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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Geberit Ltd

GEBERIT SERIES 7 AND 7 PLUS PLUVIA SYPHONIC ROOF DRAINAGE SYSTEM

Certificate No 92/2796

DETAIL SHEET 4

*Second issue**

Product

- *THIS DETAIL SHEET RELATES TO THE GEBERIT SERIES 7 AND 7 PLUS PLUVIA SYPHONIC ROOF DRAINAGE SYSTEM COMPONENTS AND THE GEBERIT SOFTWARE USED IN DESIGN.*
- *The products are for the drainage of roof areas of industrial, commercial and public buildings, conveying the rainwater from the roof to the below ground system.*
- *The products are used in conjunction with the pipe and fittings covered by Detail Sheet 2 of this Certificate.*
- *At the design rainfall intensity, installations designed using Geberit software and installed in accordance with this Certificate will ensure that the outlets eliminate the intake of air into the system thus enabling the rainwater to flow at the maximum pipework capacity. This sets up the syphonic action and maximises the capacity of the pipework.*
- *Collecting pipes can be installed horizontally under the roof reducing the number of downpipes and the associated underground work and drainage.*

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, and the Conditions of Certification.

Technical Specification

1 Description

1.1 The Geberit Series 7 and 7 Plus Pluvia Syphonic Roof Drainage System consists of roof outlets and computer software to design the pipework for each installation.

1.2 Pluvia roof outlets are available with connection to 56 mm (Series 7) and 90 mm (Series 7 Plus) pipework (with adaptors to all other Geberit pipe diameters).

1.3 The outlets are for use with the pipes and fittings covered by Detail Sheet 2 of this Certificate.

1.4 The outlets are formed from the assembly of components illustrated in Figure 1 and the range of products is given in Figure 2. Each unit is supplied with stainless steel fixing straps.

Figure 1 Geberit Pluvia outlet

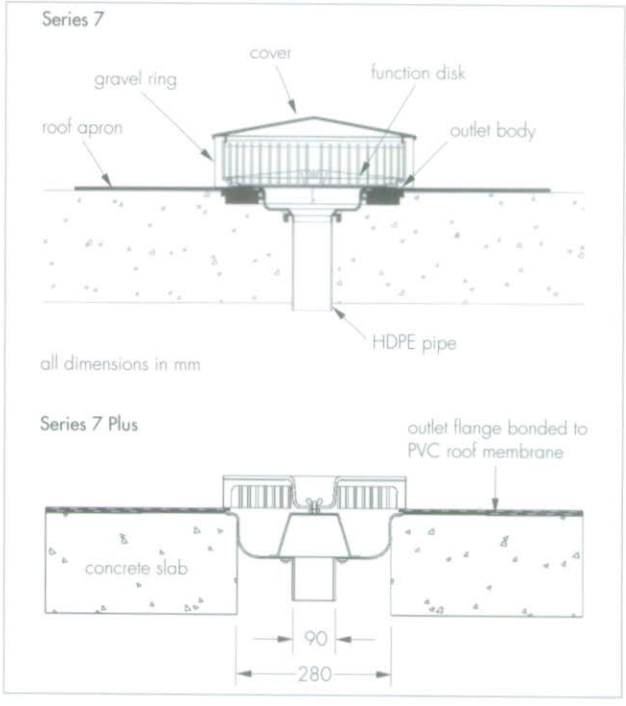
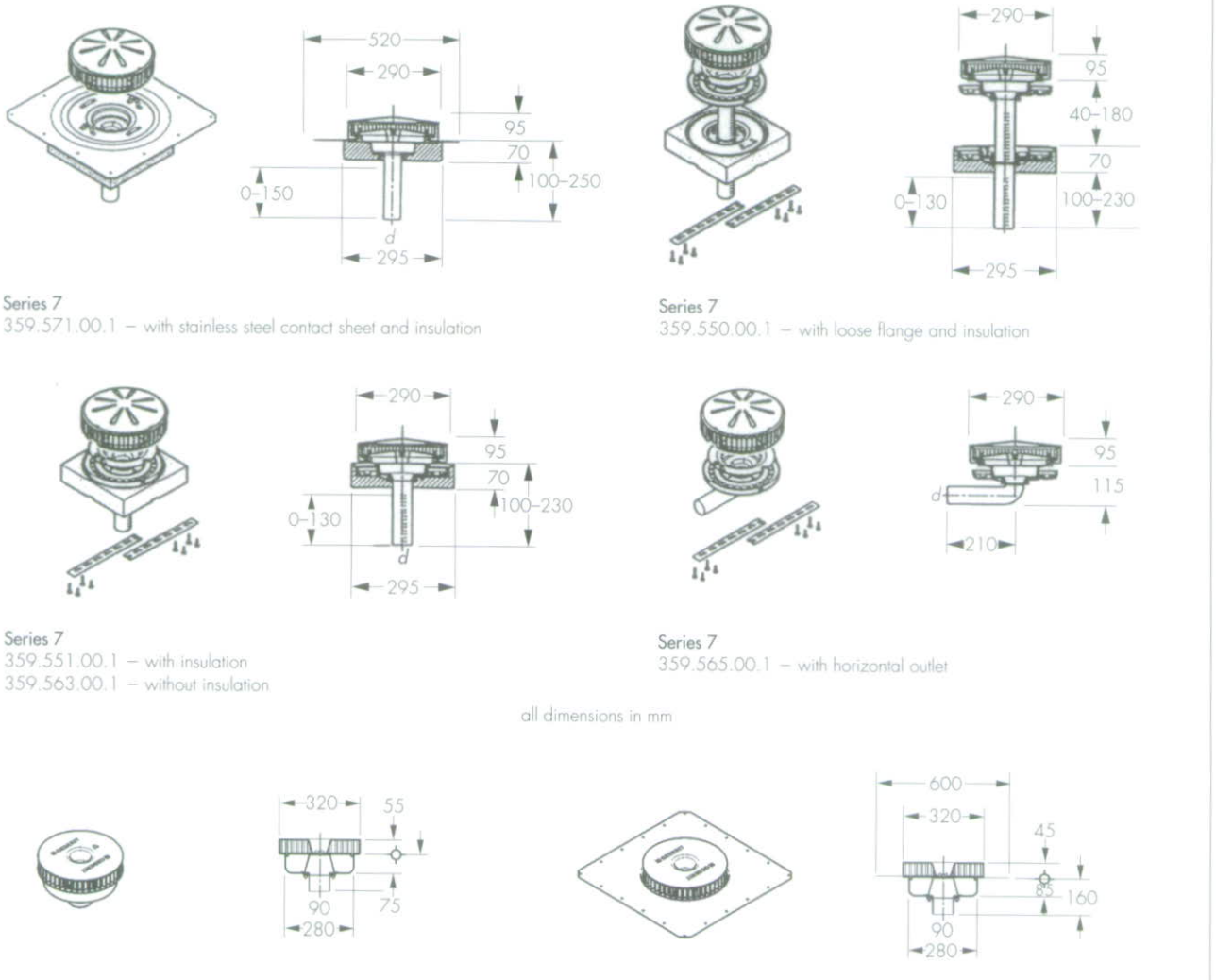


Figure 2 Pluvia product range



1.5 Quality control is carried out on each component.

2 Delivery and site handling

Each outlet is packaged in a cardboard box. Each box carries a label bearing the product code and the manufacturer's name. The BBA identification mark including the number of this Certificate is incorporated in the company's technical literature.

Design Data

3 General

3.1 When designed, installed and used in accordance with the provisions of this Certificate the Geberit Series 7 and 7 Plus Pluvia Syphonic Roof Drainage System will convey rainwater from the roof to a below ground drainage system.

3.2 Gutters should be designed in accordance with BS EN 12056-3 : 2000.

3.3 The underground drainage system must be capable of accepting without surcharge the rate of flow of water discharged by the syphonic drainage system in addition to other discharges which may be received.

4 System design and dimensioning

4.1 Each Geberit Series 7 and 7 Plus Pluvia Syphonic Roof Drainage System must be designed by a person trained and approved by the Certificate holder to use their Pluvia computer software.

4.2 The system is designed to flow at maximum capacity when rainfall is at the design intensity. A system using the minimum pipe dimensions obtained from the design will ensure sufficient capacity to transport the water from the roof to the discharge point.

4.3 Information required to enable a design to be carried out includes:

- design rainfall intensity (normally selected from BS EN 12056-3 : 2000)
- geometric layout of the roof and outlets including the height of the building and its location and plan location
- position of underground connection.

4.4 Use of the computer program ensures the most economic and effective design is achieved. Critical conditions to be achieved in any design include:

- the maximum negative pressure must not be less than 0.2 bar absolute (0.8 bar below atmospheric) for pipes rated at a pressure of 4.0 bar and up to 160 mm diameter. For pipes 200 mm or more, the limiting pressures are dependent on the nominal pressure rating of the pipe. For pipes with a pressure rating of 3.2 bar, the limiting pressure is 0.55 bar absolute (0.45 bar below atmospheric). For pipes with a pressure rating of 4.0 bar, the limiting pressure is 0.2 bar absolute (0.8 bar below atmospheric)
- minimum water velocity must be 1.0 ms^{-1} at the design flow intensity to achieve a self-cleansing velocity
- computed flow[1] from an individual outlet must be within 10% of the nominal required flow and must not exceed the specified maximum for each outlet size.

(1) The computation is based on two-phase modelling of the flow conditions and incorporates standard hydraulic principles and has been verified by testing.

4.5 An approximate indication of the pipe sizes required can be made using a manual dimensioning procedure detailed in the Geberit *Technical Data Sheets*.

4.6 The maximum permitted flow through an outlet is 12 ls^{-1} (10 ls^{-1} in gutters) for Series 7 and 25 ls^{-1} for Series 7 Plus.

5 Strength

The Pluvia outlets and accessories have adequate strength to resist loads associated with installation and subsequent use.

6 Roof/gutter design

6.1 The roof must be designed to allow rainwater to flow freely to the outlets.

6.2 When the outlets are being utilised at their maximum flow capacity, the water retention at an outlet on a roof or in a gutter should be less than 40 mm (Series 7) and 55 mm (Series 7 Plus).

6.3 The roof and/or gutter design must incorporate a built-in overflow facility. The roof must be designed to hold water up to this level should the design rainfall be exceeded or unexpected blockages occur.

7 Performance of joints

7.1 Correctly made joints within the pipework system are watertight under conditions of pressure and thermal movement in excess of those expected to occur in practice.

7.2 The performance of the joint between the outlet and the roof material is dependent on the installation. However, conventional jointing techniques for roofs constructed of similar materials applied correctly should give satisfactory performance.

8 Flow characteristics

When the system is operating syphonically, the high velocity of the water will ensure the system is self-cleansing. This effect can also occur at rainfall intensity as low as 50% of the design intensity. At rainfall intensities less than this the Pluvia system will operate as a conventional system.

9 Resistance to chemicals

The performance of the Pluvia outlets will be unaffected by the types and quantities of chemicals associated with rainwater.

10 Resistance to blockage

The high velocities at which the water flows through the pipework together with the design of the Pluvia outlets reduce the risk of blockages (see also section 13).

11 Behaviour in relation to fire

The bodies of the Pluvia outlets will not affect the overall fire hazard of the roof in which they are installed.

12 Thermal insulation

Outlets are supplied with 30 mm thick foamed polystyrene insulation fitted to the underside (for Series 7 only). It may be desirable in some situations to provide additional insulation and to insulate the pipework to prevent condensation. This will depend on the relative humidity and the temperature.

13 Maintenance

Periodic inspection should be carried out to ensure that the outlets are free from gravel, leaves and other debris which could impair the performance of the system. Maintenance is the responsibility of the owner.

14 Durability

The materials used for the manufacture of the outlets are highly durable and when installed correctly will have an effective life equivalent to, or in excess of, the roof in which they are installed.

Installation

15 General

15.1 The design of the layout of the roof outlets should be in accordance with the recommendations given in BS EN 12056-3 : 2000.

15.2 Geberit Pluvia roof outlets should be placed at the roof low points to allow efficient flow of water to the drains.

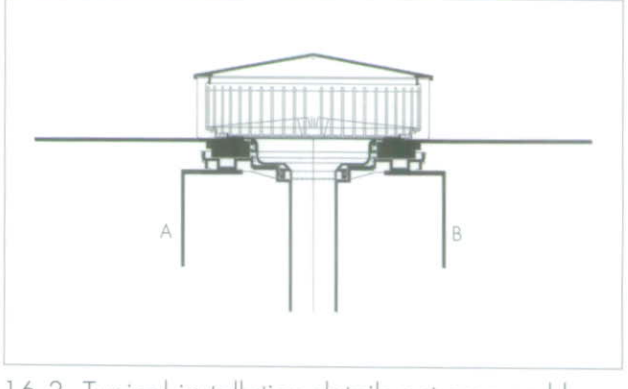
16 Procedure

16.1 An appropriately sized hole must be left in the roof structure to accommodate the outlet (see Figures 1 and 2). The weight of the outlet is secured either to the roof structure via the stainless steel straps or by adequately supported pipework.

16.2 The BBA has not assessed individual installation details since they will depend on the roof construction. However, the general principles must be followed:

- the roof outlet may be supported at locations A and B shown in Figure 3
- when using the stainless steel straps supplied with each unit, the horizontal distance between the roof outlet support and roof fixing must not exceed 50 mm and both straps must be used.

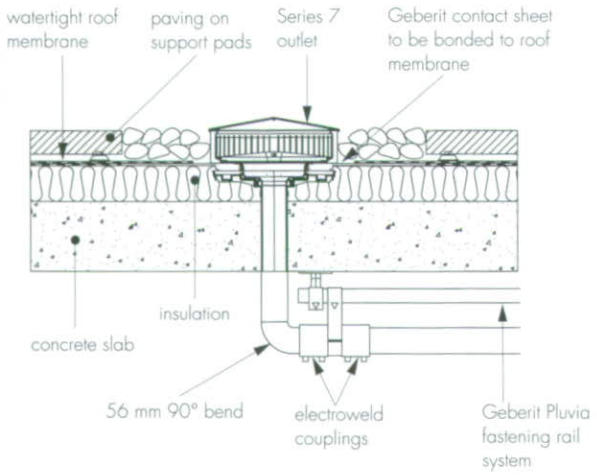
Figure 3 Acceptable anchorage locations



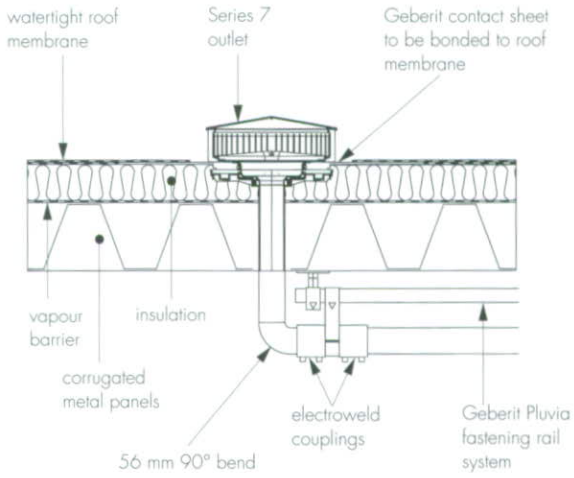
16.3 Typical installation details not assessed by the BBA but suggested by the Certificate holder are shown in Figure 4.

16.4 The pipework is connected to the outlets in accordance with the procedures given in Detail Sheet 2 of this Certificate.

Figure 4 Typical installation



Series 7 in a concrete slab with insulation/slabs



Series 7 in a steel profile with insulation

Technical Investigations

The following is a summary of the technical investigations carried out on the Geberit Series 7 and 7 Plus Pluvia Syphonic Roof Drainage System.

17 Tests

Tests were carried out to determine:

- dimensional accuracy
- maximum flow capacities
- watertightness
- resistance to loading
- full-scale tests to verify the Pluvia computer software calculation model.

18 Investigations

18.1 An evaluation of existing data was made to assess:

- resistance to chemicals
- suitability of materials
- durability
- ease of jointing to pipework
- practicability of installation.

18.2 An investigation was carried out to verify the scientific basis and the correlation with full-scale testing of the computer software used to design the installations.

18.3 The manufacturing processes were examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS EN 12056-3 : 2000 *Gravity Drainage Systems inside Buildings — Roof drainage, layout and calculation*

On behalf of the British Board of Agrément

Date of Second issue: 22nd March 2007

Chief Executive

**Original Detail Sheet issued 5th September 2001. This revised version includes the addition of Series 7 Plus and reference to revised Standards.*

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