

## Installation: Ductile Iron Coupling



1. Slacken the bolts on the Ductile Iron coupling, fully removing one bolt completely. Remove the EPDM rubber gasket.



2. Push the EPDM rubber gasket over the end of the pipe or fitting ensuring that the central inner register is abutted against the spigot end.



3. Ease the next pipe or fitting into the EPDM rubber gasket making sure that the spigot end is against the central inner register.



4. Loosely fit the coupling around the gasket, ensuring that the rubber lip sits into the corresponding locator in the coupling. The electrical continuity screws should be drawn back to fullest extent to avoid interference with the connecting pipe or fitting.



5. Check the alignment of the assembly before tightening the bolts. Alternately tighten the bolts to ensure that the coupling is aligned evenly. Bolts should be tightened until a reasonable resistance is achieved - recommended torque setting 20 Nm.



6. For electrical continuity, handtighten the electrical continuity screws on both sides. Ensure screws pierce external coating of pipe when tightened. (See page 35)

All Ductile iron couplings use an M8 bolt and require a 6mm allen key. The coupling incorporates an anti-turn feature which holds the bolt nut in place without the need for a secondary tool. (See page 31 and 48 for details of fixing tools)



## Installation: Stainless Steel Coupling



1. Harmer Duo couplings are supplied factory assembled and ready to fit.



2. Ease-in one side (next to the continuity spur) then push down on the opposite side of the coupling to fully seat, ensuring that the central inner register is abutted against the spigot end.



3. Ease the next pipe or fitting into the coupling as step 2.



4. Evenly tighten the bolts to the required torque setting. The coupling should only be tightened once because it can not be dismantled and re-used. (See Couplings Specification page 34)



5. The Harmer Duomat fixing tool is recommended for securing Harmer Duo couplings. Bolts can be tightened simultaneously with precision.



A complete range of high quality fixing tools is available from Alumasc. (See pages 31 and 48 for details)

Note:  
Harmer Duo, Grip and Adaptor couplings require a 5mm allen key.



# Installation: Vertical Pipe Support



## Support for Vertical Pipework

Vertical pipework must be supported with a load bearing bracket to carry the weight of the pipe and its contents. (See page 33 for filled pipe weights)  
The purpose of these load bearing brackets is to support the stack as it is built up to prevent downward movement of the pipe and unnecessary load at the base of the stack, and to maintain expansion gaps.

It is recommended that Harmer SML is supported either using Ductile Cast Iron Brackets or Stack Pipe Support Brackets in combination with Optimal brackets as shown below. Alternatively, Stand Pipe support Brackets can be used. (See details on page 41)

Connections joining the vertical stack should also be adequately supported above and below every branch. The vertical pipe should be fixed not closer than 30mm to the wall to allow maintenance and painting of the pipe.

## Stack Pipe Support Brackets

A Stack Pipe Support Bracket must be provided at basement level and thereafter as recommended in the table below. Typically a 100mm pipe in a building with an average of 2.5m floor to ceiling height will need to be supported every fifth floor. In addition, Harmer Optimal Brackets should be installed at maximum 2m centres as illustrated.

## Ductile Iron Bracket Supports

Ductile Iron bracket supports can be used for vertical waste and rainwater stacks without the need for Stack Supports. These must be installed at 3 metres max centres and should be tightened as the stack is built up through the floors to make sure that it becomes a self-supporting system and reduces the risk of increase pressure affecting the base of the stack.

## Stack Pipe Support Bracket Centres (when using optimal brackets)

Nominal Pipe Dia (mm)	Weight/m (filled) (kg)	Stack Pipe Safe Load* (N/kg)	Theoretical Clamp Centres (m)	Recommended Clamp Centres**
70	9.9	3000N / 300kg	30.3	1 every 5th floor
100	17.7	3000N / 300kg	16.9	1 every 5th floor
125	24.5	3000N / 300kg	12.2	1 every 3rd floor
150	32.3	3000N / 300kg	9.3	1 every 3rd floor
200	54.6	3000N / 300kg	5.5	1 every 2nd floor

\*Safe load is measured at 130mm from wall to centre of pipe; increasing this distance will reduce the safe load. \*\*Assumes 2.5m storey height

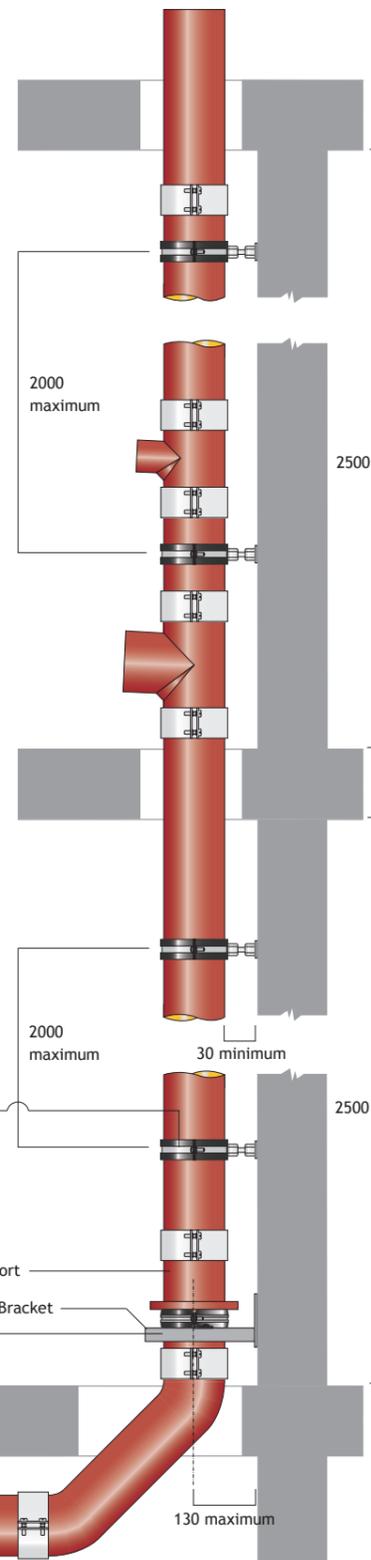


Harmer Optimal Bracket shown with Wall Plate



Stack Pipe Support Bracket shown with SML Downpipe Support

## Vertical Support Using Stack Pipe Bracket



# Installation: Vertical Pipe Support



## Stand Pipe Support Brackets

### When to use stand pipe bracket

When using the NEW Ductile Cast Iron Brackets	NO ✗
When using the Optima; Bracket Data	YES ✓
When using the Optimal HD Bracket Data	YES ✓

The Stand Pipe Support Bracket is an alternative vertical pipe support bracket and can be used where site conditions do not permit the use of the Stack Pipe Support Bracket. The number of Stand Pipe Support Brackets needed varies according to the stack weight. The table below gives details of the maximum distance between each bracket.

## Stand Pipe Support Bracket Centres

Nominal Pipe Dia (mm)	Weight/m (filled) (kg)	Stand Pipe Safe Load (N/kg)	Theoretical Clamp Centres (m)	Recommended Clamp Centres*
70	9.9	650N / 65kg	6.6	1 every 2nd floor
100	17.7	820N / 82kg	4.6	1 every 2nd floor
150	32.3	820N / 82kg	2.5	1 every floor

\*Assumes 2.5m maximum storey heights

### IMPORTANT

Where Stand Pipe Support Brackets are over 2m centres, additional Harmer Optimal Brackets should be installed to support pipework at maximum 2m centres.

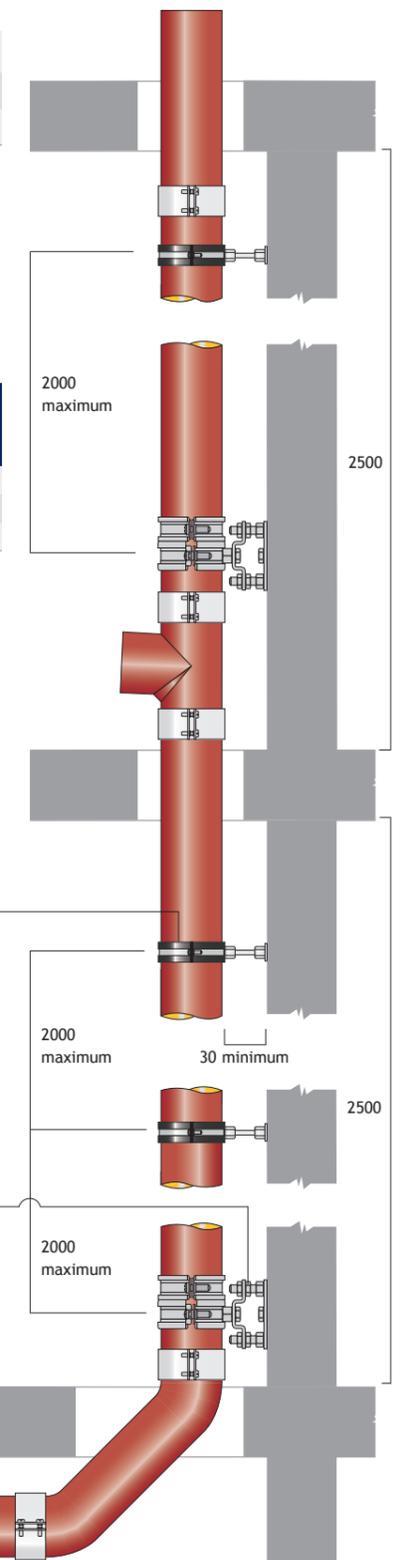


Harmer Optimal Bracket shown with Wall Plate



Stand Pipe Support Bracket

## Vertical Support Using Stand Pipe Bracket

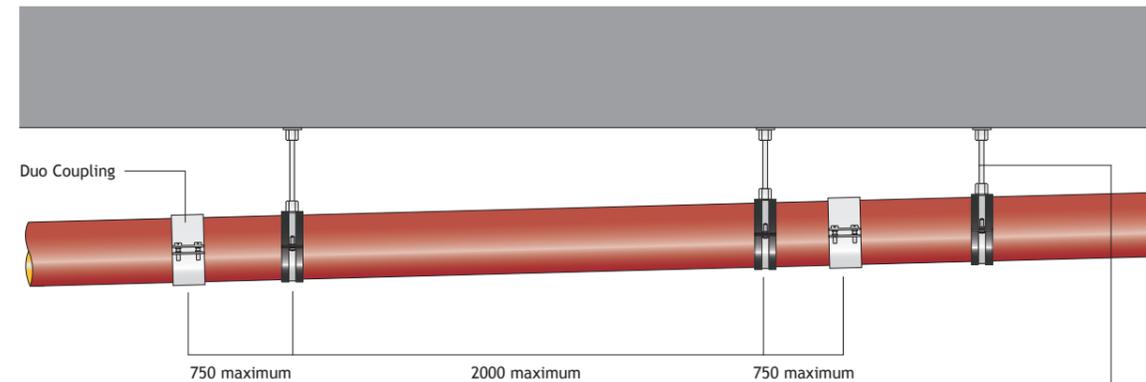


# Installation: Horizontal Pipe Support



## Support for Horizontal Pipework

Horizontal pipework should be laid to a minimum fall of 20mm per metre, and feeder pipes should be connected to the main pipe using a 45 degree branch in the direction of the flow. Refer to BS EN 12056-2: Code of Practice for Sanitary Pipework for details.



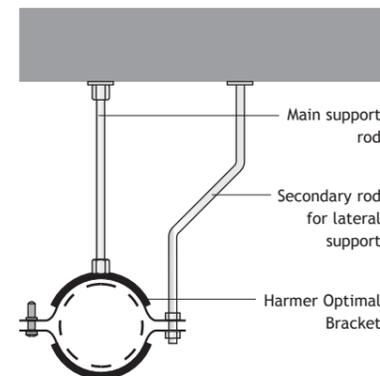
It is recommended that each pipe length in a horizontal pipe run should be supported by 2 brackets, not more than 2m apart. The length of pipe between a bracket and a coupling should not exceed 750mm.

The pipe should be supported at every change in direction or branch. At every 10-15m, a fixing arm should be attached to a bracket to prevent pendular movement of the pipe run. See detail below.



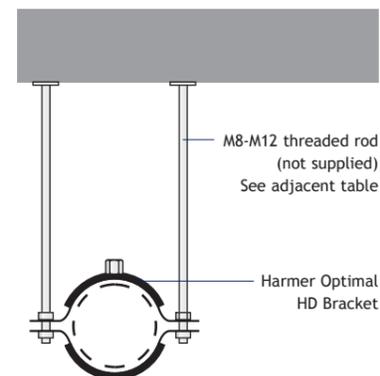
Harmer Optimal Bracket

### Harmer SML horizontal bracket and fixing arm



The requirement for pendular restraint may be removed if the pipework has branches entering at 45 or 90 degrees which are supported by at least two hangers.

### Alternative arrangement for pipework with drop length over 1 metre.



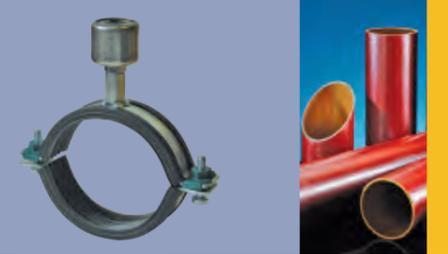
### Threaded Rod Data

Optimal HD Bracket	Threaded Rod Diameter
100	8
125	8
150	10
200	12
250	12
300	12

All dimensions are in mm.

(See Brackets Specification on pages 17 and 18 for details of safe load weights of brackets)

# Installation: Acoustic Protection



## Introduction

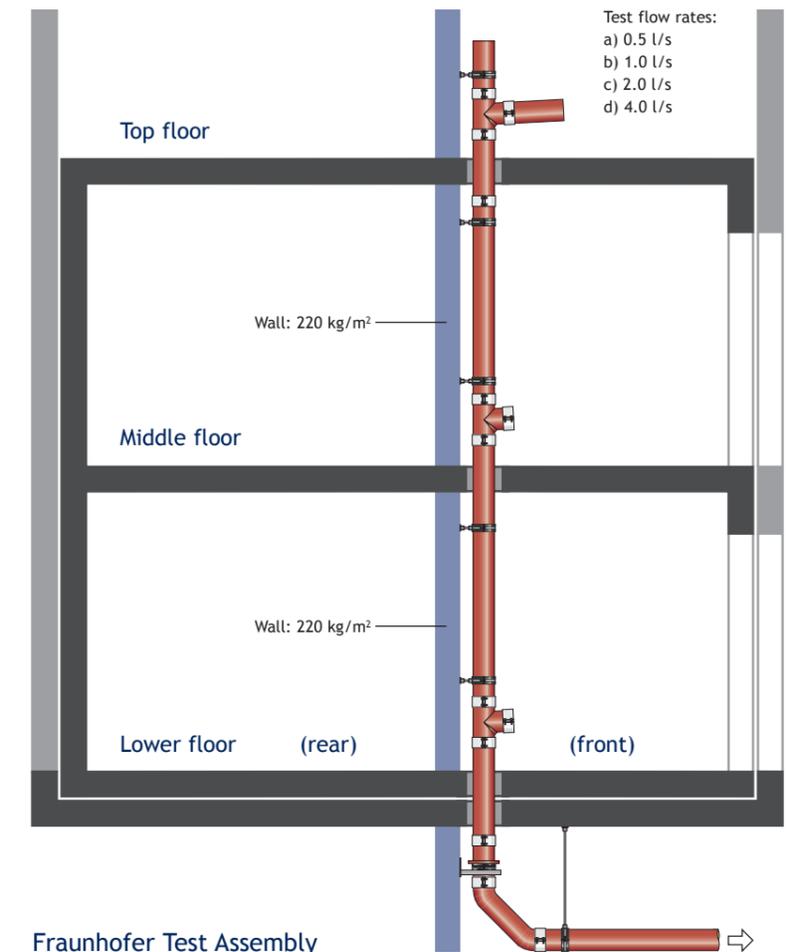
The discharge of soil, waste and rainwater through a pipe generates structure-borne and airborne sound between habitable spaces and usually occurs because the pipe is filled with a mixture of air and water. The resultant noise will then be transmitted to lightweight ceilings, cupboards and similar constructions.

Cast iron pipe systems however, because of the high mass per unit area of their pipe walls as well as the joint design characteristics, provide considerable noise reduction benefits when discharging soil, waste and rainwater within buildings.

## Testing and Certification

BS EN 14366: 2004: *Laboratory measurement of noise from waste water installations* sets out a common test method by which airborne and structure-borne noise emitted by installed discharge systems is measured. Harmer SML has been independently tested to this new standard as certified by the Fraunhofer Institute of Building Physics – test report P-BA 164/2008e and P-BA 165/2008e. See table below.

BS 8233: *Code of Practice for Sound Insulation and Noise Reduction for Buildings*, provides guidelines for indoor ambient noise levels for various room uses. The general requirement for residential/habitable rooms is 30-35 dB; the lowest design range is 20-25 dB for recording studios. The Harmer SML system is able to meet these low levels of acoustic performance.



### Fraunhofer Test Assembly

The Fraunhofer Institute of Building Physics test facility is constructed to a 220 kg/m<sup>2</sup> wall density. One of the most important parameters in the context of Structural-borne sound is wall density, as changes can greatly affect the installation sound level. For example, a wall density reduced to 140 kg/m<sup>2</sup> gives an increase in laboratory acoustic measurement of 4 dB at 4 l/s. It should be noted that test data conducted in a controlled laboratory cannot be transferred to other building conditions without restrictions.

## Test Data

Pipe and Bracket Type (see drawing)	Airborne Sound Pressure Level L <sub>pa</sub> [dB(A)] (see note a)				Structure-borne Sound Characteristic Level L <sub>w,RA</sub> [dB(A)] (see note b)				Number of Brackets Used	Wall Density (kg/m <sup>2</sup> )
	Flow rate	0.5 l/s	1.0 l/s	2.0 l/s	4.0 l/s	0.5 l/s	1.0 l/s	2.0 l/s		
1. Harmer SML with Optimal rubber-lined brackets	–	–	45	48	–	–	22	27	2	220
2. Harmer SML with Optimal rubber-lined brackets and spacers	39	43	45	48	9	14	19	24	2	220
3. Harmer SML with Optimal rubber-lined brackets with acoustic dampener (dB Fix) and Wall Plate	38	43	45	47	5	9	14	19	2	220

(a) Lower floor: front (b) Lower floor: rear

# Installation: Connection to Other Materials

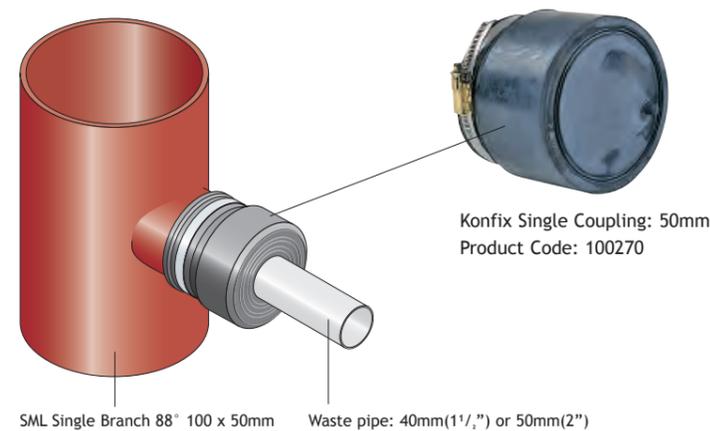


## Introduction

The Harmer SML range can be connected to waste pipes using a number of purpose-made connectors as detailed below. It is recommended that a suitable pipe lubricant be used when connecting into a push-fit joint. All connectors are available from stock.

## Konfix Single

Suitable for making a single connection from 50-100mm Harmer SML to any drainage material within the size range shown (see table). The Konfix push-fit EPDM adaptor pushes over the receiving pipe and is secured with a stainless steel circlip. The hole for the connecting pipe is created by simply pulling on the pull-out tab which exposes the hole for the connecting material. The connecting pipe must be fixed in order to avoid slippage from internal pressure.



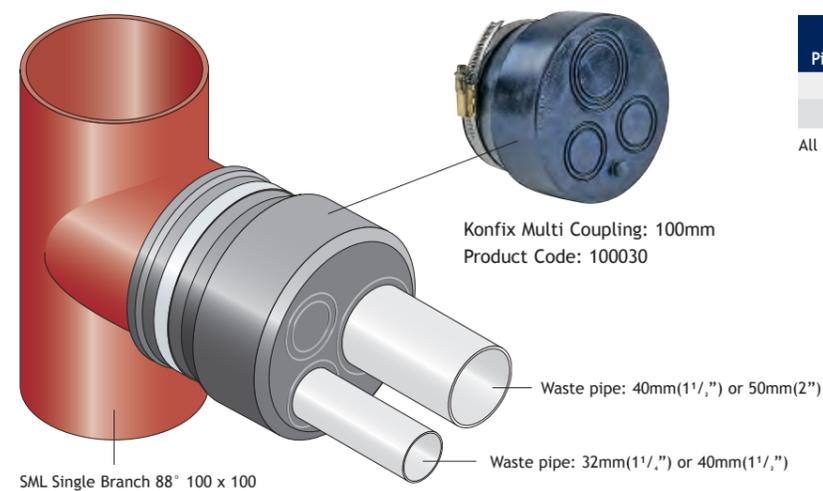
## Konfix Single Data

SML Pipe Dia	Connecting Pipe Dia	Insertion Depth	Product Code
50	40-56	42	100270
70	56-75	55	100271
100	104-110	65	100272

All dimensions are in mm.

## Konfix Multi

Allows up to 3 connections to Harmer SML 100mm pipework (see table for size range). The Konfix push-fit EPDM adaptor pushes over the receiving pipe and is secured with a stainless steel circlip. The holes for the connecting pipes are created by using a knife to cut into the appropriate groove. The connecting pipes must be fixed in order to avoid slippage from internal pressure.



## Konfix Multi Data

SML Pipe Dia	Connecting Pipe Dia	Insertion Depth	Product Code
100	2 x 32-40	40	100030
	1 x 40-56		

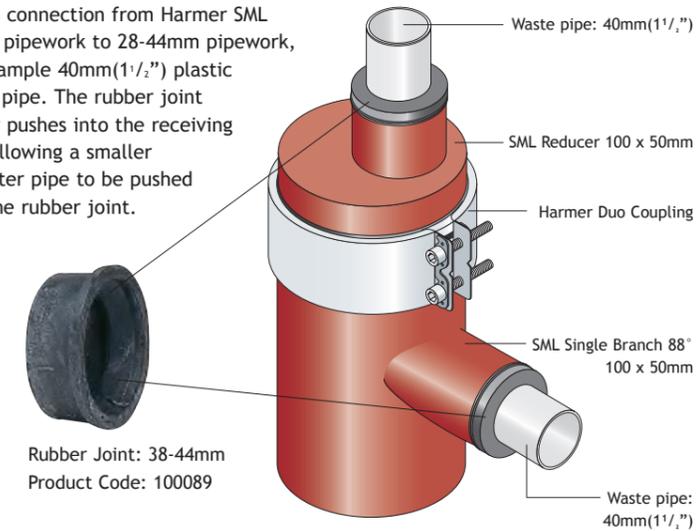
All dimensions are in mm.

# Installation: Connection to Other Materials



## Rubber Joint (Boss)

Allows connection from Harmer SML 50mm pipework to 28-44mm pipework, for example 40mm(1 1/2") plastic waste pipe. The rubber joint simply pushes into the receiving pipe allowing a smaller diameter pipe to be pushed into the rubber joint.



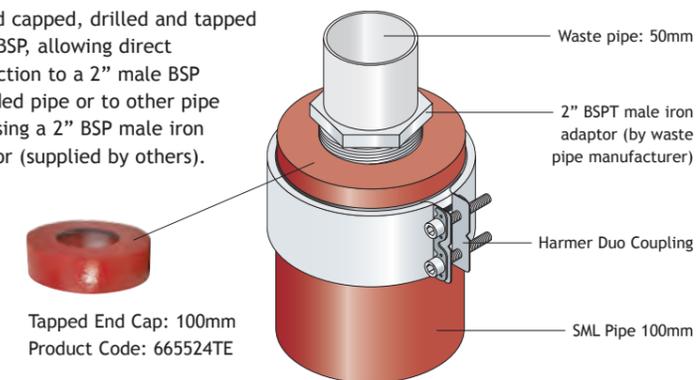
## Rubber Joint (Boss)

SML Pipe Dia	Connecting Pipe Dia	Insertion Depth	Product Code
50	28-34	40	100125
50	38-44	40	100089

All dimensions are in mm.

## Tapped End Cap

An end capped, drilled and tapped to 2" BSP, allowing direct connection to a 2" male BSP threaded pipe or to other pipe size using a 2" BSP male iron adaptor (supplied by others).



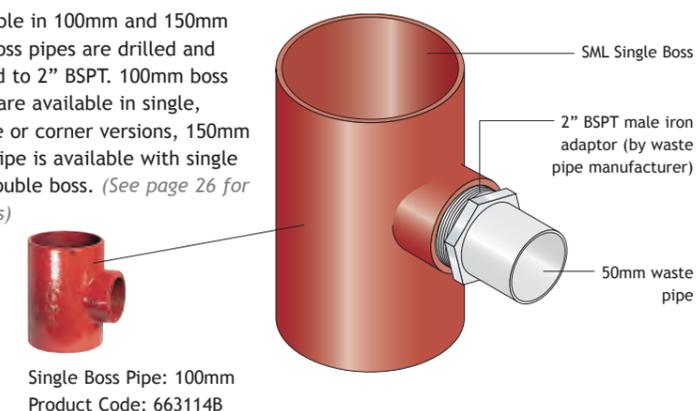
## Tapped End Cap Data

SML Pipe Dia	Product Code
50	665504TE*
70	665514TE
100	665524TE
150	665544TE
200	665554TE

All dimensions are in mm.  
\*Tap diameter is 1 1/2" BSP

## Boss Pipe

Available in 100mm and 150mm dia, boss pipes are drilled and tapped to 2" BSPT. 100mm boss pipes are available in single, double or corner versions, 150mm boss pipe is available with single and double boss. (See page 26 for details)



## Boss Pipe Data

SML Pipe Dia	Type	Product Code
100	Single	663114B
100	Double	663114DB
100	Corner	663114CB
150	Single	232746
150	Double	237738

All dimensions are in mm.

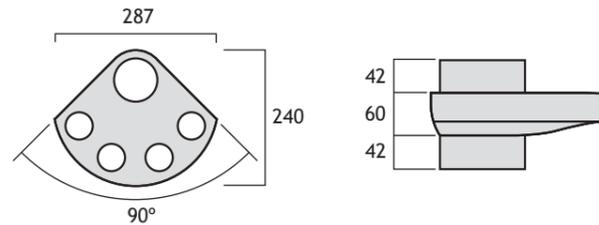
## Installation: Manifold Connection



### Introduction

The Harmer SML Manifold Connector eases waste connection by allowing up to 4 connections into this compact manifold. The Manifold Connector is available in 100mm dia and can be connected directly onto a 100mm dia Harmer SML pipe stack using any standard couplings. Waste pipework from various sources such as basins, urinals, baths and showers can be conveniently connected to a singular point above the finished floor level.

The Manifold Connector incorporates four rubber grommets which will permit the connection of 32mm(1 1/4") or 40mm(1 1/2") plastic waste pipes.



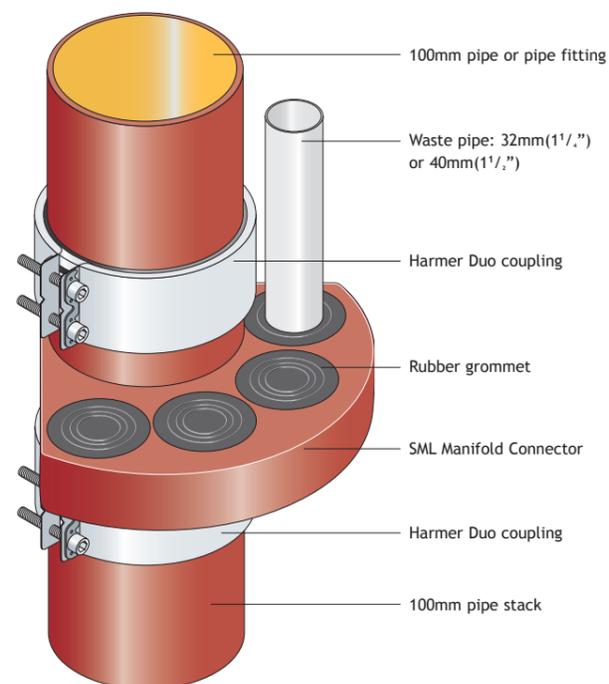
### Installation Guidelines

#### Installation of Manifold Connector

The Manifold Connector body is connected to the stack using standard couplings.

#### Installation of plastic pipe ends

1. Remove the grommets and pierce the appropriate groove for 32mm(1 1/4") or 40mm(1 1/2") waste connections.
2. Apply appropriate silicon sealant (not provided) to the outside of the grommet and re-fit into the Manifold Connector, making sure that the groove of the grommet is placed correctly in the casing. Ensure sealant is cured before air testing.
3. Lubricate the pipe ends with an appropriate lubricant and insert them into the grommets with a rotational movement. The pipe ends may be chamfered for ease of insertion.



## Installation: Other Connections



### Stoneware Connections

#### WC Connection

WC connections can be made by using the Harmer SML Stoneware Connector. Alternatively, Harmer SML will accommodate flexible push-fit type connectors.

#### Clayware

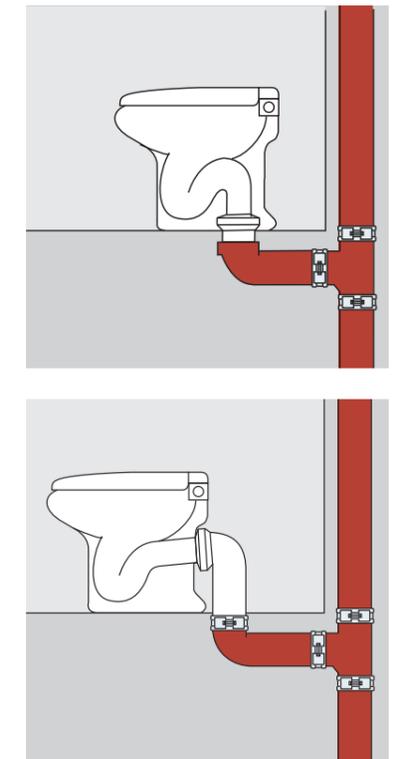
Connect Harmer SML to clayware by using Harmer SML Stoneware Connector with a traditional cement joint.

#### Traditional Soil

Connect Harmer SML to traditional soil by using Harmer SML Stoneware Connector with a traditional caulked joint.



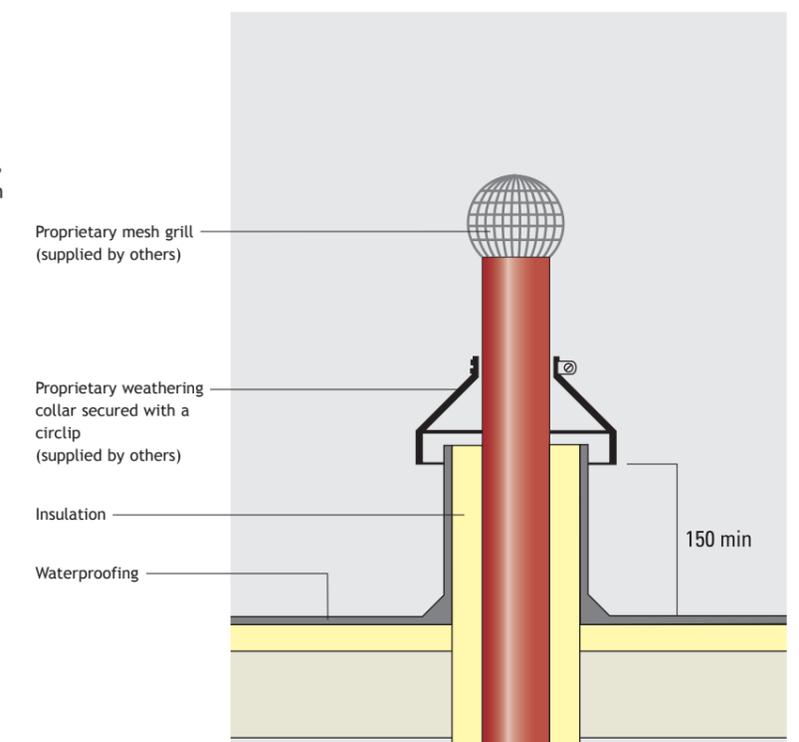
Stoneware Connector



### Roof Connections

#### Projections Through Roof

Where a vent pipe projection occurs through a roof slab with mastic asphalt, the waterproofing must be dressed with a weathering collar to a height at least 150mm above the roof surface.





## Fixing Tools

Drive Type	Product Code	Description	For Use With
1/2" Drive	3900	Harmer Duomat Torque Chuck	Stainless Steel Couplings
	110000	Ratchet Handle 1/2" Drive	For use with 1/2" Drive
	110001	Torque Wrench 1/2" Drive - 20Nm to 40Nm torque range	Couplings with 20Nm to 40Nm torque range
	110007	10mm 1/2" Drive Socket	Harmer Optimal Bracket
	110002	13mm 1/2" Drive Socket	70, 100, 150mm Access Bends, Swept Entry Branches, End Caps, Branch Traps
	110003	18mm 1/2" Drive Socket	150mm Access Pipe Rectangular Door, Branch Trap
	110004	19mm 1/2" Drive Socket	All pipe sealing flanges
	110008	5mm Allen Key 1/2" Drive Socket	Stainless Steel Couplings
	110005	6mm Allen Key 1/2" Drive Socket	Ductile Iron Couplings
	110013	8mm Allen Key 1/2" Drive Socket	70, 100mm Connect-G Coupling
	110012	10mm Allen Key 1/2" Drive Socket	125, 150mm Connect-G Coupling
3/8" Drive	110014	14mm Allen Key 1/2" Drive Socket	200-400mm Connect-G Coupling
	110006	10mm Flat Bit with 1/16" Hexagonal Shank	General purposes
	110009	Torque Wrench 3/8" Drive - 4Nm to 20Nm torque range	Couplings with 4Nm to 20Nm torque range
	110010	5mm Allen Key 3/8" Drive Socket	Stainless Steel Couplings
	110011	6mm Allen Key 3/8" Drive Socket	Ductile Iron Couplings

## Duomat Fixing Tool

Suitable for all power tools, the Duomat Fixing Tool is recommended for securing Harmer SML couplings. Bolts can be tightened simultaneously with precision. For details of availability please contact Alumasc.



## Cutting Pipes

Harmer SML pipe can be readily cut by the use of a powered disc cutter, portable bandsaw, wheel cutter or with chain cutters. Ensure the correct grade of disc appropriate to cast iron is used for disc-cutter. Coat cut ends of pipes with appropriate touch-up paint (available on request).

Observe the Health and Safety guidelines from the cutting tool manufacturer's operation manual.

Standard specification guidelines for a 100mm diameter Harmer SML soil and waste system are provided below. NBS format specifications (R11 Above-Ground Foul Drainage Systems) are available for download on the Alumasc website.

### Above-Ground Foul Drainage Systems

Inclusive of sanitary and floor drainage outlets; waste pipework; discharge stack and branch pipework; separate ventilating pipework; accessories and disposal.

### System Performance

Design to comply with BS EN 12056: 2000, Parts 1, 2 and 5.

### Products

**Harmer SML:** Cast iron pipework for internal use.

**Manufacturer:** Alumasc Exterior Building Products Ltd, St Helens, Merseyside WA9 4JG.

**Pipes and fittings:** To BS EN 877 with flexible joint couplings, Agrément certified.

**Accessories:** As required.

**Size:** 100mm diameter.

**Method of fixing:** Bracket fixed at maximum 2.0m centres when horizontal, but pipe projection beyond each bracket should not exceed 750mm. Pipe should be supported at every change of direction or branch and every 15m a fixing arm should be attached. Horizontal pipeline must be laid to a minimum 20mm per metre fall. Feeder pipes should be connected to the main pipe using a 45° branch connector in the direction of flow. Bracket fixed at 2.0m centres when vertical supported with a load bearing bracket at every floor adequately supported above and below every branch. Pipes should not be fixed closer than 30mm to a wall. For building of five or more floors plus basement, with an average 2.5m per floor, a downpipe support fitting must be provided at the basement level and every additional fifth floor.

### Execution

**General installation:** To BS EN 12056: 2000, Parts 1, 2 and 5.

**Components:** From the same manufacturer for each type of pipework.

**Electrolytic corrosion:** Avoid contact between dissimilar metals where corrosion may occur.

**Allowance for thermal and building movement:** Provide and maintain clearance as fixing and jointing proceeds.

**Concealed or inaccessible surfaces:** Decorate before starting work specified in this section.

**Protection (purpose made temporary caps):** Fit to prevent ingress of debris.

**Protection (access covers, cleaning eyes and blanking plates):** Fit as the work proceeds.

### Pipe Routes

**General:** The shortest practicable, with as few bends as possible.

**Short radius bends in wet portion of soil stacks:** Not permitted.

**Routes not shown on drawings:** Submit proposals before commencing work.

### Fixing Pipework

**Pipework:** Fix securely plumb and/or true to line. Fix discharge stack pipes at or close below socket collar or coupling.

**Branches and low gradient sections:** Fix with uniform and adequate falls to drain efficiently.

**Externally socketed pipes and fittings:** Fix with sockets facing upstream.

**Additional supports:** Provide as necessary to support junctions and changes in direction.

**Vertical pipes:** Provide a load bearing support not less than every storey level. Tighten fixings as work proceeds so that every storey is self supporting.

**Wall and floor penetrations:** Isolate pipework from structure, e.g. with pipe sleeves.

**Masking plates:** Fix at penetrations if visible in the finished work.

**Expansion joint sockets:** Fix rigidly to the building.

**Fixings:** Allow the pipe to slide.

### Jointing Pipework - Generally

**General:** Joint with materials, fittings and techniques that will make effective and durable connections.

**Jointing differing pipework systems:** With adaptors intended for the purpose.

**Cut ends of pipes:** Clean and square. Remove burrs and swarf.

**Jointing or mating surfaces:** Clean immediately before assembly.

**Junctions:** Form with fittings intended for the purpose.

**Jointing material:** Do not allow it to project into bore of pipes and fittings.

### Jointing Pipework

**Cast iron, flexible couplings jointing:** Paint cut ends of pipes.

### Coated Pipes

**Cutting:** Recoat bare metal.

### Electrical Continuity

**Joints in metal pipes with flexible couplings:** Make with clips (or suitable standard pipe couplings) supplied for earth bonding by pipework manufacturer to ensure electrical continuity.

### Identification of Internal Foul Drainage Pipework

**Markings:** To BS 1710.

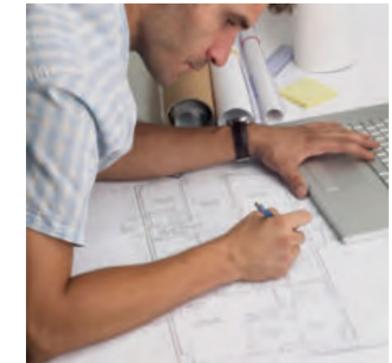
**Type:** Integral lettering on pipe wall, self-adhesive bands or identification clips.

**Locations:** At 500 mm centres, junctions and both sides of slabs, valves, appliances, bulkheads and wall penetrations.

### Discharge and Ventilating Stacks

**Terminations:** Perforated cover or cage that does not restrict airflow.

**Material:** Stainless Steel, uPVC or HDPE.



### Installing Air Admittance Valves

**Position:** Vertical, above flood level of highest appliance served and clear of insulation materials (other than the manufacturer's insulating cover).

**Connection to discharge stack:** Allow removal for rodding, e.g. ring seal.

**Roof spaces and other unheated locations:** Fit manufacturer's insulating cover.

### Access for Testing and Maintenance

**General:** Install pipework with adequate clearance to permit testing, cleaning and maintenance, including painting where necessary.

**Access fittings and rodding eyes:** Position to avoid obstruction.

### Completion and Testing

**Dates for testing:** Give minimum of 3 days notice.

**Pipework preparation:** Securely fixed and free from obstruction and debris.

**Traps preparation:** Filled with clean water.

**Testing:** Supply clean water, assistance and apparatus. Do not use smoke to trace leaks.

**Records:** Submit a record of tests.

### Pipework Airtightness Test

**Open ends of pipework:** Temporarily seal using plugs.

**Test apparatus:** Connect a 'U' tube water gauge and air pump to pipework via a plug or through trap of an appliance.

**Testing:** Pump air into pipework until gauge registers 38 mm.

**Required performance:** Pressure of 38 mm is to be maintained without loss for at least three minutes.

### Siphonage and Back Pressure Tests

**WC pans:** Test by flushing.

**Other appliances:** Test by filling to overflow level, then removing the plug.

**Number of tests:** Test each appliance three times. Recharge traps before each test.

**Self siphonage testing:** Test each appliance individually.

**Induced siphonage and back pressure testing:** Test by discharging the following numbers of appliances simultaneously on each stack:

- WCs; Washbasins; Sinks: To be confirmed by employers agent
- Selection of appliances: Submit proposals.

### Pre-handover Checks

**Temporary caps:** Remove.

**Permanent blanking caps, access covers, rodding eyes, floor gratings and the like:** Secure complete with fixings.