.

References:

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



Ensign Below Ground Specification

1.1 Below ground buried foul and stormwater pipework.

1.2 Cast iron pipes and fittings

- a) The systems shall be designed and installed in accordance with BS EN 12056 code of practice for gravity drainage systems inside buildings, BS EN 752-1 for drain and sewer systems outside buildings and the relevant sections of the Building Regulations.
- b) Foul and stormwater pipework of nominal diameters, 100, 150 to 600mm shall be installed using lightweight cast iron socketless pipe and fittings which fully comply with all relevant requirements of product standard BS EN 877:1999 with Kitemark third party approval.

Brackets

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

Joining

Standard Couplings

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

High Pressure Couplings with Integral Grip

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

Fittings

- g) Connection to small diameter waste and ventilating pipework or other materials shall be made using blank ends using push-fit connection or proprietary fittings.
- h) Junctions between pipes should use the proprietary cast iron chamber, or standard branch type fittings as recommended by the manufacturer

Cutting Pipes

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

Coating

- j) Pipes shall be externally coated with an initial flame applied anti-corrosive zinc coating at 130gr/m² then painted using a grey acrylic primer with an average thickness of 40 microns. Internally coated with a two-part epoxy coating, ochre in colour, with an average thickness of 250 microns.
- k) Fittings/couplings/brackets shall be protected internally and externally with a single coat of grey powder epoxy resin electrostatically applied to an average thickness of 150 microns.



Ensign EEZI-FIT Specification

1.1 Above ground soil and vent pipework.

1.2 Cast iron pipes and fittings

- a) The systems shall be designed and installed in accordance with BS EN 12056 code of practice for gravity drainage systems inside buildings and the relevant sections of the Building Regulations.
- b) Soil and vent pipework of nominal diameters, 100mm to 150mm shall be installed using lightweight cast iron socketless pipe and fittings which fully comply with all requirements of product standard BS EN 877:1999 with Kitemark third party approval.
- c) Soil and vent pipework shall have been tested to BS EN 14366:2004 (Laboratory measurement of noise of waste water installations) by a recognised certified laboratory.
- d) Soil and vent pipework shall have a fire rating **A1.****

Brackets

- e) Soil and vent pipework shall be supported by acoustic brackets that ensure the pipework will not exceed 47dB (A) airborne noise and 11dB (A) structure-borne noise at 4 l/s (litres per second), without insulation as recommended by the manufacturer's standard guidelines.
- f) Pipework shall be supported true to line by methods strictly in accordance with the manufacturer's recommendations. Proprietary adjustable ductile iron hanging brackets such as EFO48 or EFO49 or EFO48AD shall be used or brackets as recommended by the manufacturer's standard guidelines.

Jointing

Push-fit Couplings

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

Mechanical Couplings

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

Fittings

- i) EEZI-FIT soil pipework shall be installed using fittings that incorporate the jointing socket with integral EPDM push-fit gasket using suitable lubricant as recommended by the manufacturer.
- j) All 88 degree branches shall be swept radius curve entry.
- k) Small diameter waste pipes in plastic or copper to be connected to the main soil pipework using fittings which have integral bosses that can be cut out to suit the installation (with 51mm hole saw), push-fit boss pipes, or push-fit manifolds with grommets or blank ends.
- l) Low level waste pipes shall connect to the main stack by means of a multi-waste manifold connector. The manifold will have 2" (50mm) inlets, will ensure no cross flow can occur and have a spigot that will penetrate the floor slab without the need for a joint in the slab.

Electrical Continuity

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

Cutting Pipes

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

Coating

- o) Pipes shall be externally coated with an acrylic, anti-corrosion primer coating, red-brown in colour, average dry thickness of 40 microns. Internally coated with a two-part epoxy coating, ochre colour, with an average thickness of 130 microns.
- p) Fittings shall be protected internally with a red powder epoxy resin electrostatically applied to an average thickness of 150 microns. Externally coated to an average thickness of 70 microns.
- q) Couplings/brackets shall be protected with a red powder epoxy resin applied to an average thickness of 70 microns.

References:

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

