



# Section 3

## Couplings - Technical

Ensign and EEZI-FIT the informed choice for residential and hotels

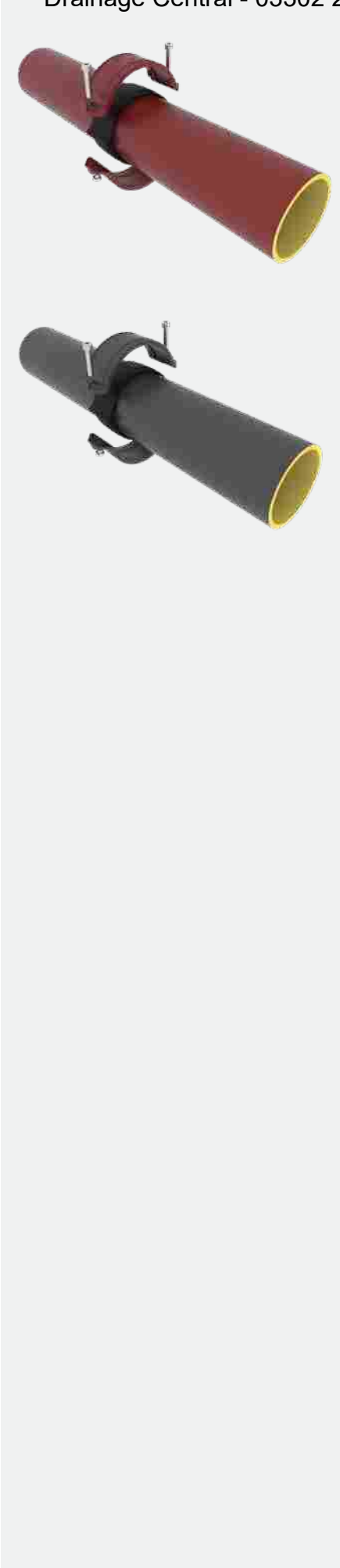
Ensign EEZI-FIT provides the installer the flexibility required for robust drainage solutions.

- Flexible range of fittings allowing connections to waste
  - Boss branches single and double
  - Boss pipes with up to 3 connections
  - Manifold with extended spigot
- Speed and simplicity of push-fit assembly:
  - 13 storey tower blocks in Hastings - installed by United House
  - Successfully installed and tested new sanitary EEZI-FIT soil stacks on 13 storeys in one day
- Acoustically the quietest solution on the market
  - 8-10 dB(a) quieter than acoustic plastic systems



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# Coupling Specification

## Above ground

50mm to 125mm two-piece couplings EC002 utilise two socket cap set screws and nuts (M12). 150mm to 300mm couplings utilise four socket cap set screws and nuts (M12), all driven by 6mm Allen key drive.

The couplings incorporate four iron nibs on each half piece which provide electrical continuity satisfying the requirements of IEE regulations (see page 58). The couplings are manufactured in ductile iron and incorporate an EPDM elastomer seal. The above ground couplings are coated in a red epoxy coating (see P100 for specification)

Nitrile gaskets are available on request POA.

Alternatively, for push-fit solution see EEZI-FIT range available in 100mm and 150mm diameters.

For 400-600mm above and below ground ranges (see high performance couplings pages 19 and 45).

## Below ground

100, 150-300mm ductile iron couplings ED001 utilise stainless steel socket cap set screws and nuts (M8), are grey epoxy coated and do not feature the continuity nibs.

Alternatively, for push-fit solution in 100mm and 150mm diameters (see page 46)

Pressure capability:

The Ensign mechanically jointed system is designed for various gravity applications:

- Foul soil, waste and vent
- Rainwater

These can be installed in various sections of the building:

- Vertical risers
- Horizontal/suspended (ie. basements)
- Buried in concrete under the building.
- In the ground to the main sewer network.

The system generally operates at gravity pressure levels ie. 0.5 bar, but is capable of withstanding much higher “accidental” static pressure in the event of a blockage – the level depending on:

- 1) The diameter of pipework
- 2) The coupling type used
- 3) If the system is restrained or unrestrained.

See Table below

| System          | Coupling          | Material               | Type       | Diameter                | Accidental static water pressure (bar) |               |
|-----------------|-------------------|------------------------|------------|-------------------------|--|---------------|
|                 |                   |                        |            |                         | Unrestrained                           | Restrained*   |
| Ensign Soil     | EC002             | Ductile Iron           | Mechanical | 50mm to 100mm           | Up to 1 bar                            | Up to 5 bar   |
| Ensign Soil     | EC002             | Ductile Iron           | Mechanical | 125mm to 150mm          | Up to 0.5 bar                          | Up to 5 bar   |
| Ensign Soil     | EC002             | Ductile Iron           | Mechanical | 200mm to 300mm          | Up to 0.3 bar                          | Up to 3 bar   |
| Ensign Soil     | EC002/<br>EC002GC | Ductile Iron<br>+ Grip | Mechanical | 100mm, 150mm<br>+ 200mm | Up to 5 bar                            | Up to 5 bar   |
| Ensign Soil     | EC002HP           | S/Steel                | Mechanical | 100mm to 300mm          | Up to 5 bar                            | Up to 10 bar  |
| Ensign Soil     | EC002HP           | S/Steel                | Mechanical | 400mm to 600mm          | Up to 1 bar                            | Up to 5 bar   |
| Ensign EEZI-FIT | EZ001             | Cast Iron              | Push-fit   | 100mm + 150mm           | Up to 0.1 bar                          | Up to 0.5 bar |
| Ensign Drain    | ED001             | Ductile Iron           | Mechanical | 100mm                   | Up to 1 bar                            | Up to 5 bar   |
| Ensign Drain    | ED001             | Ductile Iron           | Mechanical | 150mm                   | Up to 0.5 bar                          | Up to 5 bar   |
| Ensign Drain    | ED001             | Ductile Iron           | Mechanical | 200mm to 300mm          | Up to 0.3 bar                          | Up to 3 bar   |
| Ensign Drain    | EC002HP           | S/Steel                | Mechanical | 100mm to 300mm          | Up to 5 bar                            | Up to 10 bar  |
| Ensign Drain    | EC002HP           | S/Steel                | Mechanical | 400mm to 600mm          | Up to 1 bar                            | Up to 5 bar   |
| Ensign Drain    | ED04              | Cast Iron              | Push-fit   | 100mm + 150mm           | Up to 0.1 bar                          | Up to 5 bar   |

**Note - 'Accidental' static water pressure** \*Bracketed to prevent movement



## Ensign/Timesaver connecting couplings

To connect Ensign to Timesaver drain systems use Timesaver transitional couplings which are coated in a black water base primer coating. (See table below identifying the coupling required).

| Size dia | Ensign pipe dia |     | Timesaver pipe dia Drain TDOO |     | Coupling required | Product code |
|----------|-----------------|-----|-------------------------------|-----|-------------------|--------------|
|          | Max             | Min | Max                           | Min |                   |              |
| 100      | 112             | 109 | 119                           | 116 | TDO2              | 191297       |
| 150      | 162             | 158 | 173                           | 170 | TDO2              | 191298       |

## Ensign Electrical Continuity

The Ensign two-piece couplings are supplied with four iron nibs to each half-piece, providing electrical continuity (equipotential bonding) automatically when tightened to the recommended torque.

The installation should be tested in accordance with BS EN 12056-2 for gravity drainage, and BS EN 12056-3 for rainwater, and to IEE regulations on equipotential bonding (earthing).

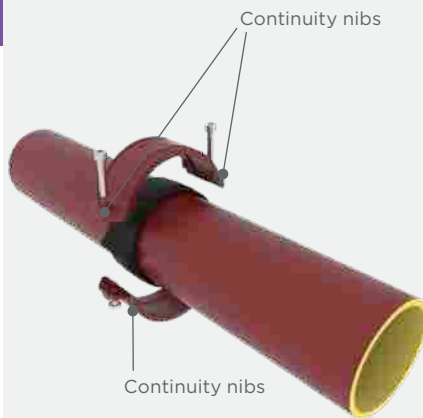
Provided that the Ensign electrical continuity coupling is assembled and installed as recommended in our instructions (see page 70) and the pipework is bonded to the electrical earth or similar earth, it is considered that the Ensign electrical continuity coupling will satisfy the IEE regulations.

It is recommended that the installation is regularly checked for equipotential bonding (earthing) in case of accidental damage, unauthorised pipework, modifications etc.

If an Ensign electrical continuity installation is to be modified for any reason, electrical continuity couplings must be used and the installation re-tested for equipotential bonding (earthing).

The test for electrical continuity on-site should be in accordance with BS 6087 amendment 2.

If provision is made for electrical continuity the electrical resistance of the coupling shall not exceed 0.3 ohms when tested in accordance with BS EN 877. Apply a steadily increasing voltage not exceeding 50V ac, 50 Hz, across the junction until a steady current of  $25 \pm 1A$  flows through the coupling. Allow the current to flow for 30s, maintaining it as necessary by adjusting the voltage. Calculate the resistance of the coupling by dividing the observed voltage by the current.



Second clip installed (diametrically opposed)

Lightly tap clip until resistance achieved



Protruding tongue inserted between rubber seal and edge of coupling

## Ensign EEZI-FIT Electrical Continuity

In situations where equipotential bonding (earthing) has been specified electrical continuity clips can be fitted to the Ensign EEZI-FIT system, with two continuity clips per joint diametrically opposed.

Fitting instructions - after the joint has been completed

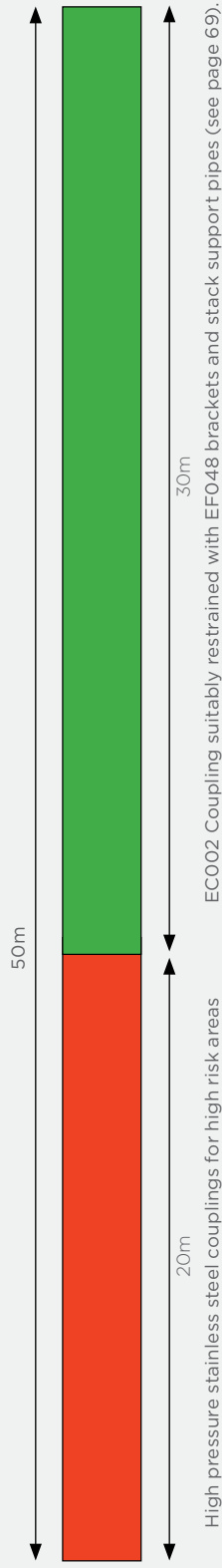
1. Locate clips by inserting the protruding tongue in between the edge of the coupling and the rubber seal.
2. Lightly tap each clip (in line with the pipe/fitting) until resistance is established.

The electrical continuity clips are supplied separately in bags of 30. Product Code 208462. Testing should be carried out in accordance with BS 6087 Amendment 2.

# High Performance Installation

Typical installation for high performance stainless steel couplings (EC002HP).

Alternatively use new grip collars EC002GC (see page 64).



Stainless Steel Coupling - EC002HP  
 NOTE: If access is required at lower level - telephone Technical Helpline: 01952 262529.  
 Stainless Steel Coupling - EC002HP

Stainless Steel Couplings - EC002HP

Stainless Steel Coupling - EC002HP



## Jointing Method

Couplings are supplied pre-assembled. The 100mm and 150mm Ensign couplings have been designed to allow assembly without dismantling the coupling.



1. Slacken bolts on coupling to fullest extent to ease assembly.



2. Push coupling over the end of the pipe or fitting ensuring the central register is abutted against the spigot edge.



3. Push the second pipe or fitting into the coupling again ensuring that the spigot is abutted against the central register.



4. Check alignment of assembly before tightening the bolts. Coupling bolts on all sizes are M8 and require special Allen socket adaptor (6mm) EF102, together with a ratchet spanner EF100. Alternatively use a time saving power tool.



**Note:** Bolts should be tightened until a suitable resistance is achieved if using a torque wrench if using a power drill or ratchet spanner 20Nm.

The couplings **do not need** to be completely tightened until both halves are touching. Guidelines: 2-3mm gap.

Over-tightening the couplings can apply excessive stress to the coupling bolts.

## Tools



|   | Product code |
|---|--------------|
| A - Lubricant for EEZI-FIT push-fit assembly joints (0.5 litre tub)   | 199037       |
| B - 13mm A/F 'T' Box Spanner EF098<br>For use with nuts on fixing brackets and on access door fittings  | 191200       |
| C - 13mm A/F ½" Square-drive EF101<br>Deep Socket (use with ratchet B) For use with nuts on fixing brackets and on access door fittings                               | 191202       |
| D - 6mm Allen Socket Adaptor (use with ratchet B) EF102<br>For use with bolts on all ductile iron couplings   | 191753       |
| E - ½" Square-drive EF100<br>Ratchet Spanner (use with C and E) For use with nuts on fixing brackets and on access door fittings and also with new two-piece coupling | 191201       |



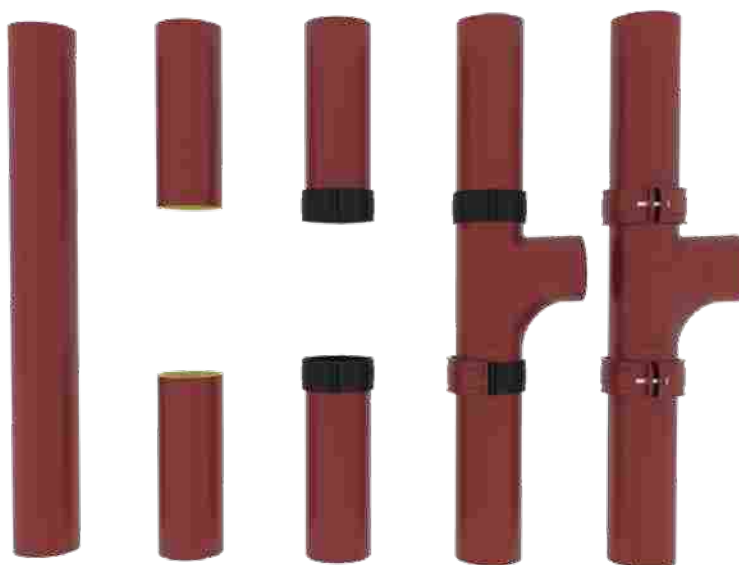


# Installation Modifications

## Modifications to an existing Ensign installation

### Typical example

1. Measure length of branch, adding a further 15mm in total to allow for coupling's central register top and bottom.
2. Make sure existing pipework is adequately supported from above.
3. Mark pipe position for cutting.
4. Cut pipe using powered disc cutter or wheel cutter.
5. Coat cut ends with appropriate touch-up (epoxy coating).
6. Lubricate cut spigot end of pipe and the coupling gasket with a silicon lubricant.
7. Push the rubber gaskets onto the spigot cut ends top and bottom, ensuring the central registers are abutted against each spigot edge.
8. Position fitting in the stack within each rubber gasket abutting against the central registers.
9. Loosely assemble the coupling around each gasket.
10. Check alignment of assembly before tightening the bolts, to recommended level (minimum 20Nm).
11. Test new stack for successful joints.



### Typical example

X = fitting + 15mm

### Building Regulations - Drainage and waste disposal - Approved Document H 2010

#### Testing of Sanitary pipework (Approved Doc H)

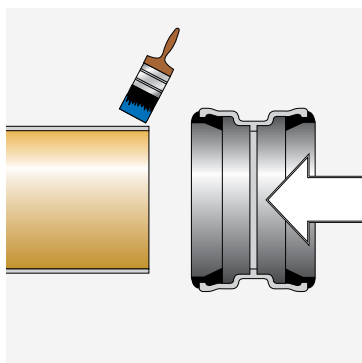
1.38 The pipes, fittings and joints should be capable of withstanding an air test of positive pressure of at least 38mm water gauge for at least 3 minutes. Every trap should maintain a water seal of at least 25mm. Smoke testing may be used to identify defects where a water test has failed.

#### Testing of Foul drainage pipework

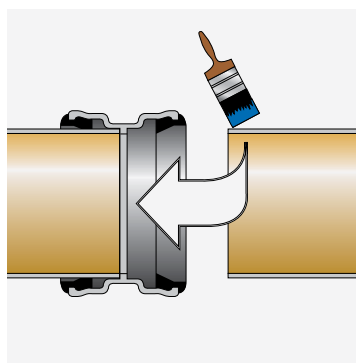
Pipes up to 300mm diameter the pipe should be pressurised up to a pressure of 110mm water gauge and held for approximately 5 minutes prior to testing. Following this the pipe should be able to hold an initial 100mm pressure with max loss of head on a manometer of 25mm in a period of 7 minutes.



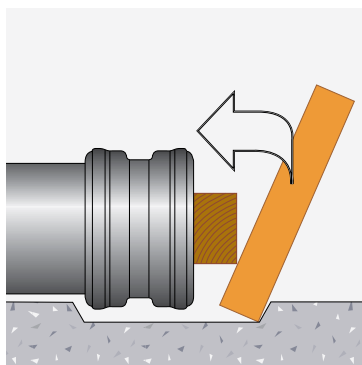
## Installation PFJ Drain Coupling ED004



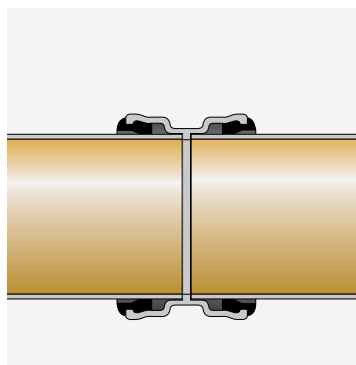
**1.** Apply lubricant (ie. silicone) to spigot end of drain pipe (remove any burrs etc. if previously cut).



**2.** Place in position and apply force easing coupling into end of pipe until abuts to the central register.



**3.** Apply lubricant to second pipe align with coupling and push pipe until abuts to central register.



**4.** Completed joint.







## Ensign EEZI-FIT Jointing Method



**1.** Apply a small amount of jointing lubricant on the lip of the rubber gaskets at both ends to ease insertion of pipe/fittings.



**2.** Push joint over the end of pipe, ensuring the central register is abutted against the spigot edge evenly.



**3.** Apply a small amount of lubricant. Push the second pipe or fitting into the gasket again ensuring that the spigot is abutted against the central register.



**4.** Installation complete.

When jointing to pipe which has been cut, please remove any sharp edges (chamfering is not necessary). Saint-Gobain PAM UK recommend the use of its own jointing lubricant available in 0.5kg tubs. Product Code of the lubricant: 199037. (Please read health and safety instructions when using this product).

## Ensign Push-Fit Couplings Performance

Accidental static water pressure (bar)

| Coupling | Material  | Type     | Diameter     | Restrained    |
|----------|-----------|----------|--------------|---------------|
| EZ001    | Cast iron | Push-fit | 100 to 150mm | Up to 0.5 bar |
| ED004    | Cast iron | Push-fit | 100 to 150mm | Up to 5 bar   |

**Note:** Ensign EEZI-FIT is designed to meet gravity 0.5 bar performance BS EN 877 although has been successfully tested to 2 bar.



## PAM Ensign Grip Collars

### Internal pressure resistance

Excessive internal pressure in drainage networks is always accidental. However, in specific areas – changes of direction, gradient or some components like branches and plugs – the junctions are exposed to end thrust forces that have to be addressed.

The grip collar is an added device used in these specific areas to lock the coupling and ensure both water tightness and mechanical stability of the pipework.



1. Position the two half parts of the PAM Ensign grip collar so to encircle the coupling uniformly. The grip collars must be positioned so that the apertures fit over the fixing bolts of the coupling and the teeth are directly located onto the pipe.



2. Insert the four screws to fix the two parts together loosely.



3. Tighten the screws crosswise alternatively so that the two plates are put in parallel with the same spacing.

### Tightening torques

The PAM Ensign grip collar is designed to be fully tightened, so there is no need checking the torques. To ease the torque programming of power tools, the following values are given for indication:

Indicative torques:

DN50-125: 20Nm

DN150-200: 30Nm

The PAM Ensign grip collar is designed to withstand four assembly cycles.

Note: The PAM Ensign grip collar has been designed to be compatible with ductile iron couplings (100 to 200mm diameter).

### Installation recommendations

In certain fitting arrangements care needs to be given to the positioning of the grip collars when installing over the Ensign ductile iron couplings. This calls for a special installation procedure to avoid any on-site difficulty. Contact technical department 01952 262529.

