2017 EDITION 2

PAM Cast Iron Drainage Solutions

ADDING VALUE TO COMMERCIAL AND RESIDENTIAL DEVELOPMENTS

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

LEADING DRAINAGE PRODUCTS

We lead markets in the supply of:

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

Across each of these categories we can provide:

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

INNOVATION

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

QUALITY ASSURANCE

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

SUSTAINABILTY

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

COMPLETE SERVICE GLOBAL EXPERTISE

Complete service integration.

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

TECHNICAL SUPPORT

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

Proud of our UK Manufacturing Heritage

Saint-Gobain PAM UK at its foundry in Telford, Shropshire, the birthplace of cast iron production in the UK, remains at the forefront of design and manufacturing of high-performing cast iron above and below ground drainage systems for commercial, public and residential buildings. PAM France manufactures the 3m pipes and the Telford site manufactures the fittings and ductile iron couplings and brackets to complete the ranges.

SYSTEM, PRODUCT AND SUSTAINABILITY ACCREDITATION

BS EN ISO 9001	Quality Management Systems Kitemark Licence: FM12908
BS EN ISO 14001	Environmental Management Systems Kitemark Licence: EMS83973
OHAS 18001	Health & Safety Management Systems Kitemark Licence: OHS 570684
CEMARS	Certified Emissions Measurement And Reduction Scheme Certificate Number: 2016053J
	CEMARS certification demonstrates the Company's commitment to measuring, managing and reducing greenhouse gas emissions in a robust and credible way.
BES6001	Responsible Sourcing of Construction Materials Kitemark Licence: BES600635

Product Certification

BS EN877: 1999 +A1:2006	***Ensign/EEZI-FIT*** Cast iron pipes and fittings, their joints and accessories for the evacuation of water from buildings. Requirements, test methods and quality assurance. Kitemark Licence: KM51733
BS416 part 2: 1990	***Timesaver Soil*** Discharge and ventilating pipes and fittings, sand-cast or spun in cast iron. Specification for socketless systems Kitemark Licence: KM06979
BS437: 2008	***Timesaver Drain*** Specification for cast iron drain pipes, fittings and their joints for socketed and socketless systems Kitemark Licence: KM06980

FM12908 EMS83973

The PAM ranges of cast iron drainage are the first-choice solutions for large commercial, public and residential buildings and particularly mixed developments that require various performance requirements for different applications, i.e. car parking in basements, lower-level retail or offices before going to higher-level residential flats and apartments.

Adding value for building owner

Drainage applications: PAM cast iron offers the building owner and its occupants so much more than just drainage solutions:

1. Underbuilding Drainage

For large commercial projects, drainage under the footprint of the building is one of the critical areas where the installation needs to be fit and forget. When the foundations are complete and the concrete floor slab is in place – and failures in the drainage at this point become difficult and extremely costly to rectify – the pipe system installed needs to be a cast iron certainty for the life of the building.

This is where the robustness and crushing strength of cast iron demonstrates its superiority over other materials such as clay and plastic-based materials.

PAM offers the market two solutions:

- Timesaver Drain BS437 – British Standard (Kitemark approved)
- Ensign Drain BS EN877 – European standard (Kitemark approved)

Timesaver, the original cast iron below ground drainage system, offers the specifier exceptional crush resistance performance due to its thick section ranging from 7mm for 100mm diameter pipe to 10mm (225mm dia), see page 15 for a further range summary. The Ensign Drain System was introduced in the mid-90s based on the 'rodding point' concept more in keeping with European drainage thinking and, more notably, the understanding that below ground cast iron drainage with section thicknesses ranging from 3.0mm minimum (100mm) to 5mm (300mm) was more than sufficient to meet most requirements.

Crush Resistance	
Cast iron Timesaver BS437	150 KN/m
Cast iron Ensign BS EN877	70 KN/m
Clay	40 KN/m
PVC	6 KN/m

By still offering two systems, PAM is allowing the market to choose which system best suits the drainage application. Timesaver can be laid in 'as dug' trenches, saving on backfill, or where the drainage has to be laid in shallow trenches or under roads, or the concrete slab is very thick and heavy – requiring extra crushing strength to give peace of mind.

The Ensign below ground system is a simplified range of bends and branches and gullies for rodding access with a small number of inspection chambers. If the system requires such fittings as gully traps and other traditional British standard designs – the two ranges can easily be connected using stepped couplings.

Encasing pipework in the concrete slab

- Cast iron has the proven strength and crush resistance to withstand the weight of the concrete and remain robust during the pouring process unlike the more volatile lighter-weight plastic materials which can require filling to weigh them down.
- Cast iron is not affected by the high temperatures generated during the pouring and curing process – which can reach temperatures in excess of 70 degrees, depending on the volume of concrete.
- Cost of failure can be very high if concrete slabs require digging up to repair drainage failures.

2. Pipework in Basements

Foul water and rainwater pipework installed in the basement area of a large commercial, mixed development building once again requires a material that is extremely strong and robust for a number of reasons:

The pipework is often exposed:

- Therefore will be vulnerable to accidental damage or even acts of vandalism – cast iron has the strength and robustness to withstand such an environment, particularly important in car parking areas
- To temperature changes within the basement atmosphere e.g.
  > Seasonal temperatures
  > Car parks – at congested busy times engines ticking over can increase the temperature
- The pipework is often installed in horizontal suspended runs
  > Plastic-based systems, particularly HDPE, expand and contract due to temperature changes and as a result require thermal limiters or expansion joints every 5 metres.

  Failure to include these in the design and installation can cause the pipework to 'snake' and put stress on the system remaining watertight.

  > Cast iron has a very low thermal expansion co-efficient similar to the concrete structure – therefore the specifier and installer need only concern themselves with the number of brackets to support the pipework.

  > Cast iron remains a stable material over time and is not subject to 'aging', unlike plastic, ensuring a consistent service life longevity.

Flexible cost-effective systems

The Ensign mechanical jointed above ground system consists of simple double-spigoted component pipes and fittings connected by mechanical couplings that can be disassembled to accommodate changes of use or make it easy to work round clashing issues on site during installation. Ensign consists of the widest range of cast iron fittings on the market to accommodate the most complex of installations.

Pipe diameter range

The Ensign system consists of pipes and fittings from 50mm to 600mm in diameter. Whilst the use of 400 to 600mm pipes is unusual – it's not uncommon to use 250 to 300mm diameter pipework on rainwater systems and in basements. The flexibility of the mechanical jointing makes cast iron far more cost-effective than using plastic systems like HDPE with fusion-welded joints. If errors or changes are made, cast iron can be dismantled and adjusted easily – whereas HDPE would have to be scrapped and started again, which could prove very expensive.

Fire safety

- Fire safety is extremely important in all areas of high-rise buildings and areas more in contact with people and flammable entities like motor vehicles.
- In car park areas – how exposed pipework reacts to fire could be vital to the safety of people. Not only if the pipe material actually fuels the fire but more importantly the smoke it can generate during a fire.
- Smoke is regarded as the biggest killer in the first 30 minutes of any fire.
- The Ensign cast iron above ground system is Classified A1 by the Exova Fire Research Centre in Warrington – the highest possible rating for non-combustible products.
- Some plastic systems like HDPE don't stipulate a fire rating because they burn like a candle if exposed to flames, feeding the fire and emitting a sooty smog. See page 10 for the Burning Question.

3. Sanitary foul water pipework & waste and vent pipes

PAM offers a choice of sanitary systems: the Ensign mechanically jointed cast iron system utilising robust high-performance ductile iron couplings or the EEZI-FIT push-fit system that offers all the benefits of cast iron with the simplicity and installation speed of push-fit assembly.

In multi-storey mixed commercial and residential buildings, the vertical soil stacks or risers play a critical role in the building's operation and, depending on the material chosen, the level of safety factor and comfort for the building's occupants.

Cast iron provides value to the building owner

For the building owner, surely the issue of fire safety must rank the highest in importance in these types of buildings as many elements can compound and influence the level of difficulty for evacuation and therefore careful consideration should be given when deciding to select materials that potentially feed any fire over non-combustible materials on the grounds of saving short-term cost. Not only that, using materials such as cast iron provides the opportunity to significantly reduce cost longer term when typically buildings are refurbished after 30 years or so – by using a more robust product with a proven longevity of 60 years or more, this value opportunity should not be ignored.

Space-saving systems

The EEZI-FIT push-fit system provides space-saving opportunities in the void to maximise the room space of flats and apartments. Significant value can be gained by the building owner for every sqm maximised in Real Estate (£ per sqm in London's more exclusive areas is circa £11k – source Evening Standard).

In the event of a fire

Cast iron is classified A1, the highest level possible for non-combustible materials. A1 also means minimal smoke, the biggest killer in the first 30 minutes of any fire – a fact regularly reported by the National Fire Brigade. When evaluating which material to select – compare the fire ratings – often plastic materials like HDPE choose not to declare their fire rating because of what happens to them when exposed to flames. In Germany HDPE is categorised E due to its flammability, production of molten droplets and generatation of sooty smog.

FIRE RATED A1

Cast iron provides the highest level of acoustic comfort.

Living in high-value flats and apartments brings with it a high expectation of quality in terms of the fixtures and fittings and appliances, and also in terms of overall comfort; air quality, warmth, light and acoustics.

Cast iron acoustically is the quietest material on the market by a significant margin (up to 8db(a) quieter than the best acoustic plastic) and up to 20 db(a) quieter than standard HDPE – if you understand 4 db(a) difference = noise x 2, you can understand the difference is significant. To quote a boxing term, 'pound for pound' cast iron surely offers the best drainage solution.

Compliance to BS EN12056 part 2

Junctions between branch discharge pipes of about the same diameter should be swept in the direction of flow using swept entry branches. PAM cast iron drainage systems have the most extensive range of swept radius curve branches on the market, from 70mm to 200mm in diameter, to ensure full compliance with the design requirements of BS EN 12056 part 2.

Bends at the base of a discharge stack should be of large radius (minimum centre line radius 200mm); again PAM systems offer fittings to meet the design criteria.

4. Rainwater pipework

PAM cast iron systems are capable of withstanding much higher levels of accidental static pressure, up to 10 bar, depending on the couplings installed and fully restrained, offering the specifier greater flexibility in design for the rainwater stacks. The pipework can be taken all the way up to roof level if an overflow or a plant room is not possible or difficult to include in the design.

PAM Ensign includes a range of coupling options that offer solutions in areas where restraining the pipework is difficult, i.e. grip collars for overclamping standard couplings that give 5 bar unrestrained, to high-performance couplings that can easily give 10 bar.

Cast iron pipework is available in 50-600mm diameter for above ground applications that can allow the specifier to naturally attenuate high rainwater flow rate before discharging into the sewer network.

Cast iron has a product life span significantly greater than most materials for sanitary soil and rainwater applications. PAM has been conducting laboratory tests for some time and, supported by field research into actual installations over the decades, PAM has strong evidence that its cast iron systems should give the following life span:


Rainwater pipework on the Shard

- Up to 60 years for sanitary soil systems
- Up to 80 years for rainwater systems

(Subject to compliance with manufacturer's installation and performance guidelines and BS EN 12056-2)

PAM cast iron drainage solutions offer the building owner the best value for money drainage services.

Resistance to fire

Cast iron is one of the safest materials in the event of a fire. As shown by the 'Burning Question' video – cast iron will not propagate fire, will not emit dangerous smog or toxic fumes like plastic-based materials and is very likely to remain intact fixed to the structure. The severity of the fire will dictate whether the system could remain intact and still useable. **See the video here >**

- Safe material in the event of fire – Certified A1

  A report published to insurers entitled 'Modern Methods of Construction and Fire Protection Considerations' by the FPA (Fire Protection Association) outlines some design guidance

  Note some objectives 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 fire

The report goes on to advise some essential principles

Some essential principles	Cast Iron	HDPE/Plastic
• Use building materials which **will not** make significant contribution to a fire at any stage of its growth	✓	✗
• Design a building structure to have a resistance to collapse or excessive deflection in the event of fire	✓	✗
• Construct a building in such a way as to **minimise** the extent of fire and **smoke damage** in the event of fire	✓	✗

Acoustically the quietest material on the market

When you are promoting high-value, high-quality residential apartments, be confident the drainage is never heard – providing that high level of comfort to your occupants.

Cast iron is the best material by some significant margin and that's a cast iron certainty based on:
> Tests to BS EN 14366:2004
> Comparing published results by manufacturers
> Independent tests carried out by TVVL based in Holland.

TVVL conducted research into noise production and noise reduction in drainage piping, examining 3 x stack arrangements, focusing on the areas that generate noise the most
> Offsets
> Changes in direction.

PAM cast iron proved to be up to 8 db(A) quieter than Acoustic HDPE and up to 12 db(A) quieter than plastic measuring airborne noise at 3 l/s.

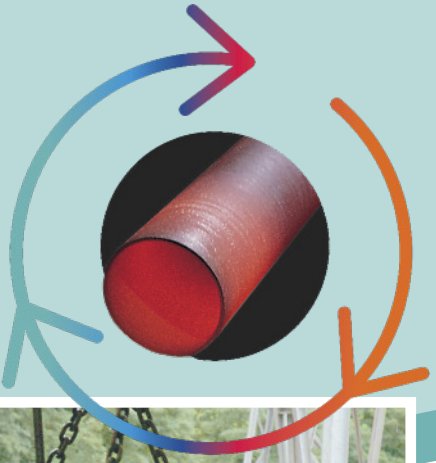
Sustainable

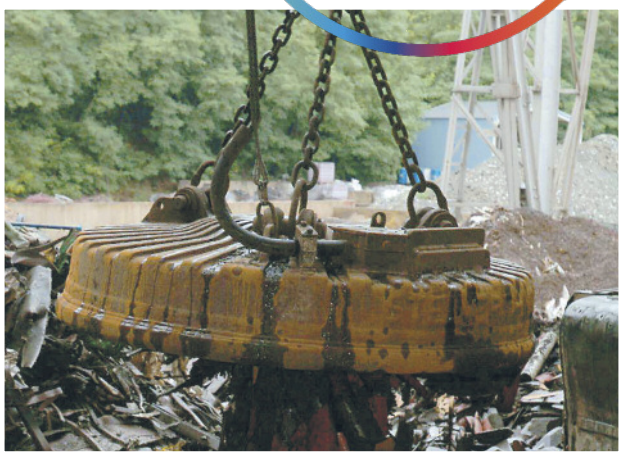
100% recyclable indefinitely without losing any of its properties

PAM 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.

- Made from up to 97% recycled content
- Virtually 100% recyclable at the end of its long life

PAM pipe systems can be recycled without deterioration of their properties, so they can be reused for exactly the same purpose, i.e. a pipe can be recycled as pipe – the perfect life cycle!





Longevity

Owing to the stability of the mechanical properties, it is currently considered that the service life of PAM cast iron pipes is twice that of alternative products made of plastic materials,

Typical life expectancy of building components:

Cast iron soil pipes = 55 years

Specifying cast iron for the sanitary and rainwater pipework gives the building owner and the facilities managers a choice in the future. In 30 years or so when the building is scheduled to be refurbished – does the sanitary pipework need replacing?

It is more likely the cast iron will be serviceable for another 30 years or only modifications are required. We can't predict what condition the plastic system will be in – but based on performance so far, it's more likely to require full replacement.

NHBC

The NHBC requires a life expectancy of 60 years for its structure elements. Does it not make sense to specify other elements to this same level?

In a high-rise residential, the main arteries of the building are the main soil sanitary stacks and rainwater stacks – these are likely to remain unchanged over the building life. PAM cast iron is best serves to give that longevity.

Tower Block International – Southampton

Above ground – sanitary soil and waste, and vent and rainwater pipework – on multi-storey buildings and in basements

Ensign Soil

- Diameter range 50mm to 600mm
- High-quality cast iron pipes manufactured using the De Lavaud process – heat treating the spun pipes and gradually cooling again – resulting in:
  > Pipes having greater resistance to impact and crushing
  > Easier to cut on site – subsequently easier to install
- High-performing mechanical couplings
  > Ductile iron couplings 50-300mm with built-in electrical continuity
    » 50-150mm capable of withstanding 5 bar (fully restrained)
    » 200-300mm capable of withstanding 3 bar (fully restrained)
  > In areas where additional pressures need to be accommodated or where restraining the pipework can be difficult:
    » Grip collars that overclamp the ductile iron coupling 100-200mm
  > Steel high-performance couplings 100 to 600mm that can deliver 10 bar
- Extensive range of rolling branches in compliance with BS EN 12056
- Extensive range of access fittings: bends and branches
- Economical connections to waste pipes
  > Compression fit boss pipes
  > Multi-waste manifolds 100 and 150mm
- Range of bracket solutions
  > Ductile iron brackets which allow adjustment 50-200mm
  > Ductile iron acoustic brackets
  > Rubber-lined mild steel brackets
  > Stack support pipe/brackets

- **Applications**
  Ensign has been installed in all types of buildings – but particularly:
  > Commercial mixed developments
  > High-rise buildings throughout – from basements to sanitary and rainwater drainage
  > Retail – shopping centres
  > Hospitals
  > Stadiums
  > Public buildings
  > Schools and universities

Above ground continued

EEZI-FIT

Push-fit sanitary pipe system

- 100mm and 150mm diameters
- Kitemark approved to BS EN 877 for sanitary applications
- Fully compatible with Ensign pipes and fittings
- Extensive range of connections to waste
  > Boss pipes with 3 positions
  > Manifold with extended spigot
  > Rolling branches with boss connections to potentially reduce fittings required
- One of the quickest solutions to install for on site assembly (BRE study)
  > Significantly quicker to install than HDPE
  > Study carried out on a 9 metre vertical stack – demonstrated EEZI-FIT was 50% quicker to install than HDPE using fusion-welded joints
- Acoustically THE QUIETEST system on the market:
  > Tested at the Fraunhoffer Acoustic Institute
  > Recorded levels of:
    » 4 Db(A) at 2 L/s – which is 8 db quieter than the best acoustic plastic systems boasting levels as DB12

- **Applications**
  EEZI-FIT is best suited for vertical sanitary soil risers in any building but its high level of acoustic performance and range of fittings make it an ideal choice for:
  > Residential flats and apartments
  > University student accommodation
  > Libraries
  > Law courts
  > Acoustic-sensitive buildings/areas

Above ground continued

NEW EEZI-FIT multi-waste manifolds

After collaboration with a consultant in London for a specific project where space was extremely tight and the waste connections very low to floor level, PAM has introduced two new manifolds to the EEZI-FIT range:

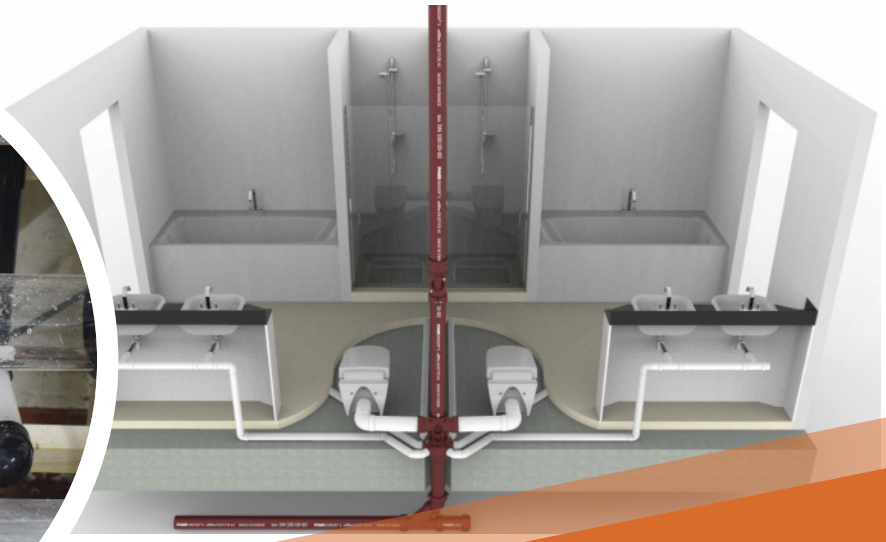
- 100mm and 150mm diameters
- Internally and externally red epoxy coated
- 6 waste inlets which can be 2" BSP or 50mm push fit
- The manifold has an internal baffle which allows all inlets to be used at any one time
  > Eliminating the cross flow in no-connect zone
- Extended spigots that can penetrate floor slabs of up to 400mm
  > Spigots have cut markers to assist installers
- The manifold utilises minimum space
  > When penetrating the floor slab with the drainage pipework the void should be kept to an absolute minimum – particularly in line with the Building Regulations Document B fire resistance
  > 100mm diameter can be installed in a 200mm core hole
  > 150mm diameter can be installed in a 225mm core hole
- BSP plugs capable of withstanding pressure test 0.5 bar
- Available for EEZI-FIT with push-fit gaskets
- Available with spigot connection to suit Ensign mechanically jointed system.

Flowrate Tested – CRM Rainwater Drainage Consultancy Ltd

CRM was commissioned by Saint-Gobain PAM UK to flow-rate test the two new manifolds to understand the performance of the units when discharge is taking place down the main stack with discharge from all waste connections at the same time.

The manifolds were subjected to maximum flow rates far in excess of standard requirements. Test set up: 100mm.

The test rig was set up with the manifold immediately below a 100/100 swept branch with a WC connection. The WC pan was simulated using bends, but a genuine 6l flush WC cistern was used. A flow of 1.8 l/s was introduced from a pipe above (simulating a toilet flush), and each of the 6 inlets could be fed with 1 l/s. The 150mm manifold was also tested. (Reports available.)



Above ground continued

Timesaver Soil

The first mechanically jointed system in cast iron servicing major projects from the mid 1970s to the early 2000s before being mostly replaced on new projects by Ensign. Now used predominantly for refurbishment of those older projects and for external soil stacks replacing the traditional socket and spigot systems BS 416 part 1.

- Diameter range 50mm to 150mm
- Push-fit 'heritage' sockets that provide traditional socket and spigot appearance
- Extensive range of access fittings
- Supplied in a black primer coating
- Pipes in 3m or 1.8m length suited for external soil stacks.

Below ground – buried foul water pipework

Ensign Drain

- Diameter range 100, 150, 200, 250, 300, 400, 500 and 600mm
- Thinner wall section – making lighter-weight cast iron solutions
- Pipes are externally coated with a layer of zinc protection and grey coating
- Fittings and couplings are grey epoxy coated
- High-performing mechanical joints
  > Ductile iron couplings 100-300mm
  > Stainless steel high-performance couplings 400-600mm
- **Applications**
  > Underbuilding buried drainage
  > Bridges
  > Ideal for rodding point drainage design
  > Unstable ground/brownfield sites.

Timesaver Drain

- Diameter range 100, 150 and 225mm
- Thicker wall section for unrivalled crushing strength of 150Kn
- Pipes are epoxy lined and externally black coated
- Ductile iron couplings
  > Stepped coupling to connect Ensign Drain to Timesaver Drain
- Can be installed in as dug trenches
- Extensive range of British Standard fittings
  > Inspection chambers
  > Gully traps
  > Bellmouth gullies
  > Raising pieces
  > Intercepting traps etc.
- **Applications**
  > Underbuilding buried drainage
  > Bridges
  > Shallow drainage under roads
  > Unstable ground/brownfield sites

VortX – roof, floor and shower drainage products

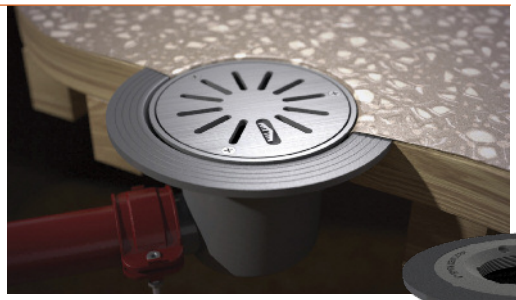
PAM has introduced a simple range of cast iron roof, floor and shower drains that predominantly connect to cast iron pipework, but will connect to most materials through a range of adaptors. Designed and manufactured in accordance with BS EN1253, the simplified range offers clear robust solutions for most applications – and large stocks carried of most items.

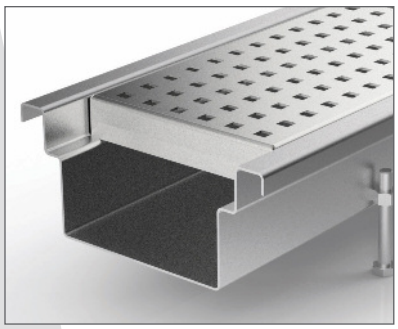
Roof drains

- Cast iron roof drains grey epoxy coated
- Vertical roof drains 100mm and 150mm diameter
  - > Cast iron domical grates polyester coated and flat grates sheradised
  - > High flow rates – tested at CRM Rainwater Ltd at 35mm head in accordance with BS EN1253
  - > 100mm – 10.7 l/s
  - > 150mm – 14.5 l/s
- Angled roof drains
- Balcony outlets
- Parapet/two-way outlets
- Spigot adaptors connecting to 4" BSP bodies to make 50 and 70mm spigots.

Floor and shower drains

- Cast iron grey epoxy-coated gullies trapped or untrapped
- Innovative S and P trap designs that only require a 180mm core hole
- New cast iron deep sump, bell trap, and brewery trap solutions with multi-facet options
- Gratings and rodding eyes in nickel bronze, stainless steel, and cast iron
- Anti-ligature gratings in stainless steel
- Full range of accessories
- Simplified range for ease of specifying
- Flow rate and load tested in accordance with BS EN 1253.

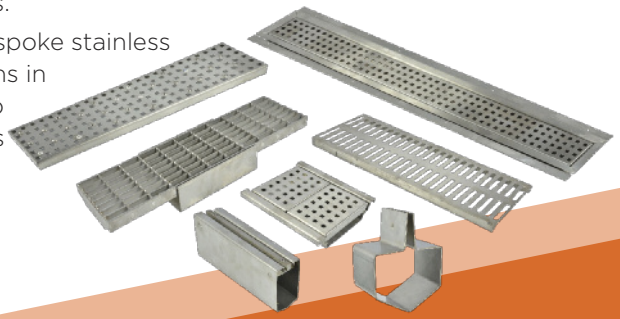




Stainless steel channel and gullies

The vast majority of stainless steel channels are made bespoke to particular project needs.

- PAM VortX offers bespoke stainless steel channel solutions in grade 304 and 316 to specific requirements
- Gullies and gratings
- Made to order basis.



PAM services

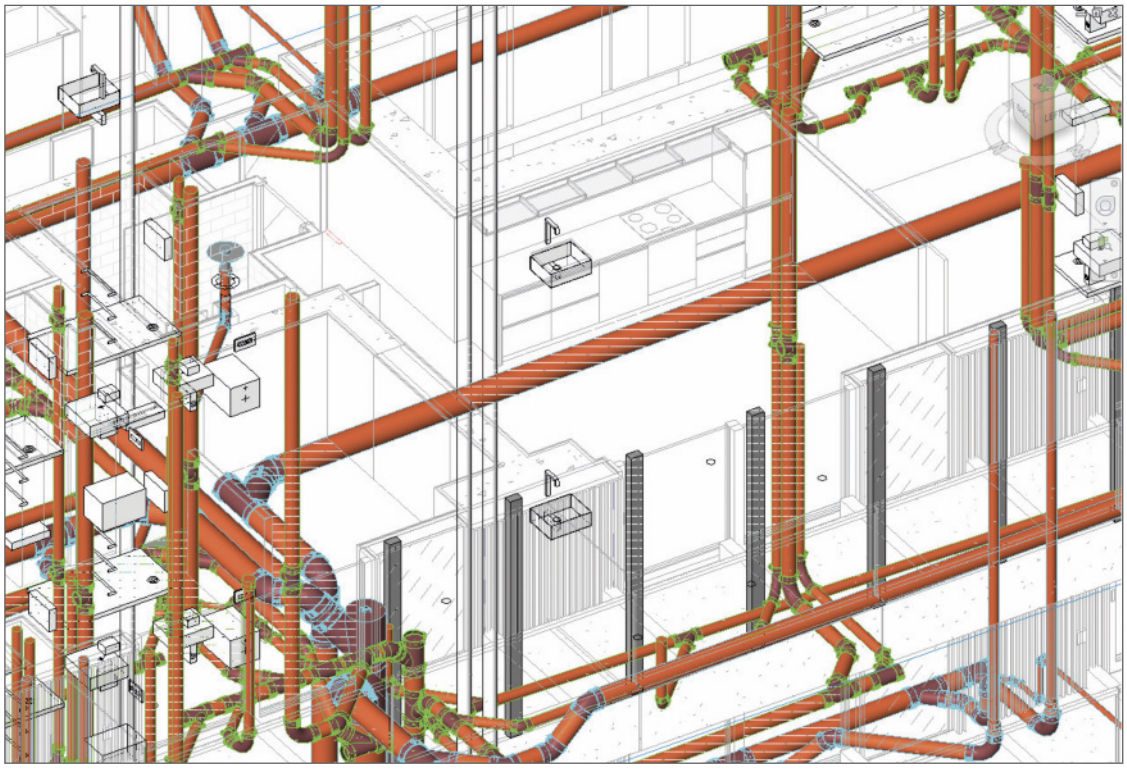
Access BIM files here >

BIM Autodesk Revit libraries:

The Saint-Gobain PAM BIM libraries have been produced on the guidelines and frameworks designed 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 350. Compatibilty:

- From 2014 Autodesk REVIT (.rvt)



REQUEST THE PAM ENSIGN/EEZI-FIT BIM REVIT LIBRARY:
www.saint-gobain-pam.co.uk

TECHNICAL SUPPORT

PAM has a number of regional sales managers who can provide on-the-spot technical support and advice on design and range recommendations

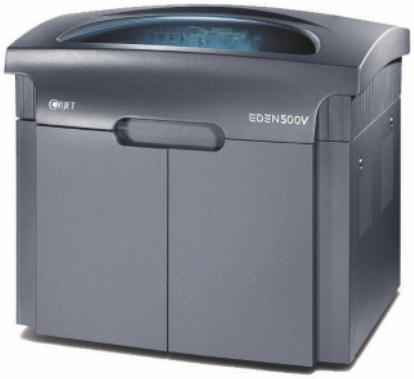
- Technical advisory team
- At Telford the technical team is on hand to provide:
  > Drawings take-off service – FOC
  > Technical advice, product support and installation advice

Technical Hotline: 01952 262529

Collaboration to Customer Special Requirements

Designing the drainage at times can throw up problems: for example, the ever-increasing issue of tight spaces for the voids or low level waste connections. It can mean the need for a special fitting that is not in the mainstream product range. In the past this has meant possibly paying a significant premium for this service.

To improve this service for PAM cast iron, Saint-Gobain PAM UK has invested in 3D printer technology, which enables rapid prototyping of bespoke fittings or new concepts here at its Telford Manufacturing site.



Case example

A Project Engineer required a special waste connection fitting to solve a particular problem of linking to a grey water system. After a meeting to collaborate the best solution, a sketch design was soon turned into a 3D BIM model and was 3D printed in resin before producing a sample casting from the Foundry for approval – all happening in the space of one week! It can be that quick!

Depending on the complex nature of the fitting and volume required, a product can be produced from the 3D printed model, which can save significantly on pattern equipment. For higher volume expectation PAM would look to industrialise with full pattern equipment.

The product developed for this project has now been added to the standard range.

3D Printer Stratasys Objet Eden 500

PAM is equipped with 3D printer technology that can provide that solution through collaboration, 3D modelling and sampling – from design to concept to casting approval within one week. For further Information contact the technical department.

Tel: 01952 262529 or email technical.soildrain.uk.pam@saint-gobain.com

Case Study: New multi-waste manifold

1. Consultant meeting – required a fitting not in the Ensign/EEZI-FIT range
   a. Discussion held about requirements – sketch drawn
   b. PAM undertakes a full drawing for client approval
2. After approval – PAM produces a rapid prototype 3D model
3. Follow-up meeting with consultant for feedback – collaboration
   a. Final model produced for approval
   b. Passed for pattern development

Project Gallery

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