

Section 7

Technical Specifications

Ensign cast iron drainage – 1st choice for stadia

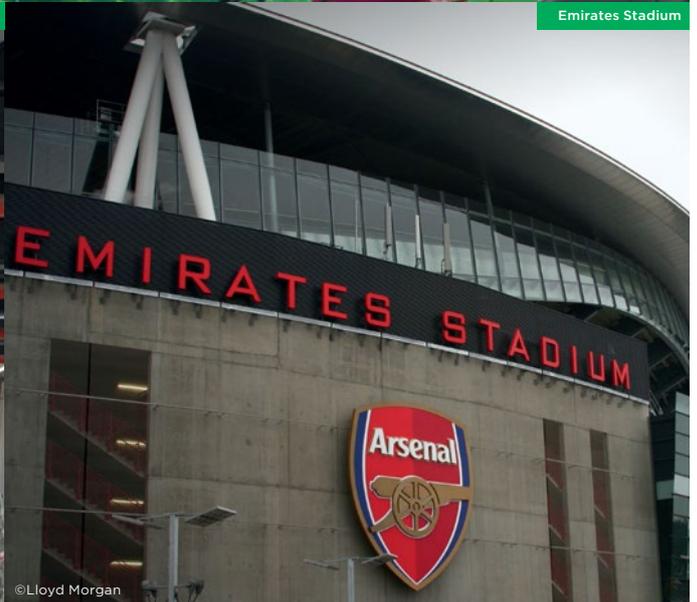
Ensign has the strength, and rigidity required for the tough stadium environment.

- 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
Contents

Technical Specifications	97
Technical Specifications	
Product Identification	98
Product Identification	
CE Mark	99
CE Mark	
Coating Specification	100
Coating Specification	
Chemical Resistance	101
Chemical Resistance	
Pipe Dimensions	102
Chemical Resistance	



Ensign Cast Iron
Above Ground Soil & Waste Drainage Systems
Technical Submittal Document




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

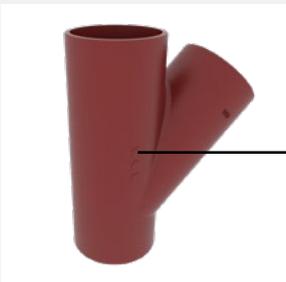
Sub-Class SMOKE production

- 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.

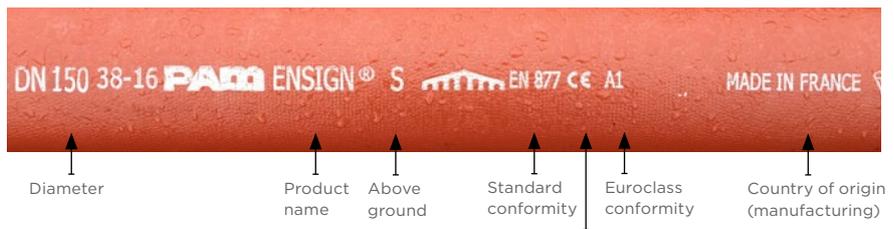
The classification obtained by Saint-Gobain PAM UK covers complete ranges – pipes, fittings, couplings and accessories, components of a waste water pipe system.

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

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).



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



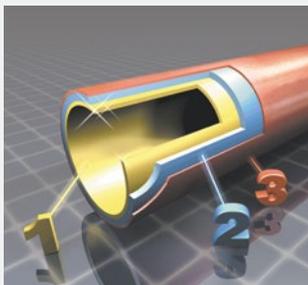
Scope	EN 877 harmonised	
	CE marking	Kitemark
Tests	CE marking	🛡️ Kitemark
Reaction to fire (Range)	A1	●
Internal pressure strength	●	●
Dimension tolerances	●	●
Mechanical resistance	●	●
Tightness	●	●
Durability (internal coating)	●	●
Durability (external coating)	●	●

● Third party certification not made compulsory by EN 877

● Third party certified

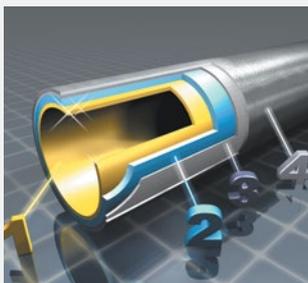
Kitemark Certification

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	Demineralsed 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)