bsi. PVC-U Eaves Gutters and Fittings BS EN 607 KITEMARK™ KM 501316

bsi. PVC-U Piping Systems for Soil and Waste BS EN 1329-1 KITEMARK™ KM 563460

bsi. PVC-U Rainwater Piping Systems BS EN 12200-1 KITEMARK™ KM 501316

bsi. PVC-U Piping Systems for Soil and Waste BS EN 1329-1 KITEMARK™ KM 544331

bsi. Brackets for Eaves Gutters BS EN 1462 KITEMARK™ KM 501316

bsi. PVC-U Piping Systems Soil & Waste BS EN 1453 KITEMARK™ KM 572704

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FloPlast Rainwater Systems Technical Data

This document relates to FloPlast Half-Round, Square Line, Niagara, Hi-Cap, MiniFlo and XtraFlo rainwater systems and associated downpipes for the collection and discharge of rainwater from roofs. It also applies to the base materials on FloPlast "Cast Iron" style rainwater systems. FloPlast's rainwater systems carry the British Standard Institute (BSI) Kitemark (KM501316)*, as having met the performance requirements of:

BS EN 607	Eaves gutters and fittings of PVC-U definitions, requirements and testing.
BS EN 12200-1	Plastics rainwater piping systems for above ground external use. Unplasticized poly (vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system.
BS EN 1462	Brackets for eaves gutters. Requirements and testing.
BS EN 1453-1	Plastics piping systems with structured-wall pipes for soil and waste discharge (low and high temperature) inside buildings – Unplasticized poly(vinyl chloride) (PVC-U).
BS EN 1329-1	Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Unplasticized poly(vinyl chloride) (PVC-U).
BS 4514	Unplasticized PVC soil and venting pipes of 82.4 mm minimum mean outside diameter, and fitting of 82.4mm and of other sizes.

BS EN 1453-1, BS EN 1329-1 and BS 4514 are applicable to 110mm downpipes and fitting used in the XtraFlo system.

* Excludes MiniFlo gutter. "Cast Iron" systems are not covered by any of the standards due to the addition of the spray paint.

Half Round

Square Line

Niagara

Hi-Cap

MiniFlo

XtraFlo

Roofline, Window and Cladding Systems

Rainwater Systems

Soil & Waste Systems

Underground Drainage Systems

MDPE Systems

Hot & Cold Plumbing Systems

Regulations

FloPlast's rainwater systems will meet or contribute to meeting the relevant requirement of the following Building Regulations

The Building Regulations 2010 (England and Wales)

Requirement: H3 Rainwater drainage

Requirement: Regulation 7 Materials and workmanship

The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2) Fitness and durability of materials and workmanship

Regulation: 9 Building standards — construction

Standard: 3.6 Surface water drainage

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

Regulation: 23 Fitness of materials and workmanship

Regulation: 82 Rainwater drainage

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Under the above Regulations, there is no information in this document which relates to the obligations of the client, designer (including Principal Designer) and contractor (including Principal contractor) under these Regulations.

Non-regulatory Information

NHBC Standards 2018

NHBC accepts the use of FloPlast rainwater systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to NHBC Standards, Part 7 Roofs, Chapters 7.1 Flat roofs and balconies, Clause 7.1.12 and 7.2 Pitched roofs, Clause 7.2.22.

1. Material Specification

1.1 All of FloPlast pipes and fittings (unless otherwise specified), are manufactured from unplasticised polyvinyl chloride (PVCu). The above fully complies with the requirements of BS EN 607, BS EN 12200-1, BS EN 1462, BS EN 1453-1, BS EN 1329-1 or BS 4514. All of the seals used within the systems are produced from a synthetic rubber material conforming to BS EN 681 or manufactured in accordance with British Standards.

1.2 The use of PVCu material in rainwater systems offers many major advantages including:

- Minimal maintenance
- Self coloured - requiring no painting
- Light weight and easy to handle
- Does not support combustion
- Corrosion free

1.3 In addition to the PVCu fascia brackets, FloPlast rainwater system also included rise & fall as well as rafter brackets, which are manufactured from zinc plated steel.

2 Product Dimensions

System	Mouth Width (mm)	Depth of Gutter (mm)
Half Round	112	52
Square Line	114	60
Niagara	110	80
Hi-Cap	115	75
MiniFlo	76	38
XtraFlo	170	108

3 Finish

3.1 All FloPlast PVCu rainwater systems have a smooth, easy to clean surface finish.

4 Colour

System	White	Black	Brown	Grey	Anthracite Grey	Cast Iron Style
Half Round	✓	✓	✓	✓	✓	✓
Square Line	✓	✓	✓		✓	
Niagara	✓	✓	✓		✓	✓
Hi-Cap	✓	✓	✓	✓	✓	✓
MiniFlo	✓	✓	✓	✓		
XtraFlo	✓	✓		✓		
50mm Round Downpipe	✓	✓	✓	✓		
65mm Square Downpipe	✓	✓	✓		✓	✓
68mm Round Downpipe	✓	✓	✓	✓	✓	✓
80mm Round Downpipe	✓	✓	✓	✓		
110mm Round Downpipe	✓	✓		✓		✓

5. Structual and Mechanical

5.1 PVCu has good flexural and tensile strength characteristics. However as with all types of gutters, ladders should be held away from gutters and brackets to avoid damage.

5.2 All of FloPlast rainwater systems are suitable for their designed applications including:

- Building Regulations (Approved Document H) requirements.
- The requirements of the Building Regulations 2010 as set out in Approved document H part 3.
- As an alternative to this requirement is to follow the relevant recommendations of BS EN 12056 - 3 Roof Drainage, Layout and Calculation.

Note: For non-standard applications, please consult FloPlast.

5.3 When installed in accordance with FloPlast installation instructions, the system will withstand the wind loads likely to be encountered in the United Kingdom, without damage or permanent deflection.

5.4 All of FloPlast rainwater systems have been extensively tested to withstand heavy snow loads in accordance with BS EN 1462 & BS EN 12056-3. When fixing brackets below a steeply pitched/slate tiled roof or in areas subject to heavy snow, it is recommended that fixing centres of the brackets are reduced. Note: Please consult FloPlast for further information.

5.5 Consideration should be given in areas of high snow falls and where severe ice might be expected. It is recommended that snow guards be fitted to the eaves of the pitched roofs. This precaution should also be considered wherever sliding snow might cause damage/injury to person's or structures below (as recommended in BS EN 12056-3).

5.6 FloPlast gutter systems must not be installed under 0°C to avoid potential breakages.

6. Thermal Expansion

6.1 FloPlast rainwater systems have been designed to accommodate normal thermal movement without leakage, distortion or displacement from fittings.

6.2 The coefficient of linear expansion of PVCu can be calculated using 6 x 10 -5 mm/m/°C and all of FloPlast rainwater systems have been designed to take this into account.

6.4 Tests have been conducted between -8°C and +40°C where an expansion of 14.63mm was experienced over a 4 metre length.

6.5 In extreme cases and under normal daily temperature fluctuations, expansion and contraction will be in the region of 10mm per 4 metre length.

6.3 Particular care is necessary to ensure that gutters are assembled to the installation lines.

7. Service Temperature

7.1 PVCu rainwater has a softening point in excess of 70°C.

8. Chemical Resistance

8.1 PVCu has good resistant properties to most solutions of acids, alkalis, salts, solvents miscible with water and most commonly occurring chemicals, so will not affected by domestic effluents.

8.2 PVCu is not resistant to aromatic and chlorinated hydrocarbons, solvents including those incorporated in most timber preservatives.

8.3 FloPlast incorporate high quality pigments within their products which afford outstanding durability and helps to prevent degradation by air pollution and U.V light.

8.4 The systems are self coloured through the pigment system and corrosion resistant, the material therefore does not require painting. However if painting is required, a good quality gloss paint or paint specific to PVC should be used. Standard gloss paint may be used if:

- The PVC surface has weathered for some time which will occur naturally.
- The system has been cleaned, with degreasing agent such as sugar soap or warm soapy water.
- Once cleaned 2 coats of good quality gloss paint should be applied.
- Avoid scouring or roughing the surface of the plastic as this effect the final appearance of the painted product.
- Contact with bituminous liquids is not advisable. It is essential that fascia boards treated with preservative such as creosote are left for at least 48 hours to dry before installation commences.

8.5 Polluted atmospheres may affect all plastic rainwater systems.

For further details on Chemical Resistance, please refer to FloPlast's website

9. Durability

The gutter system is made from a conventional material as used in gutter systems conforming to BS EN 607, BS EN 12200-1 and BS EN 1462.

9.1 Given regular and proper maintenance, rainwater systems have a life expectancy of 20 years (excluding colourfastness).

9.2 A planned cleaning program is essential to maintain the gutters appearance. For further details, please see section 14 entitled Cleaning and Maintenance.

10. Colourfastness

10.1 FloPlast rainwater systems are fully tested and Kitemark against BS EN 607, BS EN 12200-1 and BS EN 1462. This includes artificially ageing of the product to method A of BS EN ISO 4892-3 and measuring the colour fastness to BS EN 20105-A02.

10.2 This testing does not guarantee that the surface colour of the rainwater system will not change over a period. This is a measure of the degree of change according to the controlling standard.

11. Fire Peformance

11.1 FloPlast gutters, pipes and fittings are manufactured in PVC-U, which is not easily ignitable and will not support combustion.

11.2 Interior applications of plastic pipes may require protection in compliance with Building Regulations.

12. Performance of Joints

12.1 Correctly made joints between gutter sections and fittings are watertight under conditions of thermal movement in excess of those expected to occur in practice.

12.2 The fittings used with downpipes, with the exception of 110mm, are unsealed and are not designed to withstand hydrostatic pressure. In the event of a blockage of the downpipe, water leakage may occur at joints.

13. Flow Characteristics

Flow capacities associated with FloPlast rainwater systems, when calculated in accordance with BS EN 12056-3, are given in the tables below.

OUTLET AT END OF GUTTER RUN

System	Gutter Fixed Level: Gutter Flow (litres/sec) Max flow rate	Gutter Fixed Level: Gutter Flow (litres/sec) BS 12056	Gutter Fixed Level: Roof Area (m^2) Max flow rate	Gutter Fixed Level: Roof Area (m^2) BS 12056	Gutter Fixed at 1:350 fall: Gutter Flow (litres/sec) Max flow rate	Gutter Fixed at 1:350 fall: Gutter Flow (litres/sec) BS 12056	Gutter Fixed at 1:350 fall: Roof Area (m^2) Max flow rate	Gutter Fixed at 1:350 fall: Roof Area (m^2) BS 12056
Half Round 68mm Circular Downpipe	0.92	0.82	44	40	1.17	1.05	56	50
Square Line 65mm Square Downpipe	1.70	1.53	81	73	2.00	1.80	96	86
Hi-Cap 68mm Circular Downpipe	2.05	1.84	98	88	2.56	2.30	123	111
Hi-Cap 80mm Circular Downpipe	2.25	2.02	108	97	2.79	2.51	134	121
Niagara 65mm Square Downpipe	2.40	2.16	115	104	2.90	2.61	139	125
Niagara 80mm Circular Downpipe	2.64	2.37	127	114	3.19	2.87	153	138
XtraFlo 110mm Circular Downpipe	4.30	3.87	206	185	6.20	5.58	297	267

OUTLET AT CENTRE OF GUTTER RUN

System	Gutter Fixed Level: Gutter Flow (litres/sec) Max flow rate	Gutter Fixed Level: Gutter Flow (litres/sec) BS 12056	Gutter Fixed Level: Roof Area (m^2) Max flow rate	Gutter Fixed Level: Roof Area (m^2) BS 12056	Gutter Fixed at 1:350 fall: Gutter Flow (litres/sec) Max flow rate	Gutter Fixed at 1:350 fall: Gutter Flow (litres/sec) BS 12056	Gutter Fixed at 1:350 fall: Roof Area (m^2) Max flow rate	Gutter Fixed at 1:350 fall: Roof Area (m^2) BS 12056
Half Round 68mm Circular Downpipe	1.80	1.62	86	77	2.60	2.34	125	113
Square Line 65mm Square Downpipe	3.41	3.06	163	147	3.95	3.55	189	170
Hi-Cap 68mm Circular Downpipe	3.80	3.42	182	164	5.00	4.05	240	216
Hi-Cap 80mm Circular Downpipe	4.18	3.76	200	180	5.50	4.95	264	238
Niagara 65mm Square Downpipe	4.50	4.05	216	194	5.30	4.77	254	229
Niagara 80mm Circular Downpipe	4.95	4.45	237	213	5.83	5.24	279	251
XtraFlo 110mm Circular Downpipe	8.20	7.38	393	354	11.80	10.62	566	509

(1) Reduced capacities apply where bends are incorporated (see BS EN 12056-3)

(2) The effective area is based upon the Building Regulation value of 0.022 l /s-1/ m-1 and should be calculated in accordance with BS EN 12056-3

14. Cleaning and Maintenance

14.1 Although PVCu rainwater systems are considered to be relatively maintenance-free it is important to clear gutter systems of fallen leaves and other debris at least once per year.

14.2 More frequent inspections may be necessary in areas of high pollution and where there are trees in the vicinity.

14.3 Inspection of the gutter and brackets is also advisable during and after periods of ice formation in the guttering system.

14.4 In some cases lighter coloured systems may require cleaning.

14.5 Wash down with a solution of soapy warm water, in severe cases a non-abrasive kitchen cream cleaner should be used.

15. Installation

15.1 Installation must be in accordance with FloPlast instruction and/or BS EN 12056-3.

15.2 Under normal conditions fascia brackets should be positioned so as to avoid the fixing screws splitting the top edge of any timber fascia board.

15.3 All brackets should be secured to the fascia board with two 25mm x 5mm (1″ x 10) brass/ zinc plated round head screws or one 40mm x 5mm (11/2″ x 10) screw at the distances specified within the detailed installation instructions. The "Cast Iron" fascia brackets must have two fixings.

15.4 In areas of heavy snowfall it is recommended that each fascia bracket is secured using two 25mm x 5mm (1″ x 10) screws as a minimum.

15.5 Unions, outlets and angles should be fixed using two 25mm x 5mm (1″ x 10) screws or one 40mm x 5mm (1½″ x 10) screw.

15.6 External and Internal angles should have a fascia bracket within 150mm of the fitting and stopend.

15.7 Joints are made by locating the gutter under the rear clip of the flexible clip on the fitting. The gutter is then pulled forward and down until the front edge fits under the front clip and snaps into position. The elastomeric gasket in the fitting will seal the joint.

15.8 The elastomeric seals should be lubricated with FloPlast silicone to ensure an easy fit and to allow for thermal movement. Do not use washing up liquid or similar substances as these will cause the seal to degrade.

15.9 At gutter joints, the ends of the gutter should be fitted to the 'insert to here' line incorporated into the fitting to ensure that the correct provision for expansion and contraction.

15.10 The gutter may be fixed either level on the fascia board or to a maximum fall of 1:350. It is important that the distance between the gutter and roof tiles is not excessive. The roofing felt also needs to project slightly into the gutter to prevent water splash onto the fascia board behind the gutter.

15.11 Rainwater downpipe clips should be fixed using two 40mm x 6mm (1½″ x 12) brass/ zinc plated round head Screws.

15.12 All downpipe installations should start at the outlet. If an offset is required use two offset bends with or without a short piece of pipe, alternatively use an adjustable bend.

15.13 Ensure a 6mm gap is left at the top of the downpipe for expansion.

15.14 Round head screws are the recommended style of screw, however counter sunk can be used as long as care is taken not to overtighten, particulary when using power tools.

16. Transport, Handling and Storage

16.1 FloPlast PVC-U pipes and gutters are supplied in secure bales bound with straps within frames. FloPlast recommend that movement of bales is carried out by fork lift or other mechanical device using webbing or rope strings.

16.2 The bales may be stacked up to a maximum of three high providing that the timber frames are placed on each other.

16.3 To maintain the condition of gutters and pipes, FloPlast recommend storage in our manufacturers packaging however out of direct sunlight.

16.4 When pipes or gutters are supplied in individual packs or when bales are opened it is advised that movements are performed by hand.

16.5 Fittings are generally supplied in plastic bags and should be stored away from direct sunlight. If they have to be stored outside, the bags should be opened to prevent temperature build up and distortion to the products.

16.6 Whilst wrapped, direct sunlight or hot unventilated places can cause the temperature of materials to rise and in extreme conditions can result in distortion.

16.7 Cold weather affects the impact strength of most plastics so extra care should be taken when handling gutter and pipes in wintry conditions.

17. Environmental and Biological

17.1 The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that inappropriate, large or frequent disposal might have a harmful or damaging effect on the environment.

17.2 Disposal of waste materials in accordance with local Waste Regulations. When handling waste, consideration should be made to the safety precautions applying to handling of the product. Recycle where it is practical to do so.

17.3 Resistant to:

- Bacterial growth
- Fungal growth
- Termite attack

17.4 Products need protection from:

- Rodents
- Vermin

18. General Site Safety

18.1 It is essential that all FloPlast products be handled and installed in accordance with FloPlast Technical Literature.

18.2 All relevant requirements should be strictly adhered to and include:

- Wearing of hard hats and appropriate footwear/clothing.
- Ensuring safe working platforms, including guardrails, means of arresting falls and safe access to the working area. Provision of first aid facilities and appropriate storage facilities for materials.

18.3 FloPlast rainwater systems are easily cut routed and drilled using conventional woodworking tools.
Note: Products should always be cut with the correct tools-never broken.

18.4 Observe all Health and Safety Regulations regarding the use of hand and machine tools.

18.5 Fine-toothed tungsten carbide tipped power tools may be used with FloPlast products at manufacturer's recommended speeds.

18.6 Always wear a coarse particle dust mask and eye protection against airborne swarf when using power tools.
Note: PVC-U dust poses no special hazards other those generally associated with dust.

19. Technical Investigation

19.1 The following is a summary of the technical investigation undertaken by BSI in awarding the British Standard Kitemark KM501316 against FloPlast products:

Gutter and associated fittings

- impact resistance to BS EN 607 Annex B
- tensile strength and elongation at break to ISO 6259-1
- longitudinal reversion to BS EN ISO 2505
- tensile impact strength to BS EN ISO 8256
- Vicat softening temperature to BS EN ISO 306
- watertightness to BS EN 607 Annex D
- effects of heating to BS EN ISO 580
- artificial ageing to BS EN ISO 4892-2

Brackets

- load bearing capacity to BS EN 1462
- artificial ageing to BS EN ISO 4892-2

Downpipe and associated fittings

- impact resistance to ISO 3127
- longitudinal reversion to BS EN ISO 2505
- tensile impact strength to BS EN ISO 8256
- effects of heating to BS EN ISO 580
- artificial ageing to BS EN ISO 4892-2
- tensile strength and elongation at break to ISO 6259-2
- Vicat softening temperature to BS EN ISO 306.

19.2 Tests were conducted to determine the performance in use for the conditions covered in the Design Data of this document.

19.3 The manufacturing process applied to these products are controlled with FloPlast BS EN ISO 9001: 2000 Quality Management System (Certificate No. FM501414). These processes are regularly audited by representatives of BSI to ensure continued compliance with our detailed processes.

20. Bibliography

BS4514	Unplasticized PVC saoil and venting pipes of 82.4 mm minimum mean outside diameter, and fitting of 82.4mm and of other sizes.
BS EN 607:	Eaves gutters and fittings of PVC-U Definitions, requirements and testing.
BS EN 1462:	Brackets for eaves gutters. Requirements and testing.
BS EN 1329-1	Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Unplasticized poly(vinyl chloride) (PVC-U)
BS EN 1453-1	Plastics piping systems with structured-wall pipes for soil and waste discharge (low and high temperature) inside buildings – Unplasticized poly(vinyl chloride) (PVC-U).
BS EN 12056-3:	Roof Drainage, Layout and Calculation.
BS EN 12200-1:	Plastics rainwater piping systems for above ground external use. Unplasticized poly (vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system.
BS EN 20105-A02:	Colour Measurement
BS EN ISO 250:	Thermoplastics pipes — Longitudinal reversion — Test method and parameters
BS EN ISO 306:	Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)
BS EN ISO 580:	Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating
BS EN ISO 4892-2:	Plastics — Methods of exposure to laboratory light sources — Xenon-arc lamps
BS EN ISO 4892-3:	Methods of exposure to laboratory light sources UV Fluorescent tubes
BS EN ISO 8256:	Plastics — Determination of tensile-impact strength
BS EN ISO 9001:	Quality management systems — Requirements
ISO 3127:	Thermoplastics pipes. Determination of resistance to external blows — Round-the-clock method
ISO 6259-1:	Thermoplastics pipes — Determination of tensile properties — Part 1: General test method
ISO 6259-2:	Pipes made of unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly (vinyl chloride) (PVC-C), and high-impact poly (vinyl chloride) (PVC-HI)

21. Publications/Industry Standards

General Health and Safety Guidelines for construction sites are set out in publications by various organisations, including:

- COSHH
- HSE
- CDM

The Construction (Health, Safety and Welfare) Regulations 1996 complement the CDM regulations to complete the UK's response to the EC's Temporary and Mobile Worksite Directive.

Relevant HSE publications include:

- HS (G) 150 Health and Safety in Construction ISBN 07176 1143
- Guidance Note EH37 Working with Asbestos

HSE publications available from HSE Books, PO Box 1999, Sudbury, Suffolk, CO10 6FS

Tel: 01787 881165, Fax: 01787 313995

22. Technical Guidance

FloPlast provide a comprehensive technical support service.

For guidance on any Health and Safety issues including any aspect of system design, specification or installation please call the FloPlast Technical Helpline on 01795 431731.

23. Conditions

23.1 This document:

- Relates only to the product that is named, described, installed, used and maintained as set out in this document.
- Is valid only within the UK.
- Has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective.
- Is subject to English law.

23.2 References in this document to any Act of Parliament, Regulation made there under, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this document.

23.3 This document will remain valid for an unlimited period provided that the product and the manufacture and/or fabrication including all related and relevant processes thereof:

- Are maintained at or above the levels which have been assessed and found to be satisfactory by the BSI.
- Continue to be checked as and when deemed appropriate by BSI under arrangements that it will determine.
- Are reviewed by the BSI as and when it considers appropriate.

23.4 In issuing this document, FloPlast is not responsible for:

- Actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- Any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance

23.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this document are the minimum standards required to be met when the product is used. They do not support in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this document or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care.

In granting this document, FloPlast does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.

In demonstrating their compliance with BS EN 607, BS EN 12200-1 and BS EN 1462 FloPlast's rainwater systems are fit for their intended use provided they are installed, used and maintained as set out in this document. The British Kitemark Certificate KM501414 has been awarded to FloPlast.