

# HALIFAX

## SOIL & DRAIN



Hargreaves  
Foundry  
Drainage



*Cast iron mechanically jointed system*

Fully compliant with BS EN 877:1999 + A1:2006

# SUBMITTAL DOCUMENT



bsi.  
Cast Iron Pipes  
and Fittings  
KITEMARK™

KM 684754  
BS EN 877



**BBA** APPROVAL  
INSPECTION  
TESTING  
CERTIFICATION  
CERTIFICATE 06/4401

Hargreaves Foundry was established in 1881. We are specialist iron foundries and manufacture cast iron products for a range of industries. Hargreaves Foundry Group consists of two operating arms;

### Hargreaves Foundry

A traditional iron foundry manufacturing cast iron products

### Hargreaves Foundry Drainage

Hargreaves Foundry Drainage is one of the country's leading manufacturers and suppliers of cast iron drainage products for above and below ground. These range from traditional rainwater and soil products through to modern, socketless, above and below ground systems that meet international standards and carry third party certification. What sets us apart from other suppliers is our ability to make bespoke items in addition to our extensive standard ranges.

Our offer to you in this submittal is: -

- A complete system of drainage products that are fully compliant with BS EN 877:1999 + A1:2006 (Incorporating corrigendum 2008)
- Independent third party certification by the BBA and BSI to confirm compliance with BS EN 877
- Support and advice is available from our experienced technical support team

#### Sales

Tel: 01422 330607

Email: [info@hargreavesfoundry.co.uk](mailto:info@hargreavesfoundry.co.uk)

#### Technical

Tel: 01422 399113

Email: [Technical@hargreavesfoundry.co.uk](mailto:Technical@hargreavesfoundry.co.uk)

[www.soilandrain.co.uk](http://www.soilandrain.co.uk)

This submittal document provides the most up-to-date information with regard to our Halifax Soil and Drain products.

Hargreaves Foundry Drainage Ltd. have taken care in the preparation of this submittal document but makes no expressed or implied warranty of any kind. No liability is assumed for incidental or consequential damages in connection with or arising out of the use of the information contained herein.

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# 1. System Summary

## 1.1 System overview

Halifax Soil & Drain is a socketless, mechanically jointed cast iron drainage and wastewater system. It is designed to minimise installation difficulties and maintenance costs over its lifetime. This is a fit and forget system.

Cast iron drainage products are proven to be reliable, durable and strong. They are safe, non-combustible, quiet and with minimal maintenance will last the life of a building. Cast iron is sustainable and can be fully recycled without any loss of its original properties.

## 1.2 Certification

The Halifax system is covered by third party certification. This provides confirmation that the system is fully compliant with the BS EN877 standard.

Although third party certification is not required by law, on-going assessment and observations by an accredited certification organisation should give the customer confidence in our product.



Hargreaves Foundry Drainage are currently in a transitional phase with respect to our certification. As a result of this, the Halifax system is covered by both a BBA Agrément certificate (No. 06/4401) and a BSI Kitemark (No. 684754). What this means in reality is that our products have been assessed by two separate bodies, both of whom have declared the system to conform to all requirements of the standard.

Copies of the front pages of both certificates are available in Appendix 1 and full copies can be obtained by contacting [technical@hargreavesfoundry.co.uk](mailto:technical@hargreavesfoundry.co.uk).

In accordance with annex ZA of BS EN 877:1999+A1:2006, all Halifax products are CE marked and comply with the EU Construction Products Regulations (CPR 305-2011). All details relating to the CE marking can be found in the system Declarations of Performance which can be found at the end of this document.



A CE mark is a self-declaration of fitness for purpose and is a legal pre-requisite for placing certain products on the market.

## 1.3 Professional Bodies

Hargreaves Foundry Drainage are members of the SoPHE (Society of Public Health Engineers) Industrial Group, part of CIBSE, the Chartered Institute of Building Service Engineers. SoPHE membership helps us ensure the Halifax Soil and Drain products are directly meeting the industry requirements.

The Halifax system has also been accepted for use by the National House Building Council (NHBC) in accordance with our BBA Certificate No. 06/4401 in relation to NHBC standards, chapters 5.3: *Drainage below ground* and chapter 8.1: *Internal Services - D16 D17 Soil and waste systems*. We are also associate members of the Builders Merchant Federation (BMF).

## 1.4 Key standards, codes of practice & regulations

### BS EN 877:1999 + A1:2006

This harmonised European Standard applies to cast iron pipeline components used for the construction of discharge systems for buildings and for drains, normally as gravity systems.

This standard specifies the requirements for the materials, dimensions, appearance and performance characteristics for cast iron pipes, fittings and accessories. It also covers quality assurance requirements for all products in the system.

### BS EN 752:2008

Drain and sewer systems outside buildings

### BS EN 12056-2:2000

Gravity drainage systems inside buildings - sanitary pipework, layout and calculations

### BS EN 12056-3:2000

Gravity drainage systems inside buildings - roof drainage, layout and calculations

### The Building Regulations 2010 (England and Wales) (as amended)

- Requirement B3(4) - Internal fire spread (structure)
- Requirement E1 - Protection against sound from other parts of the building and adjoining buildings
- Requirement H1(1) - Foul water drainage
- Requirement H3(1) - Rainwater Drainage
- Regulation 7 - Materials and workmanship

### The Building (Scotland) regulations 2004 (as amended)

- Regulation 8(1)(2) - Durability, workmanship and fitness of materials
- Regulation 9 - Building standards applicable to construction
  - Standard 2.1 - Compartmentation
  - Standard 2.2 - Separation
  - Standard 3.6 - Surface water drainage
  - Standard 3.7 - Wastewater drainage
  - Standard 5.1 - Noise separation
  - Standard 7.1(a)(b) - Statement of sustainability
- Regulation 12 - Building standards applicable to conversions

### The Building Regulations (Northern Ireland) 2012 (as amended)

- Regulation 23(a)(i)(iii)(b)(i) - Fitness of materials and workmanship
- Regulation 35(4) - Internal fire spread - structure
- Regulation 49 - Protection against sound from other parts of the building and from adjoining buildings
- Regulation 51 - Reverberation in the common internal parts of a building containing flats or rooms for residential purposes
- Regulation 79 - Drainage systems

## 1.5 Benefits of Halifax Soil & Drain systems

- Quiet in operation - Intrinsic sound-deadening properties of cast iron reduce acoustic insulation costs
- Fire resistant - As a material Cast Iron is non-combustible and has an A1 fire rating which reduces risk and removes the requirements for fire collars
- The paint finish has been tested and proven to offer high performance when exposed to aggressive substances

- Inherent strength and low maintenance requirements of cast iron combined with high quality surface coatings offer a fit and forget solution
- Correctly installed and maintained cast iron pipe systems can last in excess of 100 years
- Cost effective over the whole life of a building
- Extremely low waste at end of life - scrap castings can be fully re-cycled
- High pressure couplings designed for use in high-rise buildings
- The system can be easily modified and adapt to changes to the building in later life with minimal extra cost which helps keep the whole life costs down

## 1.6 Product Range

The Halifax Soil & Drain systems consist of a wide range of pipes and fittings of several diameters which are suitable for the majority of standard applications.

The products are available in diameters of 50 - 200mm and in each size, a selection of bends, branches, couplings, brackets and other assorted fittings are available

## 1.7 Responsible production and trading

### Sustainability

Iron is the fourth most common element in the earth's crust. Cast iron can be fully recycled without any loss of its original properties, manufacturers use recycled scrap iron wherever possible. There is a well-established infrastructure for the recycling of scrap iron which means that cast iron products need never end up in landfill.

### Ethical Trading

Hargreaves Foundry Drainage trade responsibly, our Corporate Social Responsibility Policy is available at

[www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)

### Environment

Hargreaves Foundry Drainage is committed to our Environmental Policy, a copy of which can be viewed at [www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)

### Quality

The manufacturing site for our Halifax Soil & Drain system has been certified to ISO9001:2015 by the Beijing United Intelligence Certification Co. LTD., a UKAS certified organisation. The manufacturing site has also been audited by BSI as a mandatory part of the Kitemark process. This has also included all applicable type testing of the product range. This certification should give all of our customers the confidence that Halifax products are of a consistently high standard.



## 1.8 Ongoing Inspection & testing

All Halifax products are subject to ongoing inspection and testing to ensure that our high quality is both maintained and, where possible, improved. Samples of all deliveries are subject to dimensional, coating quality and chemical & physical properties tests to ensure that no deviation from the specification has been made. These ongoing tests are over and above the requirements from both of our certification bodies.

The regular audits also serve to confirm that all current, applicable standards, working practices and regulations are complied with.

## 2. Reaction to Fire

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### 2.1 Fire Rating Summary

The safety and comfort of a building's occupants should always get the highest priority on a construction project, especially on high rise buildings. To this end, clause 4.1.3 (and annex ZA) of BS EN877:1999+A1:2006 requires mandatory fire testing by an approved 3<sup>rd</sup> party be carried out on products. All tests carried out for this purpose must be in accordance with BS EN13501-1:2007 + A1:2009-3, EN1716:2010 and BS EN13823:2010.

Material Fire ratings are based on a European classification system dependent upon the ignitability of the material, rate of smoke generation and likelihood of burning droplets or particles being released.

It is important to note that based upon this classification system, Cast Iron has an **A1** fire rating, that is non-combustible and will not contribute at any stage to the fire. For descriptions of the fire rating definitions, please see Section 2.2 of this document.

“Cast Iron products in accordance with this European standard are non-flammable and non-combustible”

*BS EN877:1999+A1:2006 - F.2*

#### Halifax Soil

By adding a paint coating into the system, the stated fire rating, under the current regulations, is not able to remain as A1 under the current provisions of BS EN 877. Independent, third party fire tests undertaken by BRE (Building Research Establishment) on a Halifax Soil system have resulted in a rating of **A2-s1, d0**. This indicates that while the material that forms the majority of the products is non-combustible, the coatings may create a small amount of smoke but there will be no flaming droplets emitted from the casting. The rating A2-s1, d0 is the best rating currently possible for systems complying with BS EN 877:1999 +A1:2006 (incorporating corrigendum 2008).

#### Halifax Drain

The requirements for below ground products to have increased resistance to chemical attack means that the Halifax Drain products have thicker coatings than those in the Halifax Soil range. This increased paint thickness means that the coating forms a larger proportion of the whole product which results in it being a more significant contribution to a fire but remains 'low risk'. As a result of the different coatings used in production, our BBA approved products have a rating of B-S1, d0 while the BSI approved products have a rating of A2-S1, d0. The definitions for each fire classification are shown on the following page.

#### Steel Couplings

Our Stainless-Steel couplings have been independently fire tested by MPA NRW in Dortmund, Germany. The results of these tests showed that, when used to join Cast Iron pipes conforming to EN877, they achieved a rating of F90. This is a German rating and is not related to the ratings in Section 2.2. This rating means that the product will survive in a fire for 90 minutes before it fails.



## 2.2 Definitions

This table contains details of the main fire classifications. The details for sub-classes can be found below the table.

Classification	Performance Description
A1	No contribution to fire
A2	No significant contribution to fire
B	Very limited contribution to fire
C	Limited contribution to fire
D	Contribution to fire
E	Significant contribution to fire
F	Not tested or no performance requirements

### Additional classification for smoke production

S1: May emit a very limited amount of smoke

S2: May emit a limited amount of smoke

S3: No requirement for restricted emission of smoke

### Additional classification for flaming droplets/particles

d0: No flaming droplets or particles are emitted

d1: Burning droplets or particles may be released in limited quantities

d2: no limitation on burning droplets or particles

## 3. Acoustic performance

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It is desirable to reduce the ambient noise in any structure and especially so in hospitals, hotels, schools etc. As noted in Annex F of BS EN 877, cast iron has excellent sound insulating properties due to its material density.

This intrinsic property sets the bar high above some other materials, particularly HDPE and other plastics. EN 14366 sets out a standard testing system for the acoustic properties of waste water pipes and provides a framework under which comparisons can be made with other tests made under the same conditions.

**Noise: A sound which is loud, unpleasant or causes a disturbance.**

In July 2017, Hargreaves Foundry employed the Fraunhofer Institute for Building Physics (IBP) in Stuttgart to conduct these tests on the Halifax Soil & Drain systems on our behalf. These tests were undertaken as specified in EN14366 and were also related to IBP's own guidelines as released in June 2016.

### 3.1 Fraunhofer IBP Guidelines

IBP's "**Guidelines on the testing of the acoustic performance of wastewater systems according to DIN EN 14366**" were produced in order to ensure "*a high degree of reproducibility and comparability of the measurement results of different wastewater systems, as well as the applicability of the results in practice.*" There are several points in this document which are worthy of note.

In the first instance, some reports published prior to 2014, **may no longer be supported** by the Institute. The reasoning behind this decision was that some installations were made by the client rather than by the IBP technicians which introduced a variable with the result that "*the measurement values do not have any practical relevance anymore.*"

Secondly, as of 2009, results measured **below 10dB** are no longer mentioned in the test reports. This is due to several factors. There is an increased measurement uncertainty in the lower values which IBP deem to be unacceptable. The key fact however is that even if the instruments at IBP were able to reliably record readings this low, the results would not be noticeable under normal living conditions. As a general guide, please see section 3.4 for a comparative reference table.

Finally, to ensure that all tests undertaken are relevant and up-to-date, IBP "*usually assumes a validity of the test reports of 5 years*" and also recommends that the pipe systems are re-examined at a maximum interval of ten years.

### 3.2 Noise Transmission

Whilst the material properties of cast iron reduce the amplitude of the noise generated by waste water, it does not completely insulate against any noise generated. What noise is not deadened by the material density is transmitted via one of two mediums:

#### Airborne Noise

This is sound waves transmitted by the air surrounding the pipe system and would be of particular importance in areas where the pipework is unshrouded such as car parks and shopping centres. The principle form of acoustic insulation in these instances would be the cast iron itself.

#### Structure-borne noise

This is sound waves transmitted through the solid structure which supports the pipe system and is the easiest to reduce. The testing undertaken at Fraunhofer IBP focussed on the reduction of structure-borne noises by a variety of methods. It should be noted that structure-

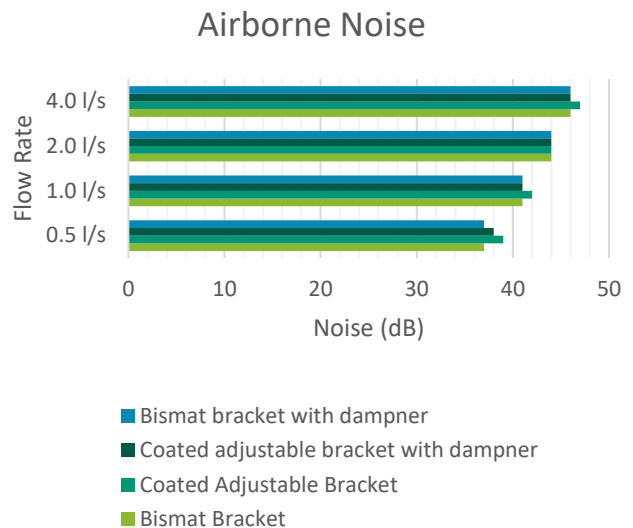
borne vibrations have the greatest potential for disturbing the occupants of a building as they can be transmitted to any location in the building. Therefore, if noise reduction is a major consideration within a project, acoustic insulation of drainage and waste water systems should be considered.

### 3.3 Testing

All testing was conducted in accordance with EN 14366. Tests were also conducted in accordance with DIN 4109 and VDI 4100. The results obtained from each of these tests were comparable. All products tested are of the 100mm diameter and the flow rates used in the test are specified within EN 14366. Higher flow rates are unlikely to be encountered in normal use.

#### Airborne

As could probably be predicted, the readings recorded for airborne noise transmissions were not generally reliant on the type of bracket used and tended to increase in amplitude with an increase in flow. As a point of reference, please see the comparative scale below.



## Structure-borne

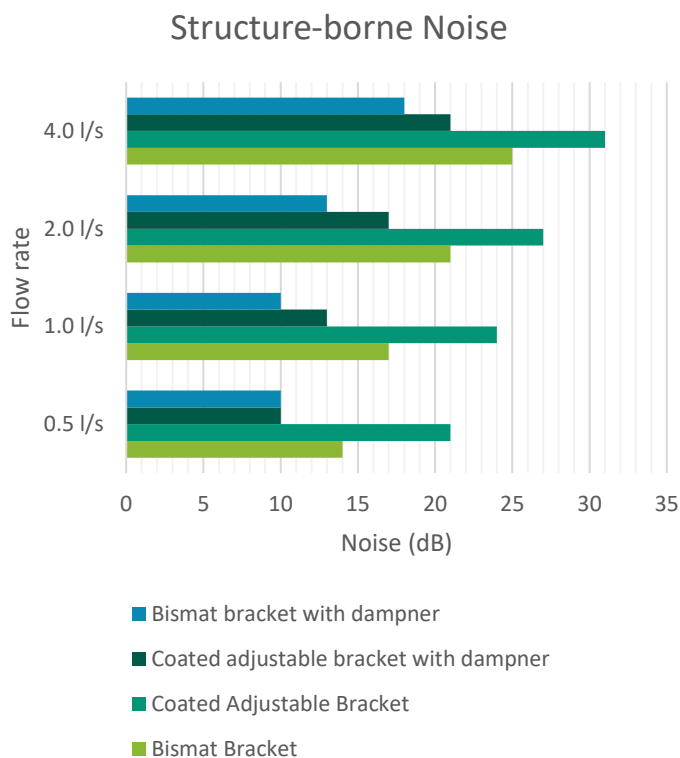
Due to the way that structure-borne noise is transmitted, the brackets have a greater impact upon the amplitude. The data table and graph here show a marked difference between the different bracket options tested and indicated that using the dampener (Part No. HSD6703) in conjunction with the Bismat bracket has an obvious impact on the amount of noise transmitted. It is important to note

Flow Rate	Bismat	Coated Adjustable Bracket	Coated adjustable bracket with dampener	Bismat bracket with dampener*
0.5 l/s	14	21	<10	<10
1.0 l/s	17	24	13	<10
2.0 l/s	21	27	17	13
4.0 l/s	25	31	21	18

\* Must be used in conjunction with stack support brackets

however that in order to achieve the greatest change, the bracket must be installed correctly as specified by Hargreaves Foundry. Failure to implement the installation correctly can result in sound levels varying by up to 15 dB(A).

Cast iron removes the need for expensive acoustic insulation to be placed around waste water systems within a structure, simplifying the whole construction process and reducing costs.



HSD6703 - dampener

### 3.4 Noise Comparison Table

Noise (dB)	Example references
10	Regular breathing
20	Whisper, rustling leaves
30	Quiet Rural Area
40	Library, bird calls, lowest limit of urban ambient sounds
50	Quiet suburb, conversation at home

## 4. Dimensional & Mechanical properties

### 4.1 Products Dimensions

#### 4.1.1 Diameters and Tolerances

The dimensions & tolerances for all products in the Halifax Soil & Drain range are shown in Table 4a (below) which have been extracted from EN877:1999 + A1:2006 Section 4.2.2 Table 1. All dimensions shown are in mm. By controlling the tolerance of the diameter, it is also possible to ensure that no product has excessive distortion of its shape. This will ensure an optimum fit when installed as part of a system.

DN	External Diameter DE		Wall Thickness	
	Nominal Value	Tolerance	Nominal Value	Minimum Value
50	58	+2 -1	3.5	3.0
70	78	+2 -1	3.5	3.0
100	110	+2 -1	3.5	3.0
150	160	+2 -2	4.0	3.5
200	210	+2.5 -2.5	5.0	4.0

Table 4a. - Dimensions of Pipes and Fittings (mm)

#### 4.1.2 Pipes

Pipes for both Halifax Soil & Halifax Drain are only available in 3m lengths. Cast Iron has greater tolerance to movement in the surrounding ground than clay pipes which reduces the need for replacements. Due to the uniformity of the pipes, they can be cut at any point to allow for differences in the project's requirements while still being able to form a good seal with a coupling.

#### 4.1.3 Fittings

A Wide selection of fittings are available in both the above ground (Halifax Soil) and below ground (Halifax Drain) ranges, which should cater to the majority of pipe system requirements for the given diameters. Irrespective of the shape and size of the fittings, they have been specially designed to allow connection to the pipes via one of the available, specialised Halifax couplings.



While the majority of fittings dimensions are not specified in the EN877 standard, all products are subject to inspections against the Hargreaves Foundry Drainage specifications by our 3<sup>rd</sup> party certification bodies, which ensures that uniformity of product is maintained.



## 4.2 Physical attributes of Cast Iron

Cast Iron products enjoy a reputation for longevity of service with minimal maintenance requirements. This durability and reliability make it the perfect material for use in the modern construction industry where sustainability and value for money have never been so important. While there will be some decay of the cast iron (oxidising) this will be a slow enough process that it will not affect the performance of the pipe system for the life of the building, provided the system is installed and maintained correctly. Research completed by Weather Works Ltd in 2008 demonstrated that the whole life costs for cast iron over a 100-year life cycle are only 35% of PVC and aluminium.

## 4.3 Pipe Weights

As a part of the standardisation of products, BS EN877 specifies that the mass of a product should not be less than 85% of the stated nominal mass of the product. This nominal mass must be stated in the manufacturer's catalogue. To ease planning for installation, loading and support, please see table 4b (below).

Pipe Diameter (mm)	Empty Pipe Weight (Kg/M)	Full pipe Weight (Kg/M)
50	5.0	7.0
70	6.1	10.0
100	9.1	17.5
150	14.6	32.3
200	23.3	54.7

Table 4b - Pipe Weights

## 4.4 Physical properties from EN877

In addition to the inherent properties of cast iron, the BS EN877 standard that Halifax Soil and Drain conforms to specifies a number of physical characteristics which must be met by all products in the system. We undertake regular testing on pipes, couplings, fittings and gaskets in order to ensure that these characteristics are maintained between batches.



### 4.4.1 Hardness

The hardness of a material refers to the ease with which it may be physically marked, manipulated or cut. The BS EN877 standard sets out a Maximum value to be obtained via the Brinell hardness test. Cast iron has a higher hardness than equivalent PVC or HDPE systems which means that Halifax Soil & Drain pipes are unlikely to suffer from accidental marking, cutting or indentations of the surface. However, with the right tools it can easily be cut on site to achieve different pipe lengths.

### 4.4.2 Ring Crush Strength

The ring crush strength of a pipe determines the likelihood of it failing when under a perpendicular load. This is particularly important for buried systems which will not only be subject to the back-fill of the trench in which it is buried but will also be subject to the varying loads imposed by structures and traffic above them. Test results show that cast iron consistently surpasses the requirements of EN 877 and offers greater resistance to crushing than PVC and HDPE.

#### 4.4.3 Tensile Strength

Cast iron products are graded dependent upon the tensile strength of the constituent material. All pipes and fittings (with the exception of some brackets and couplings) within the Halifax Soil & Drain ranges are made from grey cast iron in accordance with BS EN 877. The results from the ongoing testing and assessment of Halifax products ensures that the tensile strength is never below the minimum required in BS EN 877. This gives Halifax Pipes a great advantage when compared with PVC or HDPE pipes, which generally have a material tensile strength in the range 20-40% of the cast iron used in the Halifax Soil & Drain systems.

#### 4.4.4 Thermal Expansion

The expansion coefficient of Cast iron is approx. 0.01mm/m/°C. The material will expand by 0.01mm for every metre of the casting with every degree centigrade that the temperature increases.

This small amount is actually very similar to the coefficient of concrete and steel. The result of which is that when Halifax Soil & Drain products are installed in a building, they will not move relative to the structure around them. **This means expansion joints are normally not required, unlike HDPE and other plastic systems where expansion can be between 5 to 20 times greater than cast iron.**

## 4.5 Pipe gradients and filling capacities

The below values have been calculated based upon the nominal values of the Halifax Soil & Drain pipes:

Filling degree 50% (h/d = 0.5)

Pipe DN	50		70		100		150		200	
Slope j	Q	V	Q	V	Q	V	Q	V	Q	V
cm/m	L/s	m/s	L/s	m/s	L/s	m/s	L/s	m/s	L/s	m/s
0.50	0.3	0.3	0.7	0.4	1.8	0.5	5.4	0.6	11.6	0.7
0.75	0.4	0.4	0.9	0.4	2.2	0.6	6.6	0.7	14.2	0.9
1.00	0.4	0.4	1.0	0.5	2.6	0.7	7.6	0.9	16.4	1.0
1.25	0.5	0.5	1.1	0.6	2.9	0.7	8.5	1.0	18.3	1.2
1.50	0.5	0.5	1.2	0.6	3.2	0.8	9.3	1.1	20.1	1.3
1.75	0.5	0.5	1.3	0.7	3.4	0.9	10.1	1.1	21.7	1.4
2.00	0.6	0.6	1.4	0.7	3.7	0.9	10.8	1.2	23.2	1.5
2.25	0.6	0.6	1.5	0.8	3.9	1.0	11.4	1.3	24.6	1.6
2.50	0.6	0.7	1.6	0.8	4.1	1.0	12.0	1.4	25.9	1.7
2.75	0.7	0.7	1.7	0.9	4.3	1.1	12.6	1.4	27.2	1.7
3.00	0.7	0.7	1.7	0.9	4.5	1.1	13.2	1.5	28.4	1.8
3.25	0.7	0.7	1.8	0.9	4.7	1.2	13.7	1.6	29.6	1.9
3.50	0.8	0.8	1.9	1.0	4.8	1.2	14.2	1.6	30.7	2.0
3.75	0.8	0.8	1.9	1.0	5.0	1.3	14.7	1.7	31.8	2.0
4.00	0.8	0.8	2.0	1.0	5.2	1.3	15.2	1.7	32.9	2.1
4.25	0.8	0.9	2.1	1.1	5.3	1.4	15.7	1.8	33.8	2.2
4.50	0.9	0.9	2.1	1.1	5.6	1.4	16.2	1.8	34.8	2.2
4.75	0.9	0.9	2.2	1.1	5.6	1.4	16.6	1.9	35.7	2.3
5.00	0.9	0.9	2.2	1.2	5.8	1.5	17.0	1.9	36.7	2.3

Table 4c - Flow rate of pipes at 50% capacity

Filling degree 70% (h/d = 0.7)

Pipe DN	50		70		100		150		200	
Slope j	Q	V	Q	V	Q	V	Q	V	Q	V
cm/m	L/s	m/s	L/s	m/s	L/s	m/s	L/s	m/s	L/s	m/s
0.50	0.5	0.3	1.2	0.4	3.1	0.5	9.0	0.7	19.4	0.8
0.75	0.6	0.4	1.4	0.5	3.7	0.6	11.0	0.8	23.8	1.0
1.00	0.7	0.5	1.7	0.6	4.3	0.7	12.8	1.0	27.5	1.2
1.25	0.8	0.5	1.9	0.6	4.8	0.8	14.3	1.1	30.7	1.3
1.50	0.8	0.6	2.0	0.7	5.3	0.9	15.6	1.2	33.6	1.4
1.75	0.9	0.6	2.2	0.8	5.7	1.0	16.9	1.3	36.3	1.5
2.00	1.0	0.7	2.4	0.8	6.1	1.0	18.0	1.4	38.8	1.7
2.25	1.0	0.7	2.5	0.9	6.5	1.1	19.1	1.4	41.2	1.8
2.50	1.1	0.7	2.6	0.9	6.8	1.2	20.2	1.5	43.4	1.8
2.75	1.1	0.8	2.8	1.0	7.2	1.2	21.1	1.6	45.5	1.9
3.00	1.2	0.8	2.9	1.0	7.5	1.3	22.1	1.7	47.6	2.0
3.25	1.2	0.8	3.0	1.0	7.8	1.3	23.0	1.7	49.5	2.1
3.50	1.3	0.9	3.1	1.1	8.1	1.4	23.9	1.8	51.4	2.2
3.75	1.3	0.9	3.2	1.1	8.4	1.4	24.7	1.9	53.2	2.3
4.00	1.4	0.9	3.3	1.2	8.7	1.5	25.5	1.9	54.9	2.3
4.25	1.4	1.0	3.4	1.2	8.9	1.5	26.3	2.0	56.6	2.4
4.50	1.4	1.0	3.5	1.2	9.2	1.6	27.1	2.0	58.3	2.5
4.75	1.5	1.0	3.6	1.3	9.4	1.6	27.8	2.1	59.9	2.5
5.00	1.5	1.0	3.7	1.3	9.7	1.6	28.5	2.2	61.4	2.6

Table 4d - Flow rate of pipes at 70% capacity

Filling degree 100% (h/d = 1.0)

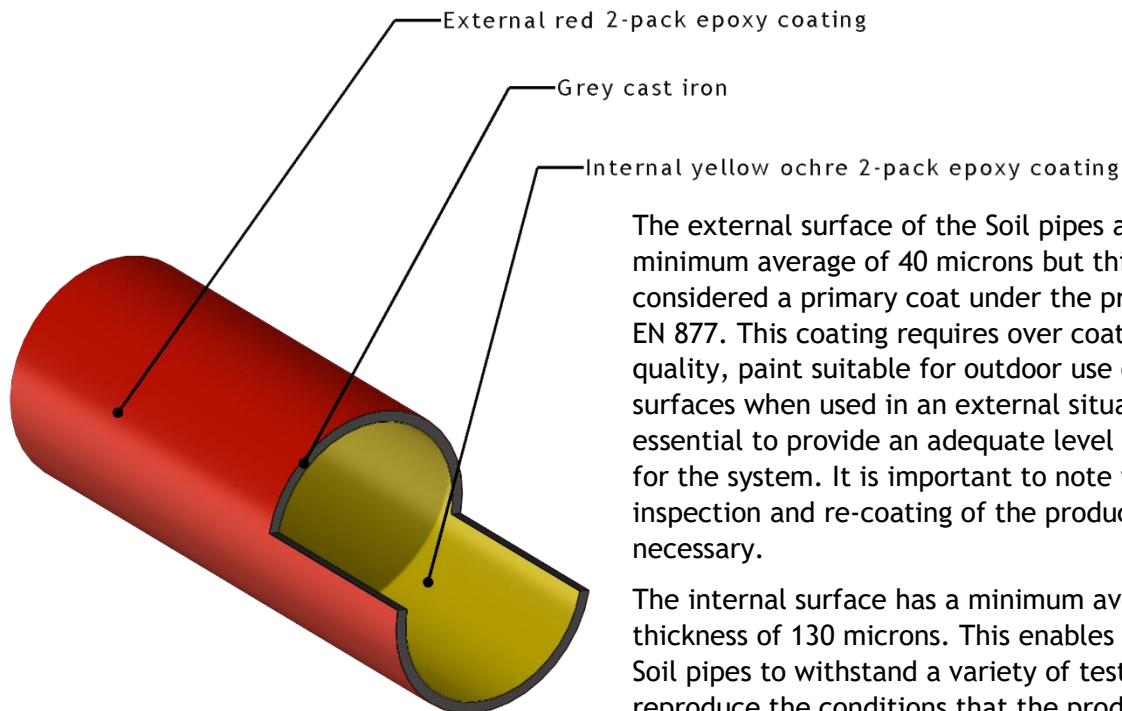
Pipe DN	50		70		100		150		200	
Slope j	Q	V	Q	V	Q	V	Q	V	Q	V
cm/m	L/s	m/s	L/s	m/s	L/s	m/s	L/s	m/s	L/s	m/s
0.50	0.6	0.3	1.4	0.4	3.7	0.5	10.8	0.6	23.2	0.7
0.75	0.7	0.4	1.7	0.4	4.5	0.6	13.2	0.7	28.4	0.9
1.00	0.8	0.4	2.0	0.5	5.2	0.7	15.2	0.9	32.8	1.0
1.25	0.9	0.5	2.2	0.6	5.8	0.7	17.0	1.0	36.7	1.2
1.50	1	0.5	2.4	0.6	6.3	0.8	18.7	1.1	40.2	1.3
1.75	1.1	0.5	2.6	0.7	6.8	0.9	20.2	1.1	43.4	1.4
2.00	1.2	0.6	2.8	0.7	7.3	0.9	21.5	1.2	46.4	1.5
2.25	1.2	0.6	3.0	0.8	7.8	1.0	22.8	1.3	49.2	1.6
2.50	1.3	0.7	3.2	0.8	8.2	1.0	24.1	1.4	51.9	1.7
2.75	1.3	0.7	3.3	0.9	8.6	1.1	25.3	1.4	54.4	1.7
3.00	1.4	0.7	3.5	0.9	8.9	1.1	26.4	1.5	56.8	1.8
3.25	1.5	0.7	3.6	0.9	9.3	1.2	27.5	1.6	59.1	1.9
3.50	1.5	0.8	3.7	1.0	9.7	1.2	28.5	1.6	61.4	2.0
3.75	1.6	0.8	3.9	1.0	10.0	1.3	29.5	1.7	63.5	2.0
4.00	1.6	0.8	4.0	1.0	10.3	1.3	30.5	1.7	65.6	2.1
4.25	1.7	0.9	4.1	1.1	10.7	1.4	31.4	1.8	67.6	2.2
4.50	1.7	0.9	4.2	1.1	11.0	1.4	32.3	1.8	69.6	2.2
4.75	1.8	0.9	4.4	1.1	11.3	1.4	33.2	1.9	71.5	2.3
5.00	1.8	0.9	4.5	1.2	11.6	1.5	34.1	1.9	73.4	2.3

Table 4e - Flow rate of pipes at 100% capacity

Q = FLOW RATE      V = FLOW VELOCITY

## 5. Product Coatings & Appearance

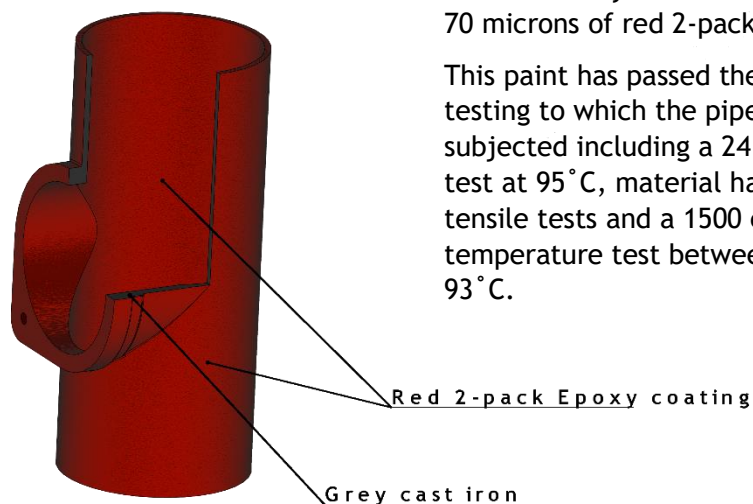
### 5.1 Halifax Soil Pipes



The external surface of the Soil pipes are coated to a minimum average of 40 microns but this is only considered a primary coat under the provisions of BS EN 877. This coating requires over coating with a high quality, paint suitable for outdoor use on metallic surfaces when used in an external situation. This is essential to provide an adequate level of protection for the system. It is important to note that regular inspection and re-coating of the products may be necessary.

The internal surface has a minimum average coating thickness of 130 microns. This enables the Halifax Soil pipes to withstand a variety of tests designed to reproduce the conditions that the products will encounter in their working life. This includes a 350-hour salt-spray test, a 30-day waste water test at 23°C and a 30-day chemical resistance test at both PH 2 (very acidic) and PH 12 (very Alkaline).

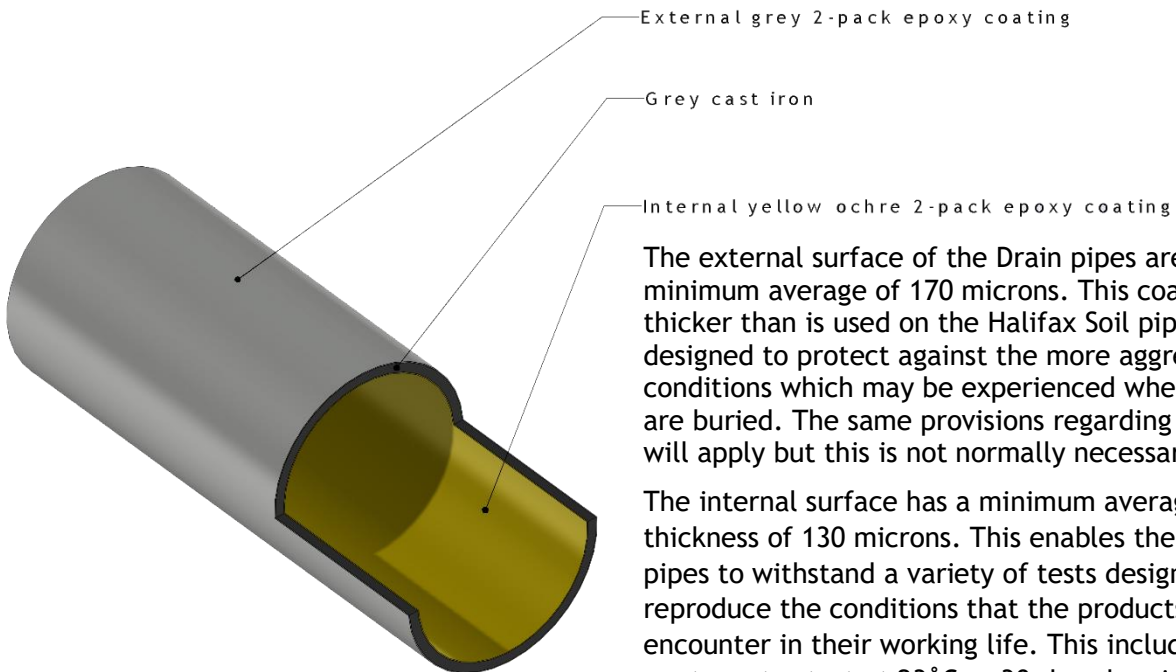
### 5.2 Halifax Soil Fittings



Halifax Soil fittings are finished internally and externally with a minimum average 70 microns of red 2-pack epoxy paint.

This paint has passed the same rigorous testing to which the pipes have been subjected including a 24 Hr hot water test at 95°C, material hardness tests, tensile tests and a 1500 cycles water temperature test between 15°C and 93°C.

### 5.3 Halifax Drain Pipes



External grey 2-pack epoxy coating

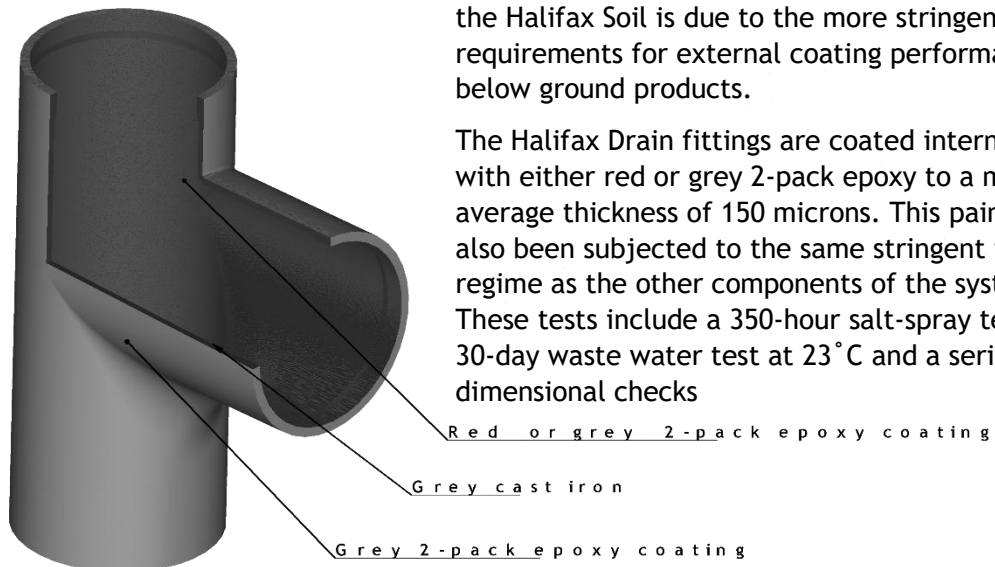
Grey cast iron

Internal yellow ochre 2-pack epoxy coating

The external surface of the Drain pipes are coated to a minimum average of 170 microns. This coating is thicker than is used on the Halifax Soil pipes as it is designed to protect against the more aggressive conditions which may be experienced when the pipes are buried. The same provisions regarding over coating will apply but this is not normally necessary

The internal surface has a minimum average coating thickness of 130 microns. This enables the Halifax Drain pipes to withstand a variety of tests designed to reproduce the conditions that the products will encounter in their working life. This includes a 30-day waste water test at 23°C, a 30-day chemical resistance test at both PH 2 and PH 12 and a 1500 cycles water temperature test between 15°C and 93°C.

### 5.4 Halifax Drain Fittings



Red or grey 2-pack epoxy coating

Grey cast iron

Grey 2-pack epoxy coating

Halifax Drain fittings are finished externally with a minimum average of 150 microns of grey 2-pack epoxy paint. The increase in paint thickness over the Halifax Soil is due to the more stringent requirements for external coating performance for below ground products.

The Halifax Drain fittings are coated internally with either red or grey 2-pack epoxy to a minimum average thickness of 150 microns. This paint has also been subjected to the same stringent testing regime as the other components of the system. These tests include a 350-hour salt-spray test, a 30-day waste water test at 23°C and a series of dimensional checks

*Note: The internal Epoxy coated surfaces are very smooth. This gives the added bonus of helping to prevent turbulence within the pipes thereby increasing flow rates.*



## 5.5 Chemical Resistance of coatings

The Halifax Soil & Drain system is designed for use in commercial and residential properties and is resistant to attack by chemicals between PH2 and PH12 which have been diluted by ordinary tap water. Unfortunately, as cleaning agents are developed, they are becoming more aggressive and as such are causing more damage to drainage systems than comparable products will have done a number of years ago. It is also important to note that other substances can cause an equal or greater level of harm to both the system and the environment.

What is being disposed of down the sink and drain?

Four things you should never put down the drain:

- Toxic chemicals like paint, cleaning products, oil, and solvents. ...
- Medications. ...
- Grease, fats, and oils. ...
- Putting milk (or any other dairy products for that matter) down the drain can have serious environmental consequences. So serious in fact, that *UK businesses can actually be fined for doing it*. This is because milk requires large quantities of oxygen to be broken down into the environment, depriving other organisms of the air they need to survive.

The biggest issue facing soil and drainage systems is what is being discharged from households, commercial and industrial premises. The most common are surfactants and soaps associated with cleaning agents and detergents to highly concentrated acidic and alkaline solutions, which may feed into the waste water system. These cleaning agents and aggressive chemicals are used in a wide variety of products, from detergents, disinfectants, oven cleaners, and chemicals for unblocking sinks.

One of the most problematic of these are the “drain” unblocking chemicals which can be either acidic (sulphuric acid) or alkaline (sodium hydroxide). Older pipes and those made of polyvinyl chloride (PVC) are more susceptible to damage from drain cleaners. The usage of these chemicals is not always controlled by the householder, commercial or industrial premises, and therefore there is a potential, albeit unintentionally, that less dilution would be used. See the *H&S Note on “Drain Cleaning” solutions* on the next page. In addition, some cleaning products rely on heat to increase their effectiveness in removing stains, grease etc, therefore these effluents could be discharged from properties with temperatures in the range 15°C to 45°C.

All hospitals and University Research and teaching / wet Laboratories have very strict guidelines on what can and can't be put down sink and drains; it should be noted that undiluted blood should not be used to “drain” via cast iron. Cast Iron can only be used when a dilution trap is used in some “wet labs”. Otherwise, Glass, Vulcathene, Geberit or other drainage products should be used. Outside of “wet labs” the Halifax Soil and Drain system coatings are more than adequate when used in these environments.

Here is a list of some the most common used cleaning products and their pH levels:

- Chlorine bleach (pH 11-13): At the top of the alkaline level, therefore corrosive and to be used with caution and not on all surfaces, as these can be damaged.
- Oven cleaner (pH 11-13): The same as bleach, so ideal to cut through grease and grime, but protect the kitchen floor and worktop when using it as they could be damaged.
- Washing up liquid (pH 7-8): The neutrality makes this cleaning product ideal for daily cleaning. Most surfaces will not be damaged, and it can be used in hundred places around the house, not only to do the washing up.

- Toilet bowl cleaner (pH 1-3): Very acidic product, so ideal to remove minerals and other non-organic substances. As it is at the end of the pH scale, you have to be careful when using it.

Here is a list of other common items and their pH levels:

- Vinegar (pH 3): As a natural product, most would think vinegar is safe to use almost everywhere in the house, but it is not the case. Vinegar is quite acidic so it can damage some delicate surfaces (e.g. wood or limestone). On the other hand, it is great for removing mineral deposits (e.g. lime scale).
- Cherry Coke and Coca-Cola have a pH of 2.5, comparable to some toilet cleaners!!

### H&S Note on “Drain Cleaning” solutions

Individuals may unknowingly mix two different types of drain cleaners, without being fully aware of the potential health and safety risks.

For example, the neutralization reaction of the acid and base may seem harmless, but in reality, this reaction is extremely exothermic; and the mixing of acid drain cleaners and bleach can result in the generation of chlorine gas.

One product that is used by commercial cleaners is “One Stop” (contains 90% Sulphuric Acid), this product is extremely corrosive and has been known to chemically erode away the walls of cast iron drain pipes and fittings whilst dissolving away a blockage in the drain system; this can lead to failure and subsequent, expensive replacements.

The first thing to know is what your pipes are made of. Many drain cleaners utilize extremely caustic chemicals in order to take care of truly tough stuff like hair and grease.

Note: You should not use a strong, caustic chemical(s) when you have stainless steel, galvanized steel, aluminium, or copper piping.

The internal paint coating used on our Halifax Soil and Drainage system have been developed to meet the requirements of EN877, which requires, coatings to withstand temperatures of 95°C, cyclic temperatures from 15°C - 93°C, waste water @ 23°C, and chemical resistance from pH 2 (Sulphuric Acid) - pH 12 (Sodium Hydroxide); and as such, our coatings can handle an array of chemicals and pH values (within the tested range) found in most waste water.

As already noted, the waste water effluents from household, commercial and industrial premises are becoming more and more aggressive and as such, HF Drainage is continually developing and improving our paints with our suppliers to meet the increasing demands of these waste water effluents.

## 5.6 Product markings

### Pipes

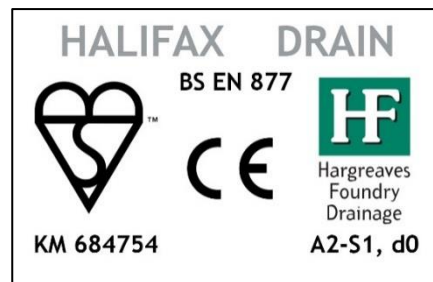
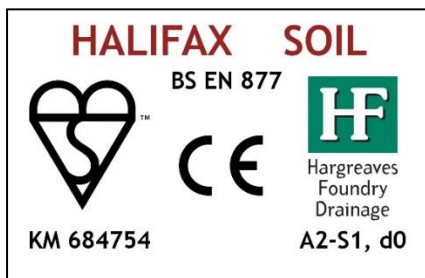
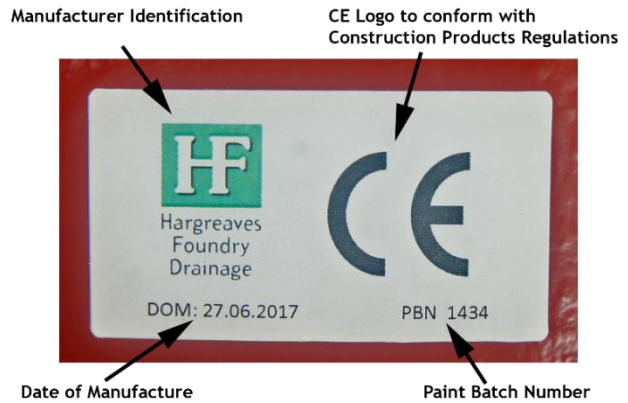
The markings are painted onto the external surface of the pipes using a stencil and are located 1 per metre length of the pipe. An example of the pipe markings can be seen here.



## Fittings

Manufacturing and production details are cast on the product as stipulated by EN 877. Additional markings are applied in the form of sticky labels in order to ensure conformity with Annex ZA of EN877. These labels commonly contain: manufacturers logo, CE mark, Paint batch number and production date. An example of this can be seen here.

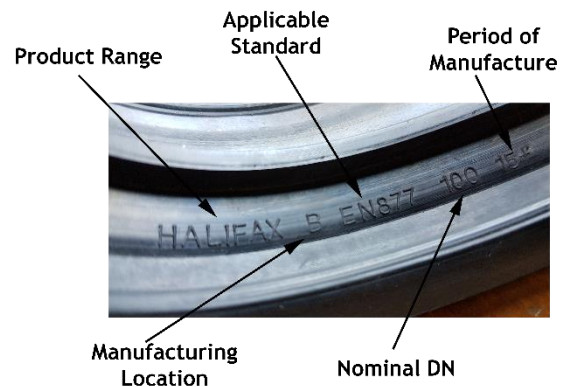
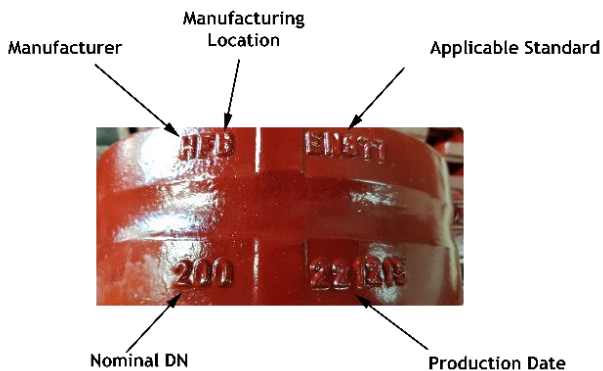
On Newer products, this will be replaced by the labels below:



## Ductile Iron couplings & Gaskets

Manufacturing and production details are cast on the product as stipulated by EN 877 as shown here. Additional markings may be applied in the form of sticky labels in order to ensure conformity with Annex ZA of EN877. These labels are similar to those used on the fittings.

Gasket markings form part of the mould used to shape the rubber and are shown in the image below. Production date of gaskets is indicated by the mark in the respective quadrant of the cross.



## 5.7 Buried Pipelines

While both pipe systems use the same 2-pack Epoxy coating, the coating used on the Halifax Drain system is thicker than that used on the Halifax Soil system and as such, has a higher resistance to chemical attack. This makes the Halifax Drain system more suited to being buried below ground. It should be noted however that where the products are to be placed in particularly aggressive soils (e.g. peat) where the PH value is less than 6, it is recommended that the pipe system be encased in polyethylene sleeves for additional protection

## 5.8 Concrete encasement

In a situation where the pipes need to be encased in concrete, provided the factory applied coating is intact & undamaged, it will form a barrier between the cast iron and the concrete therefore making either system suitable for use. However, due to the thicker coating mentioned above, the system is to be completely encased (as opposed to a short length passing through a concrete wall/foundation), the Halifax Drain system would be the most appropriate. In the event that the concrete encasement becomes damaged or is not fully coherent, the painted surface of the casting may be required to form a barrier between the otherwise exposed cast iron and any encroaching aggressive substances.

## 6. Couplings

### 6.1 Joint tests

BS EN 877 recognises the importance of secure, leak-free joints and as such, has a requirement for all pipe systems to undergo joint testing. Halifax Soil and Drain products have undergone strict water and air tightness tests which proved that the couplings within the system, are capable of making sound seals with the pipes aligned, at 3°, and when subjected to shear forces. The system meets the requirement for gravity soil installations for both external & internal pressure resistance.

### 6.2 Ductile Iron Couplings

- Two-piece coupling manufactured from Ductile Iron BS EN 1563
- Zinc plated socket cap locking screw and nut M8 x 40 for 50mm to 100mm and M8 x 55 for 150mm to 200mm (6mm Allen drive)
- 2 locking screws on 50 - 100mm and 4 locking screws on 150mm to 200mm diameters
- EPDM sealing gasket
- See table below for test pressures
- Couplings in 2-part epoxy finish red/brown colour for above ground soil and grey colour for below ground drain
- Above ground unique grub screw system for electrical continuity
- Suitable for re-use (*Gasket should be checked before re-installation for damage/distortion and replaced if necessary*)

#### Test pressures

As per Table 4, Clause 4.7.5 of BS EN877:1999 + A1: 2006 inc. Corr. 2008:

Test Condition	Hydrostatic test pressure (Bar)	
	DN < DN200	
	Internal	External
a). Aligned Joint	0 to 5	0 to 0.5
b). Deflected joint (3°)	0 to 5	
c). subject to Shear Force	0 to 1	

- External Water Pressure Test does not apply to sizes less than DN 100
- No sizes above DN 200 exist within the Halifax Range
- Assumes all joints are axially restrained

In order to ensure a seal against odours (as specified in 4.7.6 of BS EN877:1999 + A1: 2006 inc. Corr 2008) the system was also tested from 0-10mbar of internal air pressure

### 6.3 Rapid Connect Couplings

These are not suitable for use below ground so are only available in the Halifax Soil range of products. The Halifax system uses the Rapid Connect steel coupling;

- Stainless steel body, bolts and nuts steel, surface protected
- Single screw lock, fast and reliable
- Resists axial pull forces of up to 0.5 bar
- M8 zinc plated socket cap screw for 50-150mm (6mm Allen Drive)
- M10 zinc plated socket cap screw for 200mm (8mm Allen Drive)
- Defined locking torque without using a special tool
- 6mm Allen drive
- EPDM rubber sleeve
- Suitable for re-use



## 6.4 High Performance Coupling

Fully re-usable axial restraint pipe coupling system for use in high risk areas e.g. Computer suites etc. and also areas where a pipe stack flows through several floors without outlets.

- WRAS approved
- 16 bar internal pressure
- Casing 304 stainless steel no spot welding
- 2 locking screws on all sizes
- Alloy steel zinc PTFE coated
- EPDM gasket with stainless steel anchor teeth

## 6.5 Electrical Continuity

Electric continuity is needed when using metal pipes in construction to provide an earth. Cast iron has excellent conductive properties, however, the Halifax Soil system includes rubber gaskets where the adjacent pipe ends or fittings connect, that create a barrier to electrical conductivity.

The Halifax system has a choice of two standard couplings, the Rapid Connect coupling in stainless steel and the ductile iron coupling. Essentially, as the Rapid Connect coupling is tightened the edges are designed to 'cut' through the coating ensuring metal on metal contact. This maintains the conductive path allowing the electrical current to flow to earth.



To achieve the same result with a ductile iron coupling the Halifax system employs a unique grub screw feature. By tightening the two grub screws, one above and one below the joint, contact is made through the coating with the metal underneath and the continuity via coupling and grub screws is achieved.

Tests commissioned by Hargreaves Foundry at an independent laboratory (Pullmans Instruments Ltd) in accordance with section NA8 of BS EN 877:1999 + A1:2006 have shown that with a steady current of 25 Amps, both the Rapid Connect couplings and the Ductile iron couplings demonstrate conclusively excellent electrical continuity. When Halifax Soil couplings are correctly installed, they provide a resistance less than 4% of the maximum, 0.3Ω, permitted.

These results prove that the Halifax Soil system is suitable for use in structures where creating a continuous electrical discharging circuit is necessary.

## 7. Brackets

The Halifax Soil and Drain systems are designed to be used in a range of common situations. To aid with this flexibility, there are a range of brackets designed to suit different applications.

### 7.1 Support intervals

It is a requirement of BS EN 12056 code of practice that supports for a horizontal pipe run are no more than 3m apart. Hargreaves recommends that support is provided every 1.5m with the first bracket placed within 500mm of the first coupling. The pipe should also be supported at every change in direction or connection with another pipe. In the case of long pipe runs, it may be advisable to place lateral support every 12m. The maximum length for a single threaded rod to a bracket should be 750mm however longer drops may be utilised if two rods and a split band clip are used.

When the pipes are running vertically, the stack should be supported by a load bearing bracket at each floor level such as those listed below. The maximum separation between brackets should be 3m. It is important that each bracket is correctly secured as the installation progresses to avoid undue strain at the bottom of the stack. It is recommended that extra support is provided near fittings to ensure correct alignment of the stack.

### 7.2 Coated Adjustable brackets

These are supplied in steel or cast iron and are the simplest way to support a Halifax system. They are supplied coated in the same external finish as the Soil and Drain fittings so are a good choice for projects where the system will be on show and the support brackets are required to blend in with the remainder of the system. These brackets are supplied in two halves which are joined together with Nuts and Bolts. Fixing to the wall is achieved via the fixing slot on one half of the bracket. This fixing slot can be used with a variety of different products such as threaded rods, acoustic dampeners and standard bolts.



### 7.3 Rubber Lined Bismat bracket



This bracket is the standard alternative to the coated bracket. It also has excellent acoustic dampening properties as shown in Section 3 of this document. The EPDM rubber lining provides a layer of insulation which reduces the amplitude of any vibrations (including sound waves) being transferred between the pipe system and the supporting structure. These brackets are manufactured in zinc plated steel to resist corrosion. They feature a quick connection feature where the bolts do not need to be completely removed from the bracket in order to fix it to the pipes. The rubber lining forms a close fit around the bracket which eases installation.

### 7.4 Heavy-Duty Bossed Brackets

This bracket is available in both a standard and EPDM rubber lined version. The bossed socket allows the pipe to be positioned at a distance from its supporting structure via the use of threaded rods. The threaded boss contains threads of two different diameters to give flexibility depending on what is required for a particular project. These brackets are manufactured in zinc plated steel to resist corrosion. The rubber on the lined version of this bracket is a similar design to that used on the Bismat brackets.



## 7.5 Stack Support Brackets

These are a ductile iron product designed for use with Halifax stack support pipes and cantilever arms. They are designed specifically to provide support and restraint for large vertical pipe systems. Hargreaves recommends that a stack support is placed every fifth floor from the base (where average floor height is 2.5m). For further information please see our installation guide (HFDS 108).



## 7.6 Acoustic Dampener



The acoustic dampener bracket (*HSD6703*) is designed for use with the Rubber-lined Bismat bracket. Although it is also compatible with the Coated Adjustable Bracket and the Heavy-duty bossed brackets, in testing, the combination of dampener and Bismat resulted in the lowest transmission of noise. More details regarding this bracket can be found in section 3 of this document.

To achieve the optimum effect, the bracket should be installed with a gap of 10mm between the wall and dampener and 16mm between the dampener and the Bismat.

## 7.7 Console bracket

Used as an alternative to a stack support pipe, stack support bracket and 2 cantilever arms, this single unit provides an adjustable, fixing system for supporting pipe stacks. The console bracket is available for our 70, 100, 150 and 200mm pipes and the clamp provides all the benefits of the Bismat bracket while increasing the support provided.



## 8. Pipe System Design Guidance

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Excerpts & references from BS EN 12056-2:2012.

*[ It should be noted that these requirements also form part of The Building Regulations 2010 - Document H (2015 Edition)]*

When designing pipe systems for use in the UK, it is imperative that the requirements of the above standard and Building Regulations are adhered to. To this end, some key guidance notes are included here for reference purposes. For full details, BS EN 12056-2 should be consulted before a soil system design is finalised.

### ND.3.2.4 - Branch pipe bends and junctions

*This section refers to the use of swept-radius branches*

Bends in branch discharge pipes should be avoided, especially for single and ranges of wash basins, as they can cause blockages and increase self-siphonage effects. When they are unavoidable, they should be of a large radius.

Junctions between branch discharge pipes of about the same diameter should be swept in the direction of flow using swept entry branches, with a 25mm minimum root radius, otherwise, 45° branches should be used. To minimise the risk of blockage, branches up to DN 40 size joining larger diameter horizontal branches of DN 100 or over should, if practicable, connect to the upper part of the pipe wall of the larger branch. For the same reason, opposed branch connection in the horizontal plane to a main branch discharge pipe should be avoided.

### ND.3.5.2 - Bends at the base of stacks

Bends at the base of a discharge stack should be of large radius (minimum centre line radius 200mm) or two 45° radius bends may be used. Increasing the diameter of the bend at the base of a stack is an alternative but this may oversize the drain and be uneconomic.

### ND.3.5.3 - Branches at the base of stacks

Generally, for systems up to five storeys, the distance between the lowest branch connections and the invert of the drain should be at least 750mm, but 450mm is adequate for low rise single dwellings. For larger multi-storey systems it is better to connect the ground floor appliances to their own stack or the horizontal drain and not directly to the main stack. For buildings over 20 storeys high, it may be necessary to connect both the ground and first floor appliances in the same manner.

### ND.3.5.4 - Offsets

Offsets in the wet portion of a discharge stack should be avoided. When they have to be fitted, large radius bends should be used as described in ND.3.5.2. In a secondary ventilated stack system, connections to the discharge stack should be made above and below the offset. Offsets above the topmost appliance or branch connection do not require venting.

## 9. Connecting to other Systems

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### 9.1 Equivalent Systems

The range of Pipe bores in the Halifax Soil and Drain system is designed to be compatible with any number of equivalent systems. The standard couplings within the Halifax Soil and Drain systems are suitable for connecting products of other materials into the system provided the external diameters are the same. (For example: A Plastic pipe with an O/D of 110mm could be joined to the 100mm Halifax Drain pipe (*HD4001*) with a 100mm Halifax Drain Ductile Iron Coupling (*HD4012*) because the outer diameter is the same.)

### 9.2 Conventional soil/drain systems

Halifax Soil and Drain are modern adaptations of a traditional Cast Iron waste system. Despite containing different jointing methods than would have originally been used, it is still possible to connect the new system into existing products using a traditional, caulked joint.

This versatility allows the Halifax systems to be used where an upgrade is necessary thus saving money over alternative systems which would require a full replacement.

### 9.3 Threaded Connections

The Halifax Soil system threaded boss is designed to suit standard 2" BSPT threaded connections from plastic or copper pipe systems and provide a secure way of transitioning between smaller bore pipes of other materials.

These bossed connections can operate either as blank ends, where the other system can join the start of the Halifax system or, on specially designed boss pipes, to allow the ingress of waste part way through a system. In both cases, the bossed fittings can be connected to the main system using standard Halifax Soil Couplings

### 9.4 Compression-fit Boss



There may be some occasions where using a threaded component to connect into the system is not practical. In this case, a compression-fit boss pipe may be more suitable for use. These can be used with any 50mm pipe which can simply be pushed home and then the bolts on the front plate, tightened to form a water-tight seal. These are available in single, double opposed and double 90° versions.





### 9.5 Push-fit Connectors

From time to time it may be necessary to connect pipes of non-standard dimensions into the Halifax system. In this case, a Rubber Halifax fix connector can be used to cater for the difference in pipe diameters. The Halifax Fix connectors are available for our 50, 70 and 100mm pipe sizes and each is capable of connecting to a range of smaller diameter pipes. For more information on the range of diameters to which the connector is suited, please speak to a member of our sales team.



### 9.6 Manifold Connector



The Halifax Soil Manifold Connector provides a simplified solution for joining multiple waste sources with the main soil stack. The three insertion points cater to copper, plastic or similar material push-fit connections from 32 to 40mm Diameter. The rubber bungs included with the product allow the insertion points to be blanked off if they are not required thus providing a degree of versatility that will help the system to adapt to the user's requirements.

Connection to the main pipe stack is made by using any of the standard Halifax Soil 100mm couplings such as the Ductile Iron couplings (*HS4012*). The Halifax Soil Manifold connector has been designed in such a way that any incoming waste water will not unduly impede the flow within the main stack.

## 10. Spares & Accessories

---

### 10.1 Accessories

#### Zinc Plated Wall Plate

Wall Plates can be used in conjunction with several brackets plus an M10 threaded rod to form a support system for suspended or vertical pipe stacks.



#### Zinc Plated Thread adapter



Provides an easy transition between threaded components of multiple diameters. The male side of the adapter is sized at M10 with the Female at M12. This allows a larger diameter threaded rod to be used in conjunction with the Zinc Plated Wall plate.

#### Ratchet Spanner

The use of a Ratchet spanner (*HSD001*) greatly simplifies the installation of couplings and enables easier opening and sealing of access products. This comes with a 13mm drive and must be coupled with an appropriate adaptor to match the fastening to be manipulated.



#### Socket Adaptors



There are a range of socket adaptors available to suit the different fixing types used on Halifax Products. A 13mm Hex head adaptor (*HSD002*) is available for access door bolts and for those on some brackets. There are also two Allen socket adaptors available for tightening couplings. These Allen adaptors are available in 6mm (*HSD003*) and 8mm (*HSD004*) sizes.

#### Hex Allen Key

All purchases of ductile iron couplings (With continuity) come with a detailed installation guide plus a 3mm Allen Key (*HSD005*) to tighten the Grub screws. Additional Allen keys may be purchased from our sales team if they are required.



#### Cantilever Arms

These are designed for use with stack support brackets and pipes. They form a horizontal fixing point which allows a variation in the distance from the wall. This could be of great advantage when there are protrusions in the surface of the supporting structure. These arms are also available with a diagonal under brace.

### 10.2 Spares

A range of spares are available upon request. These may include, Nuts, Bolts, Grub screws, Gaskets and doors. For more detailed information please speak to a member of our Sales team who would be happy to check availability.

# 11. Appendix A - Certification

## 11.1 BBA Certificate 06/4401

### Hargreaves Foundry Drainage Ltd

Water Lane  
South Parade  
Halifax  
West Yorkshire HX3 9HG  
Tel: 01422 330607 Fax: 01422 320349  
e-mail: info@hargreavesfoundry.co.uk  
website: www.hargreavesfoundry.co.uk



Agrément Certificate  
**06/4401**  
Product Sheet 1

### HARGREAVES FOUNDRY DRAINAGE SYSTEMS

### THE HALIFAX CAST IRON SOIL AND DRAIN PIPEWORK SYSTEM, PIPE, COUPLINGS AND FITTINGS

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to the Halifax Cast Iron Soil and Drain Pipework System, Pipe, Couplings and Fittings, cast iron products for use in the conveyance of domestic wastewater and rainwater in above- and below-ground applications.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Strength** — the products have adequate resistance to site and service loading (see section 6).

**Performance of joints** — joints with the pipeline remain watertight under conditions where pipeline movement is present, and will not be adversely affected by thermal expansion or contraction (see section 7).

**Flow characteristics** — a cast iron soil system using the pipes, couplings and fittings will have satisfactory flow characteristics (see section 8).

**Resistance to chemicals** — the products will be unaffected by those types and quantities of chemicals likely to be found in domestic waste water (see section 9).

**Resistance to elevated temperatures** — the products have adequate resistance to temperatures likely to occur in service (see section 10).

**Durability** — the products will have a service life equivalent to conventional cast iron sanitary pipework systems (see section 14).



The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Paul Valentine  
Technical Excellence Director

Claire Curtis-Thomas  
Chief Executive

Date of Third issue: 16 November 2017

Originally certificated on 13 March 2013

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément  
Bucknalls Lane  
Watford  
Herts WD25 9BA

©2017

tel: 01923 665300  
fax: 01923 665301  
clientservices@bbacerts.co.uk  
[www.bbacerts.co.uk](http://www.bbacerts.co.uk)

## 11.2 Kitemark Certificate

**bsi.**

**COPY**



By Royal Charter

### Kitemark™ Certificate

This is to certify that:

Hargreaves Foundry Drainage Limited  
Water Lane  
South Parade  
Halifax  
HX3 9HG  
United Kingdom

Holds Certificate Number:

KM 684754

In respect of:

**BS EN 877**

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

This issues the right and licence to use the Kitemark in accordance with the Kitemark Terms and Conditions governing the use of the Kitemark, as may be updated from time to time by BSI Assurance UK Ltd (the "Conditions"). All defined terms in this Certificate shall have the same meaning as in the Conditions.

The use of the Kitemark is authorized in respect of the Product(s) detailed on this Certificate provided at or from the above address.

For and on behalf of BSI:

  
Chris Lewis - Certification Director, Product Certification

First Issued: 2018-09-27

Effective Date: 2018-09-27

Latest Issue: 2018-09-27

Expiry Date: 2021-09-26

Page: 1 of 16



**COPY**

...making excellence a habit.™

This certificate has been issued by and remains the property of BSI Assurance UK Ltd, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP, United Kingdom and should be returned immediately upon request.  
To check its validity telephone +44 (0) 345 080 9000. An electronic certificate can be authenticated [online](#).

BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.  
A member of BSI Group of Companies.



## 11.3 Halifax Soil Declaration of performance (Kitemark Product)



### DECLARATION OF PERFORMANCE No. HF-DOP 3

In accordance with Annex III of Delegated Regulation (EU) No. 574/2014

- 1) Unique identification code of the product type:

**KM001A - Halifax Soil Cast Iron Pipework System designed to meet BS EN 877:1999 + A1:2006 incorporating corrigendum 2008 – Cast iron pipes and fitting, their joints and accessories for the evacuation of water from buildings.**

- 2) Identification of the construction product as required under article 11(4) of the regulation (EU) No. 305/2011:

**Halifax Soil – EN877 Product Range.**

- 3) Intended use or uses of the construction product:

**Above ground conveyance of waste water and rainwater from domestic, commercial & public buildings:**

- 4) Name, registered trade name or registered trade mark and contact address of the manufacturer as required under article 11(5) of the regulation (EU) No. 305/2011:

**Hargreaves Foundry Drainage Ltd**

**Water Lane, South Parade, Halifax, West Yorkshire, HX3 9HG. [www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)**

- 5) Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in article 12(2): **Not applicable**

- 6) System or systems of assessment and verification of consistency of performance of the construction product as set out in Annex V of the regulation (EU) No. 305/2011:

**System 3 for the reaction to fire of the pipe system & system 4 for all other characteristics.**

- 7) In case of the declaration of performance concerning a construction product covered by a harmonized standard:

**The notifying testing laboratory BRE Global No. 0578, performed the initial type testing of the reaction to fire on samples taken by the supplier, under system 3 and EN877:1999 + A1:2006 incorporating corrigendum 2008 – Annex ZA and issued a report for the classification.**

- 8) In the case the declaration of performance concerning a construction product for which a European Technical assessment has been issued: **Not applicable**



9) Declared performances

All essential characteristics listed in the following table correspond to those described in Annex ZA of BS EN 877:1999 + A1:2006 inc. Corr. 2008.

<u>Essential Characteristics</u>	<u>Performances</u>	<u>Harmonized Technical Standard</u>
<b>Reaction to fire:</b> <ul style="list-style-type: none"> <li>○ Cast iron <i>NOTE 1</i></li> <li>○ System*</li> </ul>	A1 A2-s1, d0	EN877:1999 + A1:2006 incorporating corrigendum 2008.
<b>Internal pressure strength</b> <ul style="list-style-type: none"> <li>○ Water tightness</li> </ul>	Conforms	
<b>Dimensional tolerances:</b> <ul style="list-style-type: none"> <li>○ External diameter</li> <li>○ Wall thickness</li> <li>○ Ovality</li> </ul>	Conforms Conforms Conforms	
<b>Impact resistance:</b> Mechanical properties: <ul style="list-style-type: none"> <li>○ Tensile strength pipes</li> <li>○ Ring crush strength pipes</li> <li>○ Brinell hardness pipes</li> <li>○ Tensile strength Fittings</li> <li>○ Brinell hardness Fittings</li> <li>○ Tensile strength Couplings</li> <li>○ Brinell hardness couplings</li> </ul>	min 200 MPa - Conforms min 350 MPa - Conforms 260 HB max - Conforms min 150 MPa - Conforms 260 HB max - Conforms min 420 MPa - Conforms 250 HB max - Conforms	
<b>Tightness: Gas and liquids</b> <i>NOTE 4</i> <ul style="list-style-type: none"> <li>○ Water tightness internal pressure               <ul style="list-style-type: none"> <li>○ Aligned</li> <li>○ Deflected</li> <li>○ Shear</li> </ul> </li> <li>○ Air tightness internal pressure</li> </ul>	$\geq 5$ bar – Conforms $\geq 5$ bar – Conforms $\geq 1$ bar – Conforms $\geq 10$ mbar – Conforms	
<b>Durability aspects</b> <i>NOTE 5</i> <ul style="list-style-type: none"> <li>○ External coatings pipes</li> <li>○ External coating fittings</li> <li>○ External coating couplings</li> <li>○ Internal coating pipes</li> <li>○ Internal coating fittings</li> </ul>	Epoxy – Conforms Epoxy – Conforms Epoxy – Conforms Epoxy – Conforms Epoxy - Conforms	

NOTE 1: In accordance with the Commission decision 96/603/EC of 4<sup>th</sup> October 1996, the material is class A1 without the need for testing.

NOTE 4: For the purpose of tightness the testing with air is more severe since the air molecules will be smaller than those of gasses normally encountered in drainage systems.

NOTE 5: The durability of cast iron is determined by the performance of the coating used. Provided the coating is properly maintained the cast iron products will last indefinitely

\* BS EN877:1999 + A1:2006 inc. corr. 2008 does not allow for fire classifications greater than A2.

10) The performance of the product identified in points 1 and 2 in conformity with the declared performance in point 9. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

**David Leach** – Quality & Technical Departmental Manager

Halifax 09/10/18

(Place and Date of issue)

Signature 

## 11.4 Halifax Soil Declaration of performance (BBA Product)

- Premier Rainwater & Soil Drainage
- Halifax Socketless above & below ground drainage
- Architectural Castings
- Engineering Castings
- Castings Supply



### DECLARATION OF PERFORMANCE No. HF-DOP 1 In accordance with annex III of regulation (EU) No. 305/2011

- 1) Unique identification code of the product type:  
**Halifax Soil Cast Iron Pipework System – EN877 Pipe, Couplings & Fittings.**
- 2) Identification of the construction product as required under article 11(4) of the regulation (EU) No. 305/2011:  
**Halifax Soil – EN877 Product Range.**
- 3) Intended use or uses of the construction product:  
**Above ground conveyance of waste water and rainwater from domestic, commercial & public buildings:**
- 4) Name, registered trade name or registered trade mark and contact address of the manufacturer as required under article 11(5) of the regulation (EU) No. 305/2011:  
**Hargreaves Foundry Drainage Ltd**  
**Water Lane, South Parade, Halifax, West Yorkshire, HX3 9HG. [www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)**
- 5) Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in article 12(2): **Not applicable**
- 6) System or systems of assessment and verification of consistency of performance of the construction product as set out in annex V of the regulation (EU) No. 305/2011:  
**System 3 for the reaction to fire & system 4 for all other characteristics.**
- 7) In case of the declaration of performance concerning a construction product covered by a harmonized standard:  
**The notifying testing laboratory BRE Global No. 0578, performed the determination of the reaction to fire on samples taken by the supplier, under system 3 and EN877:1999 + A1:2006 incorporating corrigendum 2008.**  
**Classification reports for The Halifax Soil Cast Iron pipework system issued:**
- 8) In the case the declaration of performance concerning a construction product for which a European Technical assessment has been issued: **Not applicable**

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HF-DOP 1

**Hargreaves Foundry Drainage Ltd**  
Water Lane, South Parade, Halifax, West Yorkshire HX3 9HG  
Tel: +44 (0) 1422 330607 Fax: +44 (0) 1422 320349 [www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)

Registered in England No. 3428346

- Premier Rainwater & Soil Drainage
- Halifax Socketless above & below ground drainage
- Architectural Castings
- Engineering Castings
- Castings Supply



Hargreaves  
Foundry  
Drainage

Castings

9) Declared performances

Essential Characteristics	Performances	Harmonized Technical Standard
Reaction to fire: -Cast iron - system	A1 A2-s1, d0	EN877:1999 + A1:2006 incorporating corrigendum 2008.
Internal pressure strength: Water tightness	Conforms	
Dimensional tolerances: External diameter Wall thickness Ovality	Conforms Conforms Conforms	
Impact resistance: Mechanical properties: Tensile strength pipes – min 200 MPa Ring crush strength pipes – min 350 MPa Brinell hardness pipes 260 HB max Tensile strength Fittings – min 150 MPa Brinell hardness Fittings 260 HB max Tensile strength Couplings – min 420 MPa Brinell hardness couplings 250 HB max	Conforms Conforms Conforms Conforms Conforms Conforms Conforms	
Tightness: Gas and liquids Water tightness internal pressure Air tightness internal pressure	Conforms Conforms	
Durability aspects External coatings pipes External coating fittings External coating couplings Internal coating pipes Internal coating fittings	Epoxy – Conforms Epoxy - Conforms Epoxy - Conforms Epoxy - Conforms Epoxy - Conforms	

10) The performance of the product identified in points 1 and 2 in conformity with the declared performance in point 9. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by: **Leonard Gill – Technical & QA Manager**  
(Name and function)

(Place and Date of issue): Halifax 24/2/2015

Signature  .....

**Hargreaves Foundry Drainage Ltd**  
Water Lane, South Parade, Halifax, West Yorkshire HX3 9HG  
Tel: +44 (0) 1422 330607 Fax: +44 (0) 1422 320349 www.hargreavesfoundry.co.uk

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HF-DOP 1

Registered in England No. 3428346

## 11.5 Halifax Drain Declaration of Performance (Kitemark Product)



### DECLARATION OF PERFORMANCE No. HF-DOP 4

In accordance with Annex III of Delegated Regulation (EU) No. 574/2014

- 1) Unique identification code of the product type:

**KM001B - Halifax Drain Cast Iron Pipework System designed to meet BS EN 877:1999 + A1:2006 incorporating corrigendum 2008 – Cast iron pipes and fitting, their joints and accessories for the evacuation of water from buildings.**

- 2) Identification of the construction product as required under article 11(4) of the regulation (EU) No. 305/2011:

**Halifax Drain – EN877 Product Range.**

- 3) Intended use or uses of the construction product:

**Below ground conveyance of waste water and rainwater from domestic, commercial & public buildings:**

- 4) Name, registered trade name or registered trade mark and contact address of the manufacturer as required under article 11(5) of the regulation (EU) No. 305/2011:

**Hargreaves Foundry Drainage Ltd**  
**Water Lane, South Parade, Halifax, West Yorkshire, HX3 9HG. [www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)**

- 5) Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in article 12(2): **Not applicable**

- 6) System or systems of assessment and verification of consistency of performance of the construction product as set out in Annex V of the regulation (EU) No. 305/2011:

**System 3 for the reaction to fire of the pipe system & system 4 for all other characteristics.**

- 7) In case of the declaration of performance concerning a construction product covered by a harmonized standard:

**The notifying testing laboratory BRE Global No. 0578, performed the initial type testing of the reaction to fire on samples taken by the supplier, under system 3 and EN877:1999 + A1:2006 incorporating corrigendum 2008 – Annex ZA and issued a report for the classification.**

- 8) In the case the declaration of performance concerning a construction product for which a European Technical assessment has been issued: **Not applicable**



9) Declared performances

All essential characteristics listed in the following table correspond to those described in Annex ZA of BS EN 877:1999 + A1:2006 inc. Corr. 2008

Essential Characteristics	Performances	Harmonized Technical Standard
<b>Reaction to fire:</b> <ul style="list-style-type: none"> <li>○ Cast iron <i>NOTE 1</i></li> <li>○ System*</li> </ul>	A1 A2-s1, d0	EN877:1999 + A1:2006 incorporating corrigendum 2008.
<b>Internal pressure strength</b> <ul style="list-style-type: none"> <li>○ Water tightness</li> </ul>	Conforms	
<b>Dimensional tolerances:</b> <ul style="list-style-type: none"> <li>○ External diameter</li> <li>○ Wall thickness</li> <li>○ Ovality</li> </ul>	Conforms Conforms Conforms	
<b>Impact resistance:</b> Mechanical properties: <ul style="list-style-type: none"> <li>○ Tensile strength pipes</li> <li>○ Ring crush strength pipes</li> <li>○ Brinell hardness pipes</li> <li>○ Tensile strength Fittings</li> <li>○ Brinell hardness Fittings</li> <li>○ Tensile strength Couplings</li> <li>○ Brinell hardness couplings</li> </ul>	min 200 MPa - Conforms min 350 MPa - Conforms 260 HB max - Conforms min 150 MPa - Conforms 260 HB max - Conforms min 420 MPa - Conforms 250 HB max - Conforms	
<b>Tightness: Gas and liquids</b> <i>NOTE 4</i> <ul style="list-style-type: none"> <li>○ Water tightness internal pressure               <ul style="list-style-type: none"> <li>○ Aligned</li> <li>○ Deflected</li> <li>○ Shear</li> </ul> </li> <li>○ Air tightness internal pressure</li> </ul>	≥ 5 bar – Conforms ≥ 5 bar – Conforms ≥ 1 bar – Conforms ≥ 10 mbar – Conforms	
<b>Durability aspects</b> <i>NOTE 5</i> <ul style="list-style-type: none"> <li>○ External coatings pipes</li> <li>○ External coating fittings</li> <li>○ External coating couplings</li> <li>○ Internal coating pipes</li> <li>○ Internal coating fittings</li> </ul>	Epoxy – Conforms Epoxy – Conforms Epoxy – Conforms Epoxy – Conforms Epoxy - Conforms	

NOTE 1: In accordance with the Commission decision 96/603/EC of 4<sup>th</sup> October 1996, the material is class A1 without the need for testing.

NOTE 4: For the purpose of tightness the testing with air is more severe since the air molecules will be smaller than those of gasses normally encountered in drainage systems.

NOTE 5: The durability of cast iron is determined by the performance of the coating used. Provided the coating is properly maintained the cast iron products will last indefinitely

\* BS EN877:1999 + A1:2006 inc. corr. 2008 does not allow for fire classifications greater than A2.

10) The performance of the product identified in points 1 and 2 in conformity with the declared performance in point 9. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

**David Leach** – Quality & Technical Departmental Manager

Halifax 09/09/18

(Place and Date of issue)

Signature 

## 11.6 Halifax Drain Declaration of Performance (BBA Product)

- Premier Rainwater & Soil Drainage
- Halifax Socketless above & below ground drainage
- Architectural Castings
- Engineering Castings
- Castings Supply



### DECLARATION OF PERFORMANCE No. HF-DOP 2 In accordance with annex III of regulation (EU) No. 305/2011

- 1) Unique identification code of the product type:

**Halifax Drain Cast Iron Pipework System – EN877 Pipe, Couplings & Fittings.**

- 2) Identification of the construction product as required under article 11(4) of the regulation (EU) No. 305/2011:

**Halifax Drain – EN877 Product Range.**

- 3) Intended use or uses of the construction product:

**Below ground conveyance of waste water and rainwater from domestic, commercial & public buildings:**

- 4) Name, registered trade name or registered trade mark and contact address of the manufacturer as required under article 11(5) of the regulation (EU) No. 305/2011:

**Hargreaves Foundry Drainage Ltd  
Water Lane, South Parade, Halifax, West Yorkshire, HX3 9HG. [www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)**

- 5) Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in article 12(2): **Not applicable**

- 6) System or systems of assessment and verification of consistency of performance of the construction product as set out in annex V of the regulation (EU) No. 305/2011:

**System 3 for the reaction to fire & system 4 for all other characteristics.**

- 7) In case of the declaration of performance concerning a construction product covered by a harmonized standard:

**The notifying testing laboratory BRE Global No. 0578, performed the determination of the reaction to fire on samples taken by the supplier, under system 3 and EN877:1999 + A1:2006 incorporating corrigendum 2008.**

**Classification reports for The Halifax Drain Cast Iron pipework system issued:**

- 8) In the case the declaration of performance concerning a construction product for which a European Technical assessment has been issued: **Not applicable**

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HF-DOP 2

**Hargreaves Foundry Drainage Ltd**  
Water Lane, South Parade, Halifax, West Yorkshire HX3 9HG  
Tel: +44 (0) 1422 330607 Fax: +44 (0) 1422 320349 [www.hargreavesfoundry.co.uk](http://www.hargreavesfoundry.co.uk)

Registered in England No. 3428346



- Premier Rainwater & Soil Drainage
- Halifax Socketless above & below ground drainage
- Architectural Castings
- Engineering Castings
- Castings Supply



9) Declared performances

Essential Characteristics	Performances	Harmonized Technical Standard
Reaction to fire: - Cast iron - system	A1 B-s1, d0	EN877:1999 + A1:2006 incorporating corrigendum 2008.
Internal pressure strength: Water tightness	Conforms	
Dimensional tolerances: External diameter Wall thickness Ovality	Conforms Conforms Conforms	
Impact resistance: Mechanical properties: Tensile strength pipes – min 200 MPa Ring crush strength pipes – min 350 MPa Brinell hardness pipes 260 HB max Tensile strength Fittings – min 150 MPa Brinell hardness Fittings 260 HB max Tensile strength Couplings – min 420 MPa Brinell hardness couplings 250 HB max	Conforms Conforms Conforms Conforms Conforms Conforms Conforms	
Tightness: Gas and liquids Water tightness internal pressure Air tightness internal pressure	Conforms Conforms	
Durability aspects External coatings pipes External coating fittings External coating couplings Internal coating pipes Internal coating fittings	Epoxy – Conforms Epoxy - Conforms Epoxy - Conforms Epoxy - Conforms Epoxy - Conforms	

10) The performance of the product identified in points 1 and 2 in conformity with the declared performance in point 9. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by: **Leonard Gill – Technical & QA Manager**  
(Name and function)


(Place and Date of issue): Halifax 25/2/2015      Signature 

**Hargreaves Foundry Drainage Ltd**  
Water Lane, South Parade, Halifax, West Yorkshire HX3 9HG  
Tel: +44 (0) 1422 330607 Fax: +44 (0) 1422 320349 www.hargreavesfoundry.co.uk

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HF-DOP 2

Registered in England No. 3428346

# 11.7 Halifax System Safety Data Sheet

	
<b>Safety Data Sheet</b>	
<b>Product:</b>	<b>Halifax Soil &amp; Drain Cast Iron Castings</b>
<b>Ref:</b>	<b>HFDS 005</b>
<b>1. Identification of the substance/mixture and of the company/undertaking</b>	
<b>1.1 Product Identifier/Trade Name:</b>	<b>Halifax Soil &amp; Drain Cast Iron Castings</b>
<b>1.2 Manufacturer / Supplier:</b>	Hargreaves Foundry Drainage Water Lane, South Parade, Halifax, West Yorkshire, HX3 9HG. Tel: +44 (0) 1422 330607 Fax: +44 (0) 1422 320349 email: info@hargreavesfoundry.co.uk
<b>1.3 Emergency Telephone Number:</b>	01422 330607
<b>2. Hazard Identification</b>	
Hazards associated with this product are cuts, abrasions, manual handling and dust/fume when cutting or grinding is used. The dust/fume hazard produced during cutting/grinding may require additional control measures if ventilation is poor and or is likely to exceed the workplace exposure limit, see section 8.2. Minor burns if the "cut" surface is handled before allowing to cool.	
<b>3. Composition and Information about the product</b>	
Castings in Grey or Ductile cast iron	
<b>4. First Aid Measures</b>	
Skin contact: Basic first aid for minor cuts and or grazes. Eye contact: Wash out with plenty of water and if irritation persists seek medical attention. Inhalation: Move the exposed person into fresh air, seek medical attention if irritation of respiratory tract persists.	
<b>5. Fire-fighting measures</b>	
Extinguishing media - Water spray, foam, dry powder or carbon dioxide, will be dependent on actual fire conditions. The metal in this product do not constitute a fire or explosion risk Painted product - In a fire, hazardous decomposition products such as smoke, carbon monoxide, carbon dioxide and oxides of nitrogen may be produced. Breathing apparatus may be necessary due to possible decomposition products being produced.	
<b>6. Accidental release measures</b>	
This product is not classified as hazardous under COSHH regulations. Damaged product can be recycled i.e. Melted and re-cast	
<b>7. Handling and storage</b>	
Cast iron is a heavy material and supplies / products need to be assessed on receipt and appropriate mechanical and manual handling techniques employed to avoid personnel being subjected to lifting or moving excessive weight. Care needs to be taken when handling to avoid potential trap and crush injuries. When handling cast iron products sumo cut level 5 gloves or similar should be worn. If there is any drilling, cutting and or grinding of the casting, then it is recommended that personnel wear suitable gloves, eye protectors and a dust mask. Product should ideally be stored in a clean, dry environment. For product used on "site", then the product should be stored off the ground and protected against mechanical damage and contamination by debris and detritus.	
<b>8. Exposure controls/personal protection</b>	
<b>8.1 Occupational work exposure limits:</b>	
Exposure limits for iron oxide fume as per document EH40/2005 Table 1: List of workplace exposure limits with amendments 2011.	
Long term exposure(8-hr TWA reference period)	5 mg.m-3
Short-term exposure(15-min)	10mg.m-3
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## Safety Data Sheet

### 8.2 Exposure controls (PPE)

**Respiratory Equipment** - When drilling, cutting and or grinding, a suitable respirator should be used, especially if the general level of ventilation cannot remove any dust and fume(s) sufficiently from the area. Additional control measures i.e. local LEV may be required if workplace exposure limits could be exceeded.

**Hand Protection:** For prolonged or repeated skin contact use suitable protective gloves - see section 7

**Eye Protection:** Wear approved safety glasses when cutting, drilling or grinding;

**Other:** Suitable safety boots and overalls are recommended.

### 9. Physical and chemical properties

Appearance	Cast, shaped product
Colour	
Odour	none
pH	N/A
Boiling Point	N/A
Melting Point	N/A
Flash Point	N/A
Flammability	N/A
Auto Ignition Temperature	N/A
Explosive Properties	N/A

### 10. Stability and reactivity

Grey and Ductile cast iron in its solid form is stable and non hazardous

### 11. Toxicological information

This product is not classified as being toxic

Reference section 8.2 for controls measures

### 12. Ecological information

Grey and Ductile cast iron in its solid form is stable and non hazardous

This product poses no known long term adverse effects in aquatic environments

### 13. Disposal considerations

#### **Disposal Methods:**

Dispose of product / scrap in accordance with local authorities regulations.

This product can be recycled and should be the first choice when considering disposal

### 14. Transport information

Classification for transportation - None required

### 15. Regulatory information

Control of Substances Hazardous to Health 2002 (amended)

### 16. Other information

The information supplied in this "Safety Data Sheet" is designed only for guidance for the safe use, storage and handling of the product. The information is correct to the best of our knowledge and belief at the date of publication. This information relates only to the specific product designated above.

## 12. Standard Halifax Specification Clauses

This section contains example clauses which can be used when specifying Halifax Soil & Drain products for your project.

### 12.1 Halifax Soil (Specification) - Above Ground

#### Pipes and fittings

- a) Cast Iron pipes, fittings and accessories for the evacuation of water from buildings; The system shall be designed and installed in accordance with BS EN 12056 - (1-5 Inc.) code of practice for gravity drainage systems and the relevant sections of the Building Regulations.
- b) Nominal diameters of 50mm to 200mm cast iron socketless pipes and fittings for above ground applications which are fully compliant with **BS EN 877:1999 + A1:2006** (Incorporating corrigendum Jan 2008);
- c) **BBA or BSI Kitemark third party approval;**
- d) Pipes and fittings are manufactured to **BS EN 877:1999 + A1:2006** (Incorporating corrigendum Jan 2008) and are **CE marked** in compliance with the EU Construction Products regulations (305/2011)



#### Fire Safety

- e) If applicable, fire testing / classification to be carried out by a UKAS accredited organisation e.g. BRE Global Ltd. See clause (f);
- f) Under the requirements of **BS EN 877:1999 + A1:2006 (Incorporating corrigendum Jan 2008)** clause 4.1.3 and 4.6.3 reaction to fire and fire classification, our Halifax Soil achieved the maximum fire classification of **A2-s1, d0**. **Note:** Under the current EN877 Standard BS EN 877:1999 +A1:2006 incorporating corrigendum Jan 2008, an **A1 fire classification is not possible**. The best fire rating possible is **A2**. We have also been advised that an A1 fire rating is also not possible under EN13501-1 standard alone without reference to EN877 Fire classification criteria, since EN13501-1 is a whole product test and unlike the EN877 Standard, does not allow exclusion of internal coatings from the fire classification under this standard.

#### Acoustics

- g) The acoustic performance of wastewater systems shall be tested as per the requirements of **DIN EN 14366:2004**. All tests should be carried out by a recognised test facility e.g. The Fraunhofer Institute for Building Physics (IBP);
- h) All tests undertaken **must be relevant and up-to-date**, IBP “usually assumes a validity of the test reports of 5 years” and also recommends that the pipe systems are re-examined at a maximum interval of ten years;
- i) Airborne sound is measured in the room where the pipeline is installed and should have readings <50 dB(A) at 4 l/s, Structure -born sound is measured on the other side of the wall to which the pipeline is fixed and should have readings < 20dB(A) at 4 l/s.

- j) *Values below 10 dB(A) are not considered relevant due to increased measurement uncertainty and are not noticeable in a normal living environment;*
- k) Using (Part No. HSD6703 acoustic dampener) in conjunction with the Bismat bracket gives some of the best results for the reduction of structure borne noise.
- l) Pipes, brackets and dampeners must be installed as per manufacturers instructions; failure to follow the installation instructions i.e. incorrect mounting of the clamps, wrong tightening torque, use of spacers, poor load distribution *could result in sound levels varying by up to 15 dB(A).*

## Design and Installation considerations (Pipes, Fittings)

- m) **BS EN 12056-1:2000, section 5.4.2, water and gas tightness:**  
Drainage systems shall be water and gas tight against the operational pressures. Pipework systems installed inside buildings shall not release vapours and foul air into the building.
- n) **BS EN 12056-5:2000, section 6.3, fixing and supporting:**  
Pipelines with joints, which allow longitudinal movement, shall be fixed and/or supported in such a way as to ensure that during service the joint cannot become unintentionally disconnected.  
  
Reaction forces shall be considered.
- o) **The testing requirement of EN877 clause 4.7.5 water tightness** states that the *apparatus preventing excessive axial displacement and the hydrostatic pressures* used in the test, the joints shall not exhibit any visible leakage.

## HF Test Results

- **Aligned** - When tested in accordance with 5.8.4 on test apparatus preventing any excessive axial displacement and subjected to the test conditions and hydrostatic pressures  
Internal pressure at 5 bar for 15 minutes there was no leakage **Pass**
- Deflected**  
When tested in accordance with 5.8.4 on test apparatus preventing any excessive axial displacement and Internal pressure at 0.5 bar for 10 minutes there was no leakage **Pass**
- Internal pressure at 5 bar for 15 minutes there was no leakage **Pass**
- Shear**  
When tested in accordance with 5.8.4 on test apparatus preventing any excessive axial displacement and subjected to the test conditions of >1000N shear force and hydrostatic pressures of 0 -1 Bar (internal)  
Internal pressure at 0.5 bar for 10 minutes there was no leakage **Pass**  
Internal pressure at 1 bar for 15 minutes there was no leakage **Pass**
- Air tightness**



An assembly of DN100 pipe joined with a DN100 DI coupler was tested in accordance with the method described in this clause. When tested in accordance with 5.8.6 on test apparatus preventing any excessive axial displacement and subjected to the test conditions and an air pressure.

Internal pressure at 10 mbar for 10 minutes there was no leakage **Pass**

### Above Ground

- Pipes and fittings up to 150mm diameter shall be joined by couplings capable of withstanding up to 5 bar (accidental static water pressure); In vertical stacks pipes should be installed “true” to line and secured against sideways movement;
- Pipes and fittings that have changes of direction, should have couplings capable of withstanding 5 bar (accidental static water pressure), and be restrained using **grip collars**;
- Joints which will only carry limited pressure because of the intended use and installation, aligned or deflected up to 3° and up to 0.5 bar; such as joints connecting to sanitary ware, e.g. WC, washbasin. require no additional measures.

### Electrical Continuity

- p) Socketless pipes and fittings to be jointed using our **HS “Ductile Iron” Couplings** with zinc plated set screws and synthetic EPDM gasket, and shall have our **unique grub screw system for providing electrical continuity**; coupling colour (red) to match the pipes and fittings;

Or

- q) Pipes and fittings to be jointed using our **HS (WS product code) “Rapid Connect”** stabilised chrome steel couplings with single locking zinc plated set screw and EPDM gasket; the coupling **providing electrical continuity**.



**HS “Ductile Iron” Couplings**



**HS (WS product code) “Rapid Connect”**

If provision is made for electrical continuity, then the electrical resistance must not exceed 0.3Ω. Test results to be made available from an independent test laboratory, and tested in accordance with section NA8 of

BS EN 877:1999 + A1:2006



## Cutting Pipes

- r) Pipes cut on site shall be cut square with clean edges and no burrs, to ensure full entry depth into the couplings gasket register; NOTE: It is recommended that “cut ends” are re-coated with high-quality paint suitable for outdoor use on metallic surfaces due to the uncertainty of any aggressive chemicals passing through the drainage system.

Further information regarding installation of our Soil system pipes and fittings is provided in our installation guidance documents.

## Coatings

- s) Pipes shall be externally coated with a 2-pack epoxy paint, red in colour, with a minimum dry thickness of 40 $\mu$ ; internally coated with a 2-pack epoxy ochre yellow coating with an average dry thickness of 130 $\mu$

## 12.2 Halifax Drain (Specification) - Below Ground

### Pipes and fittings

- a) Cast Iron pipes, fittings and accessories shall be designed and installed in accordance with BS EN 12056 (2 - 3 Inc.) code of practice for gravity drainage systems inside buildings and BS EN 752:2008 and the relevant sections of the Building Regulations e.g. NHBC Standards, Chapter 5.3 drainage below ground.
- b) Nominal diameters of 100mm to 200mm cast iron socketless pipes and fittings for below ground applications which are fully compliant with **BS EN 877:1999 + A1:2006** (Incorporating corrigendum Jan 2008);
- c) **BBA or BSI Kitemark third party approval;**
- d) Pipes and fittings are manufactured to **BS EN 877:1999 + A1:2006** (Incorporating corrigendum Jan 2008) and are **CE marked** in compliance with the EU Construction Products regulations (305/2011)



### Fire Safety

- e) If applicable, fire testing / classification to be carried out by a UKAS accredited organisation e.g. BRE Global Ltd. See clause (f);
- f) Under the requirements of **BS EN 877:1999 + A1:2006 (Incorporating corrigendum Jan 2008)** clause 4.1.3 and 4.6.3 reaction to fire and fire classification, our Halifax Drain has achieved the following fire classification of **A2-s1, d0 (2018) / B-s1, d0 (pre 2018)**. **Note:** Under the current EN877 Standard BS EN 877:1999 +A1:2006 incorporating corrigendum Jan 2008, an **A1 fire classification is not possible**. The best fire rating possible is **A2**. We have also been advised that an A1 fire rating is also not possible under EN13501-1 standard alone without reference to EN877 Fire classification criteria, since EN13501-1 is a whole product test and unlike the EN877 Standard, does not allow exclusion of internal coatings from the fire classification under this standard.

### Design and Installation considerations (Pipes, Fittings)

- g) **BS EN 12056-1:2000, section 5.4.2, water and gas tightness:**  
Drainage systems shall be water and gas tight against the operational pressures. Pipework systems installed inside buildings shall not release vapours and foul air into the building.
- h) **BS EN 12056-5:2000, section 6.3, fixing and supporting:**  
Pipelines with joints, which allow longitudinal movement, shall be fixed and/or supported in such a way as to ensure that during service the joint cannot become unintentionally disconnected.

Reaction forces shall be considered.

**The testing requirement of EN877 clause 4.7.5 water tightness** states that when tested in accordance with 5.8.4 and 5.8.5, on test apparatus **preventing any excessive axial displacement** and subjected to the test conditions **and the hydrostatic pressures** used in the test as per clause 4.7.5, the joints shall not exhibit any visible leakage.

### HFD Test Results

- **Aligned** - When tested in accordance with 5.8.4 on test apparatus preventing any excessive axial displacement and subjected to the test conditions and hydrostatic pressures

Internal pressure at 5 bar for 15 minutes there was no leakage **Pass**

#### **Deflected**

When tested in accordance with 5.8.4 on test apparatus preventing any excessive axial displacement and Internal pressure at 0.5 bar for 10 minutes there was no leakage **Pass**

Internal pressure at 5 bar for 15 minutes there was no leakage **Pass**

#### **Shear**

When tested in accordance with 5.8.4 on test apparatus

preventing any excessive axial displacement and subjected to the test conditions of >1000N shear force and hydrostatic pressures of 0 -1 Bar (internal)

Internal pressure at 0.5 bar for 10 minutes there was no leakage **Pass**

Internal pressure at 1 bar for 15 minutes there was no leakage **Pass**

#### **Air tightness**

An assembly of DN100 pipe joined with a DN100 DI coupler was tested in accordance with the method described in this clause. When tested in accordance with 5.8.6 on test apparatus preventing any excessive axial displacement and subjected to the test conditions and an air pressure.

Internal pressure at 10 mbar for 10 minutes there was no leakage **Pass**

- Pipes and fittings that have changes of direction, should have couplings capable of withstanding 5 bar (accidental static water pressure), and be restrained using **grip collars**;

## Cutting Pipes

- i) **Pipes** cut on site shall be cut square with clean edges and no burrs, to ensure full entry depth into the couplings gasket register; NOTE: It is recommended that “cut ends” are re-coated with a high-quality paint suitable for outdoor use on metallic surfaces due to the uncertainty of any aggressive chemicals passing through the drainage system.

Further information regarding installation of our Drain system pipes and fittings is provided in our installation guidance documents.

## Coatings - Below ground

- j) **Pipes** shall be **externally** coated with a 2-pack epoxy paint, grey in colour with an average dry coating thickness of 170µ; internally coated with a 2-pack ochre yellow with a minimum dry coating thickness of 130µ;

**Fittings / Couplings** shall be painted **externally** with a 2-pack epoxy paint, grey in colour to an average dry coating thickness of 150µ, and internally in a 2-pack epoxy paint, (grey or red in colour), to a dry coating thickness of 150µ.





Hargreaves  
Foundry  
Drainage



**Sales**

01422 330607

[sales@hargreavesfoundry.co.uk](mailto:sales@hargreavesfoundry.co.uk)



**Technical**

01422 399113

[technical@hargreavesfoundry.co.uk](mailto:technical@hargreavesfoundry.co.uk)

[www.soilanddrain.co.uk](http://www.soilanddrain.co.uk)