



# Section 4

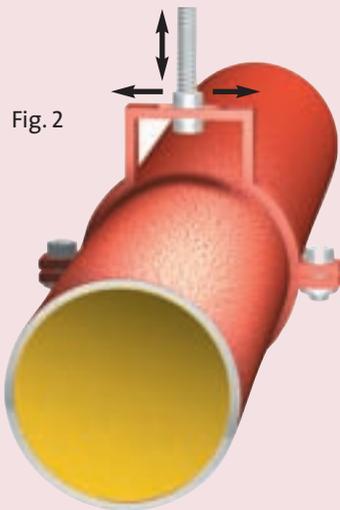
## Brackets – technical

**Ensign cast iron drainage 1st choice for commercial offices**

Ensign has the performance to promote a productive and safe environment:

- non-combustible – will not drip as molten, burning globules (unlike HDPE), contributing to spread of fire and threat of injury, and will not emit toxic fumes like UPVC
- silent in operation – staff/ employees will not hear the drainage system in action and therefore will not be distracted in their work – the quietest system on the market
- requires minimal up-keep – helps keep maintenance costs and disruption to an absolute minimum
- durable – systems last in excess of 50 years, reducing any further drain on financial resources

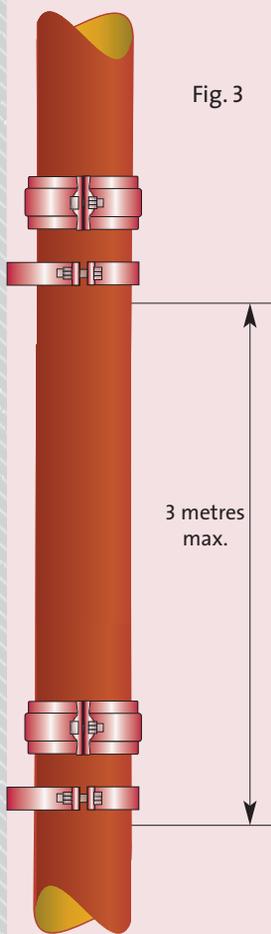
# Pipe support brackets



The unique, all-purpose, lightweight, ductile iron bracket incorporates an elongated slot at the fixing point (see Fig. 2).

This allows both vertical and lateral adjustment without dismantling the pipe system.

# Support for vertical pipework



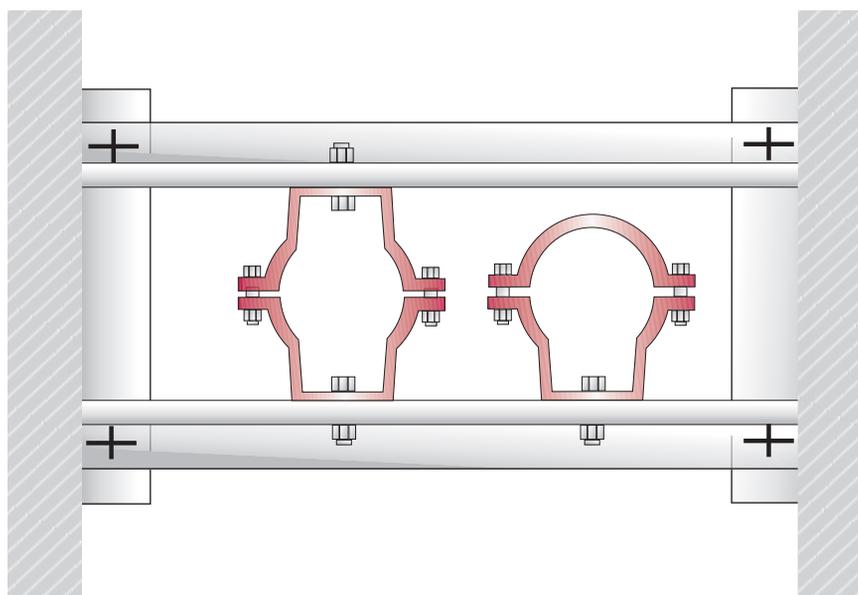
For vertical waste or rainwater stacks, it is recommended that a load-bearing bracket be fitted to each floor level, to carry the weight of the pipe and its contents. This is of particular importance on multi-storey applications.

These brackets should be tightened as the stack is built up, so that each floor height is self-supporting and undue pressure is not imposed upon the base of the stack.

Where rainwater and soil stacks (as Fig. 3) are located at standard distances from wall or column (see table below), one bracket EF048 per length of pipe will be adequate within 600mm of the joint.

<b>Ensign pipe diameters</b>	50, 70	100, 150, 200
<b>Stand distances from back of pipe wall face</b>	32mm	38mm

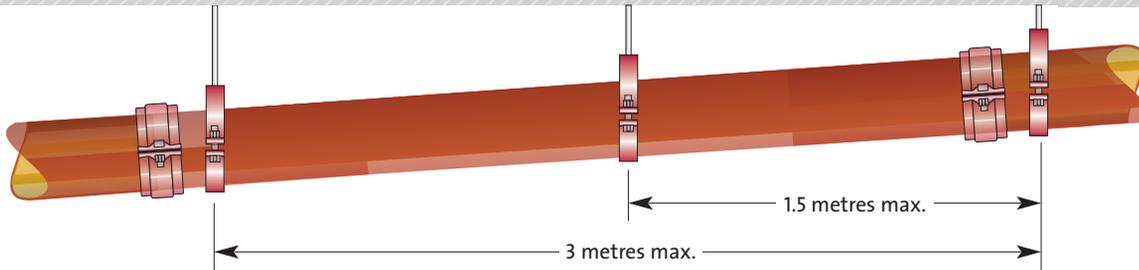
Additional brackets may be required where fittings are installed within the vertical stack, at the discretion of the designer.



Typical support arrangement for vertical pipework.

# Support for low gradient pipework

Fig. 4



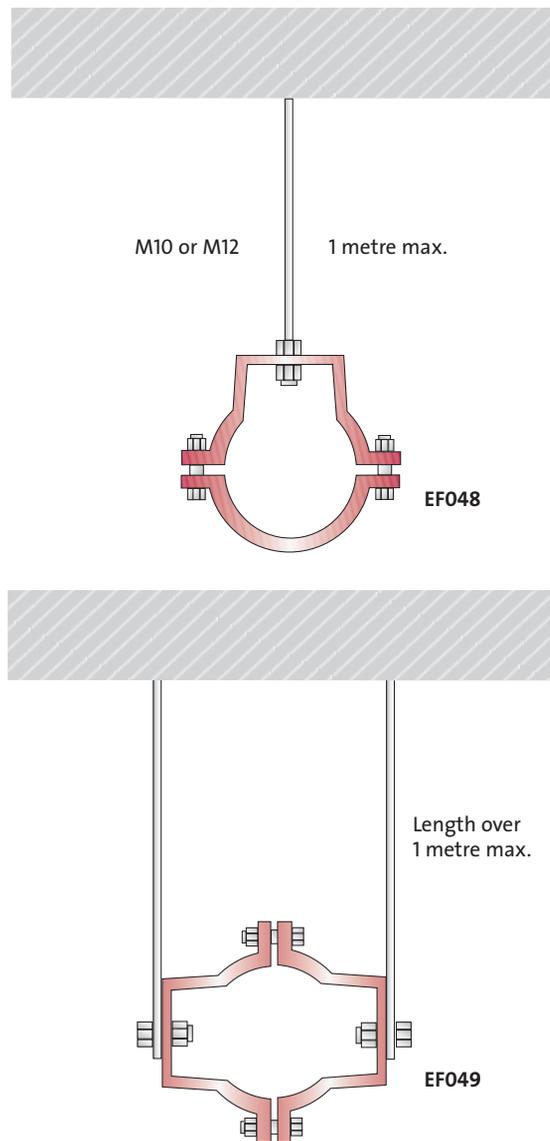
The distance between pipe supports should not exceed 3 metres, as advised in BS EN 12056-2 Code of Practice for Sanitary Pipework.

However, as shown in Fig. 4, to ease installation it is recommended that suspended Ensign pipework should have two bracket supports per 3 metre length.

Positioning of brackets as follows:

One bracket maximum of 300mm from joint. Second bracket positioned approximately centre of 3m length pipe, or as further guidance, 1.5m approx. from first bracket (see diagram).

## Typical support arrangement for horizontal pipework



## Pipe weights per metre

Size	Empty	Full
50	4.4	6.5
70	6.0	10.0
100	8.5	17.8
125	11.9	24.6
150	14.3	32.5
200	23.3	54.8
250	33.5	87.9
300	43.6	121.3
400	59.3	176
500	81.6	278
600	107.3	391

Note: Design details within the catalogue are for gravity systems only or accidental pressure up to 1 bar (for pipe diameters 50-150mm).

For systems which require higher accidental pressure (for pipe diameters >150) please telephone: Technical Helpline 01952 262562.

## Brackets – Components

Bracket diameter	50	70	100	125	150	200	250	300
Threaded rods (recommended)	M10	M10	M10	M10	M12	M12	M12 (x 2)	M12 (x 2)

Maximum recommended length of threaded rod is 1 metre for single drop EF048, two drops recommended over 1 metre EF049 type bracket. Lateral movement brace **may** be required for horizontal pipework at 6 metre spacing.

# Stack support pipe

The stack support pipe offers extra support to fittings and brackets.

**When to use stack support pipe/brackets**

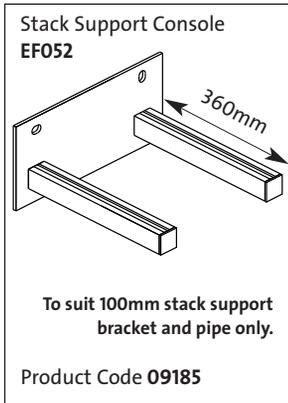
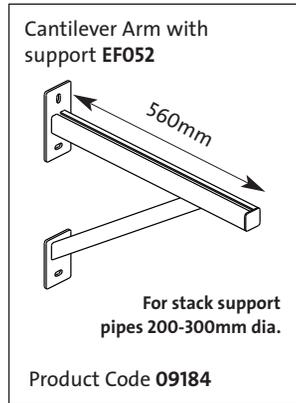
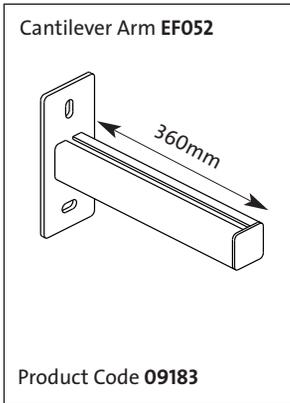
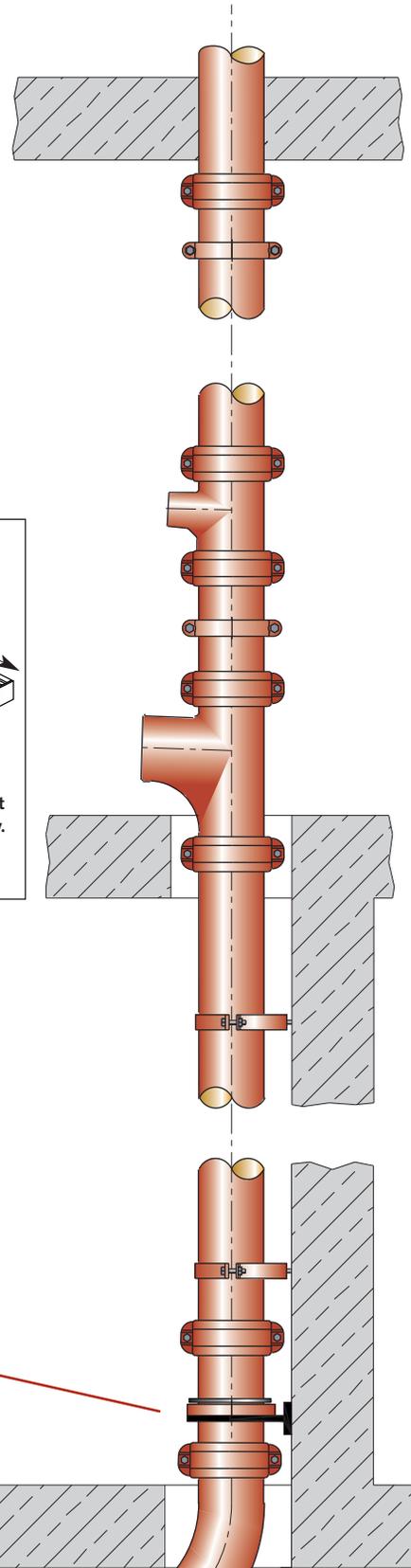
If using standard ductile iron proprietary brackets EF048/EF049	NO
If using rubber lined steel brackets	YES
If using new acoustic brackets EF048AD	YES
If using mild steel fixing brackets	YES

When stack support pipes/brackets are required, use on any building with an average of 2.5m between floors, positioning stack support pipe at the base of the first floor, and every subsequent fifth floor.

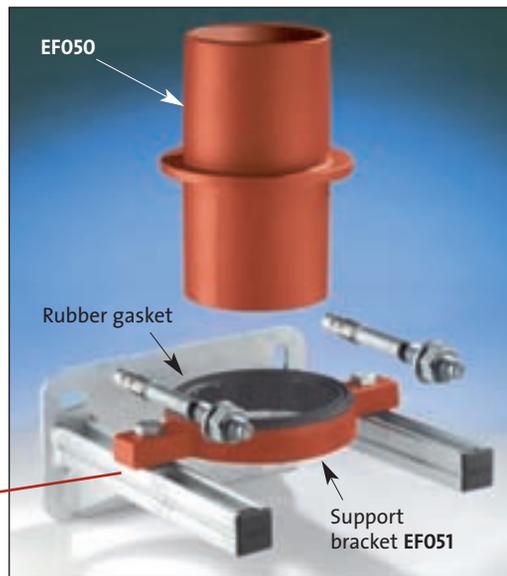
This should be typically fixed to a wall or column, as illustration below. The use of the new cantilever arm/console range EF052 is ideal for support and fixing of bracket.

**IMPORTANT!** A stack support pipe is not an alternative to bracketing, but an additional support bracket.

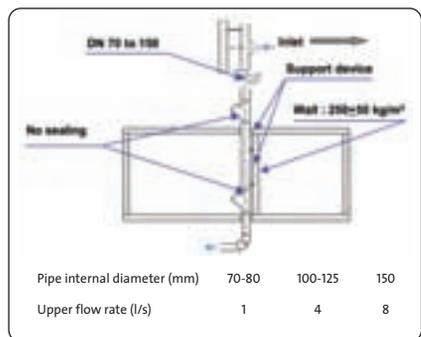
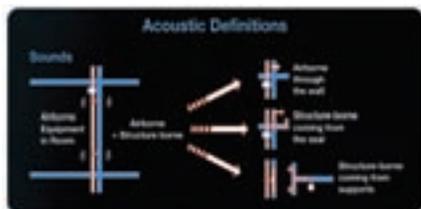
*Wall bracketing system in mild steel, for use with stack support pipe and brackets are available.*



**10mm retaining nut Product Code 09186**  
Sits in the cantilever arm or console to retain the 10mm set screw, securing the bracket.



# Acoustic brackets



The evacuation of waste, soil and rainwater generates structure-borne and airborne sound between rooms and usually occurs as the result of a mixed flow, when the pipe is filled with water and air. In such circumstances a pipe will radiate noise outwards and transfer it to any lightweight ceilings, cupboards and similar areas wherever it makes contact.

### Relevant regulations

UK building regulations Document 'E' provides guidelines in residential dwelling houses, flats for separating walls, separating floors and stairs with a separating function – stipulating an airborne insulation value of 43-45dB(A).

### BS 8233:1999 – Code of practice for governing acoustics within buildings

- Suggests acoustic levels by building type, ie. office, library, bedroom, etc
- Provides details of acoustic insulation and their estimated insulation value

### BS EN 14366:2004

A new standard introduced to provide manufacturers of all drainage materials with a simple testing criteria (see diagram). The results recorded should be comparable and allow the specifier to make a more informed choice.

Ensign was the first UK drainage system to be tested to this new European Standard, carried out on the complete range of Ensign bracketry providing independently assessed results.

### Conclusions of tests

All brackets within the Ensign range meet the requirements of BS 8233. For exceptionally low levels of acoustic performance, the standard ductile iron bracket fitted with a new acoustic dampener should be used (see table).

	Airborne sound Pressure level La, A [dB(A)] <sup>1</sup>		Structure-borne sound characteristic level Lsc, A [dB(A)] <sup>1</sup>		Number of brackets used	Wall density kg/m <sup>2</sup>
Flow rate [litres/second]	2.0	4.0	2.0	4.0	–	–
Ductile iron bracket EF048	45	48	27	32	2	220
Steel bracket rubber lined	48	51	19	24	2	220
Ductile iron bracket filled with acoustic dampener	45	47	5	11	2	220

Test report P-BA 99/2006e

The general requirement for residential/habitable rooms according to BS 8233 is for 30-35dB(A) for structure-borne sound.

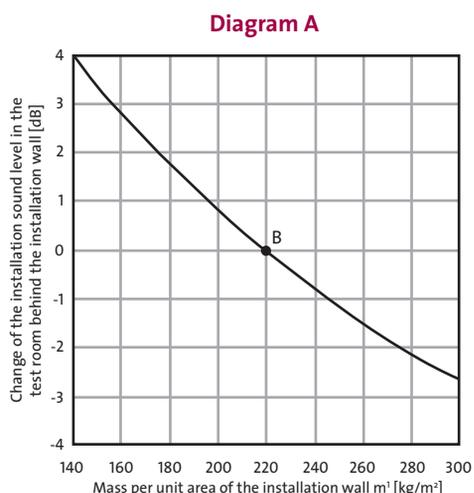
**Please note:** When comparing Ensign to alternative systems – ensure comparing the same flow rate, and number of brackets used in the tests (eg. 2). For vertical stacks, Ensign often requires only one bracket per 3 metres, therefore acoustic performance will be even better in this instance.

### Effect from changes in wall density

Apart from the acoustical properties of the tested installation the measured sound level also depends on the construction of the test facility. One of the most important parameters in this context is the mass per unit area of the installation wall. For the installation test facility in the Fraunhofer-Institute of Building Physics, the effect of the installation wall on the installation sound level has been investigated by acoustical calculations. The results of the calculations are shown in Diagram A, which approximately shows how much the installation sound level in the test room behind the installation wall will change when the mass of the installation wall is modified.

### Diagram A

Change of the installation sound level in the adjacent test room against the mass per unit area of the solid installation wall at constant sound excitation. The figure shows the change of the installation sound level in comparison to an installation wall with a mass per unit area of 220kg/m<sup>2</sup>. The mapped curve originates from acoustical calculations and refers to the conditions in the installation test facility in the Fraunhofer-Institute of Building Physics. Generally they cannot be transferred to other building conditions without restrictions. The calculations were performed on condition that thickness, loss factor and elastic modulus of the installation wall remains constant. Basis of the calculations were measurements of the installation sound level performed on a solid wall with a mass per unit area of 220kg/m<sup>2</sup>.



B = Ensign at 11dB(A).  
 Example: wall density reduced to 140kg/m<sup>2</sup> then laboratory acoustic measurement of Ensign increased to 15dB(A) at 4 litres per second.

# Acoustic bracket features



Markings  
40-150  
ww-yy  
DEP

Developed to meet the increasing demand for buildings which require a high level of acoustic performance over and above the guidelines of BS 8233:1999 (UK Code of Practice for governing acoustics within buildings). Tested to BS EN 14366:2004. *Laboratory measurements of noise from waste water installations.*

*The EF048 ductile iron bracket fitted with the new acoustic dampener achieved an exceptionally low level of noise transmission.*



**Material:**

1. Dampener – elastomer EDPM
2. M8-M10 nut – galvanised-bichromated steel (will accept both threaded options)
3. Retainer cup – AISI 304 stainless steel
4. Small dish – AISI 304 stainless steel
5. M8-M10 tapped base – galvanised-bichromated steel

Size	50mm	70mm	100mm	150mm
Product Code	199881	199882	199883	199884

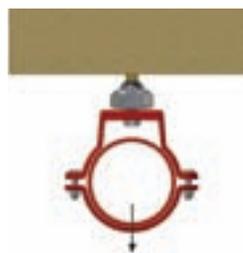
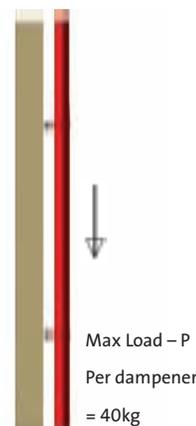
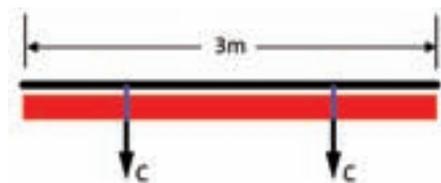
- Supplied fitted to EF048 bracket 50mm to 150mm
- EF048 bracket is manufactured in high strength ductile iron and red epoxy coated
- Dampener is connected to EF048 using M10 x 25 zinc and clear coated steel set screw with 2 x 25mm washers

# Acoustic bracket installation

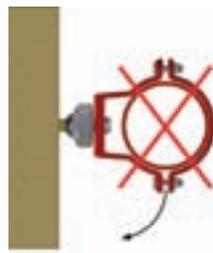
Vertical pipe stack – one acoustic bracket minimum per 3 metres. It is also recommended that the EF050/EF051 stack support is used every fifth floor.



Max Load – C  
Per dampener  
= 100kg



Horizontal suspended pipework – two acoustic brackets minimum per 3 metres.



Horizontal pipework – fixing brackets on side as per diagram is not recommended, this will lead to product failure.

In every case of fixing – to obtain the best noise reduction, the elastomeric dampener must not be deformed or compressed!