Standard: BSEN 1329

Scope:
The British standard BS EN 1329 specifies the requirement for uPVC pipes for soil and waste discharge (low and high temperature). These pipes are applicable for the discharge of soil waste inside the building and for soil and waste discharge buried within the building area.
Colour:
Light Grey RAL 7042
Appearance:
6 / 5.8 / 4 meter with spigot end and socket-solvent cement joint. Push fit joint are available in 110mm and above on request.

Nominal Size (mm)	Mean Outside Diameter (mm)	Wall Thickness (mm)			
		Inside Building Area (B)		Inside Building Area & buried within building (BD)	
		Min	Max	Min	Max
32	32	3.0	3.5	-	-
40	40	3.0	3.5	-	-
50	50	3.0	3.5	-	-
63	63	3.0	3.5	-	-
75	75	3.0	3.5	3.0	3.5
80	80	3.0	3.5	3.0	3.5
82	82	3.0	3.5	3.0	3.5
90	90	3.0	3.5	3.0	3.5
110	110	3.2	3.8	3.2	3.8
160	160	3.2	3.8	4.0	4.6
200	200	3.9	4.5	4.9	5.6
250	250	4.9	5.6	6.2	7.1
315	315	6.2	7.1	7.7	8.7

(SERIES BASED ON EACH DIMENSIONS)

Nominal Size (In.)	Mean Outside Diameter (mm)	Wall Thickness (mm) Inside Building Area (B)
Inch./mm	mm	mm
1 1/4″ / 36	36	3,0
1 1/2″ /43	43	3,0
2″ / 56	56	3.0

		3.5
		3.5
		3.5

QA/QC Test: Long term hydrostatic pressure test; vicat softening point; heat reversion; dichloromethane test; impact test.
uPVC Fitting & Accessories: Please refer to Qatar National Plastic fittings Catalogue.

Standard: BS 5255

Scope: Domestic Waste Pipe - Above Ground Drainage System and Venting System.
Colour: Light Grey RAL 7042
Appearance: 4 meter with spigot end and socket-solvent cement joint.

Nominal Size (In.)	Mean Outside Diameter (mm)		Wall Thickness	Unit Length
	Minimum	Maximum		
1¼	35.15mm	36.45mm	2.2mm	4 meters
1 ½	42.75mm	43.05mm	2.3mm	4 meters
2″	55.75mm	56.05mm	2.4mm	4 meters

QA/QC Test: Heat reversion, impact test, vicat softening temperature.

Standard: BS 4514

Scope: Soil, Vent and Waste Pipe
Colour: Light Grey RAL 7042
Appearance: 5.8 / 4 meter with spigot end and socket-solvent cement joint.

Nominal Size (In.)	Mean Outside Diameter (mm)		Extreme Outside Diameter (mm)		Wall Thickness	Unit Length
	Minimum	Maximum	Minimum	Maximum		
82mm (3″)	82.4mm	82.8mm	81.0mm	84.3mm	3.2mm	4 meters
110mm (4″)	110.0mm	110.4mm	108.0mm	112.4mm	3.2mm	5.8 meters
160mm (6″)	160.0mm	160.6mm	157.1mm	163.5mm	3.2mm	5.8 meters

QA/QC Test: Heat reversion, impact test, vicat softening temperature.

Standard: AS / NZS 1260

Scope: Drain, Waste and Vent application.
Colour: Grey RAL 7042
Appearance: 4 meter with spigot end and socket-solvent cement joint.

Nominal Size		Mean Outside Diameter (mm)		Wall Thickness (mm)	
Inch	DN	Minimum	Maximum	Minimum	Maximum
1 1/4	32	36.2	36.5	1.9	2.3
1 1/2	40	42.8	43.1	2.0	2.4
2	50	55.7	56.0	2.2	2.6
3	80	82.3	82.7	2.9	3.4

QA/QC Test: Heat reversion; impact test; vicat softening temperature; pipe stiffness.

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Continuous Operating Temperature

u-PVC pipe properties are depended on temperature range. The Vicat Softening Temperature of u-PVC is 78-80 degree Celsius. The proposed maximum frequent operational temperature for u-PVC pipes is 60°C, this limitation refers to the complete pipe wall being at 60°C and would apply for continuous flow of a fluid at 60°C.

For intervallic flow, the fluid temperature can be higher due to the lower thermal conductivity of Qplast drainage pipes. The duration and volume of the discharge determines the maximum temperature, which should be considered in terms of a 60°C limitation average across the pipe wall thickness. Generally, higher temperature discharges are limited to a small volumes and short durations satisfactory. Thermal cycling for u-PVC drainage pipes require the ability to withstand alternating 90 seconds cycles of 35 liters of water at 93°C with 35 liters of water at 12°C without leakage or excessive deformation. However, Qatar National Plastic technical advice has to be obtained for sophisticated applications.

Low Temperature Application

The Impact properties of u-PVC pipe are reduced at zero degree celcius and below. Special care has to take when applications at this temperature by means of any kind of protection like encased in duct. u-PVC pipes should not be used at temperature where water freezes.

Thermal expansion

Thermal expansion for above ground pipe is 6mm for 10mtr pipe for each 10°C rise in temperate. It is mandatory to keep an expansion ring seal joint in between two solvent joints to avoid the stress in pipes and to allow the pipe to expand and contract smoothly. The maximum distance between expansion joints would be 4mtr for diameters ranging 75mm-160mm and 2mtr for 32mm-63mm.

Chemical resistance

Qplast branded u-PVC drainage pipes are resistant to public sewer discharge acids. However, with elevated service temperature (ie increase above 60 degrees celsius) may reduce the chemical resistance. Please refer Qatar National Plastic "Chemical resistance chart"

Exposure to Ultra violet rays

Long time exposure of UV rays on u-PVC pipes may create discoloration, but will not significantly affect the performance of pipes. To minimize the UV degradation Qatar National Plastic u-PVC pipes are manufactured with titanium dioxide which will reflect UV rays. The depth of penetrating degradation would range between 0.025-0.076mm. In case of stronger protection is required pipe and fitting may have painted with white colour acrylic based latex paint or made be opaque with any other shield to avoid penetration UV rays.

Installation

When installing of u-PVC sanitary drainage pipes it is necessary to keep supporting brackets in between the pipe work. This supporting brackets could be plastic coated or using any other suitable materials fit for that purpose. Special care must be taken to ensure pipe surfaces should not be damaged while tightening the supports in to the wall. Where anchor points are required to control thermal movement, supporting brackets are usually fitted on the pipe sockets between special ribs. Intermediate guide brackets fitted to the pipe barrel should allow thermal movement to take place.

Maximum distance between supports

The maximum distance between vertical and low gradient supports shall not be exceed values from the below table. In vertical pipe runs there should be at least one pipe support bracket at each storey height, fixed behind a collar to support the vertical load, avoid downward movement of the pipes and loss of expansion gaps.

Supports should be adjacent to joints and of adequate strength to carry the weight of the pipe plus contents. Where the layout requires shorter lengths than the maximum, support distances should be adjusted to suit these shorter lengths and provision of lateral bracing should be considered when pipes are flexibly jointed.

Pipe DN(mm)	Vertical pipes (m)	Low gradient pipes (m)
32 to 40	1,2	0,5
50	1,2	0,6
75 to 100	2,0	1,0
150	2,0	1,2

Types of Above Ground Drainage Systems

System I

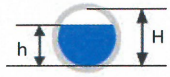
Single discharge stack system with partly filled branch discharge pipes

Sanitary appliances are connected to partly filled branch discharge pipes. The partly filled branch discharge pipes are designed with a filling degree of 0.5 (50 %) and are connected to a single discharge stack.

System II

Single discharge stack system with small bore discharge branch pipes

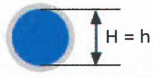
Sanitary appliances are connected to small bore branch discharge pipes. The small bore branch discharge pipes are designed with a filling degree of 0.7 (70 %) and are connected to a single discharge stack.



System III

Single discharge stack system with full bore branch discharge pipes

Sanitary appliances are connected to full bore branch discharge pipes. The full bore branch discharge pipes are designed with a filling degree of 1.0 (100 %) and each branch discharge pipe is separately connected to a single discharge stack.



System IV

Separate discharge stack system

Drainage systems type I, II and III may also be divided into a black water stack serving WC's and urinals and a grey water stack serving all other appliances.

Configurations

Each system may be configured in a number of ways, governed by the need to control pressure in the pipework in order to prevent foul air from the waste water system entering the building. The principal configurations are described below but combinations and variations are often required.

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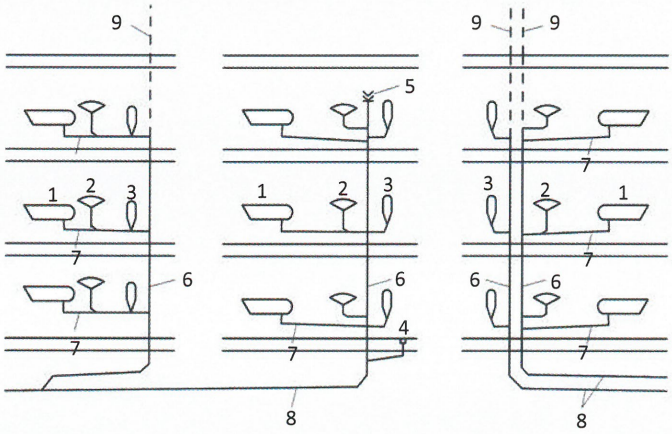
(a) Primary ventilated system configurations

Control of pressure in the discharge stack is achieved by air flow in the discharge stack and the stack vent (Please refer Figure: AGD 1). Alternatively, air admittance valves may be used.



Legend:

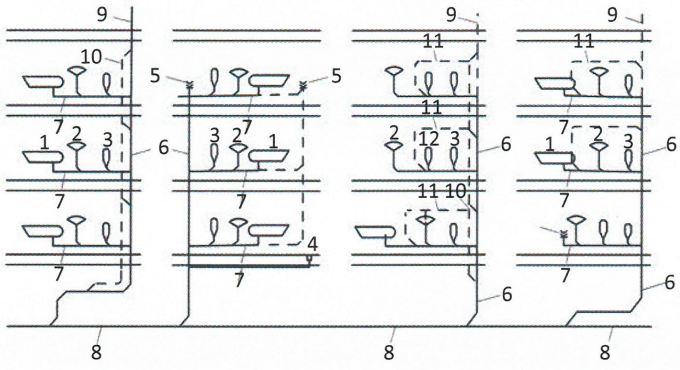
1 Bath
2 Wash basin
3 WC
4 Floor gully
5 Air admittance valve
6 Stack
7 Branch discharge pipe
8 Drain
9 Stack vent

Figure: AGD 1

(b) Secondary ventilated system configurations

Control of pressure in the discharge stack is achieved by use of separate ventilating stacks and/or secondary branch ventilating pipes in connection with stack vents (Please refer Figure AGD 2).

Alternatively, air admittance valves may be used.



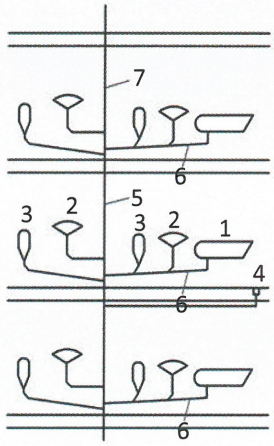
Legend:

1 Bath
2 Wash basin
3 WC
4 Floor gully
5 Air admittance valve
6 Stack
7 Branch discharge pipe
8 Drain
9 Stack vent
10 Ventilating stack
11 Branch ventilating pipe
12 Urinal

Figure: AGD 2

(c) Unventilated discharge branch configurations

Control of pressure in the discharge branch is achieved by air flow in the discharge branch (Please refer Figure AGD 3).



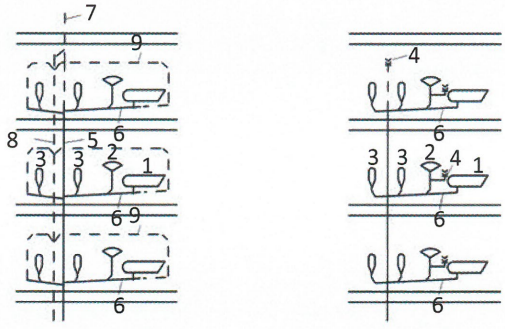
Legend:

1 Bath
2 Wash basin
3 WC
4 Floor gully
5 Stack
6 Branch discharge pipe
7 Stack vent

Figure: AGD 3

(d) Ventilated discharge branch configurations

Control of pressure in the discharge branch is achieved by ventilation of the discharge branch (Please refer Figure: AGD 4). Alternatively, air admittance valves may be used.



Legend:

1 Bath
2 Wash basin
3 WC
4 Air admittance valve
5 Stack
6 Branch discharge pipe
7 Stack vent
8 Ventilating stack
9 Branch ventilating pipe

Figure: AGD 4

Nominal diameters (DN) and related minimum internal diameters (di min)

Nominal Diameter	Minimum Internal Diameter
DN	*di* min (mm)
30	26
40	34
50	44
56	49
60	56
70	68
80	75
90	79
100	96
125	113
150	146
200	184
225	207
250	230
300	290

Table AGD 5

Table AGD 6: Discharge Unit (DU) values

Appliance	System I	System II	System III	System IV
	DU	DU	DU	DU
	l/s	l/s	l/s	l/s
Wash basin, bidet	0,5	0,3	0,3	0,3
Shower without plug	0,6	0,4	0,4	0,4
Shower with plug	0,8	0,5	1,3	0,5
Single urinal with cistern	0,8	0,5	0,4	0,5
Urinal with flushing valve	0,5	0,3	-	0,3
Slab urinal	0,2*	0,2*	0,2*	0,2*
Bath	0,8	0,6	1,3	0,5
Kitchen sink	0,8	0,6	1,3	0,5
Dishwasher (household)	0,8	0,6	0,2	0,5
Washing machine up to 6 kg	0,8	0,6	0,6	0,5
Washing machine up to 12 kg	1,5	1,2	1,2	1,0
WC with 4,0 l cistern	**	1,8	**	**
WC with 6,0 l cistern	2,0	1,8	1,2 to 1,7***	2,0
WC with 7,5 l cistern	2,0	1,8	1,4 to 1,8***	2,0
WC with 9,0 l cistern	2,5	2,0	1,6 to 2,0***	2,5
Floor gully DN 50	0,8	0,9	-	0,6
Floor gully DN 70	1,5	0,9	-	1,0
Floor gully DN 100	2,0	1,2	-	1,3

* Per person.
** Not permitted.
*** Depending upon type (valid for WC's with siphon flush cistern only).
\- Not used or no data.

Discharges from non-domestic sanitary appliances (e.g. commercial kitchen) should be determined individually.

Calculation of Waste water flowrate (Qww)

Qww is the expected flowrate of waste water in a part or in the whole drainage system where only domestic sanitary appliances are connected to the system.

$$Qww = K\sqrt{\sum DU}$$

where:
Qww= Waste water flowrate (l/s)
K = Frequency factor

SDU = Sum of discharge units

Typical frequency factors (K)

Usage of appliances	K
Intermittent use, e.g. in dwelling, guesthouse, office	0,5
Frequent use, e.g. in hospital, school, restaurant, hotel	0,7
Congested use, e.g. in toilets and/or showers open to public	1,0
Special use, e.g. laboratory	1,2

Waste water flow rates (Qww) Using different frequency factors (K)

Sum of Discharge Units	K 0,5	K 0,7	K 1,0	K 1,2
ΣDU	Qww	Qww	Qww	Qww
	l/s	l/s	l/s	l/s
10	1,6	2,2	3,2	3,8
12	1,7	2,4	3,5	4,2
14	1,9	2,6	3,7	4,5
16	2,0	2,8	4,0	4,8
18	2,1	3,0	4,2	5,1
20	2,2	3,1	4,5	5,4
25	2,5	3,5	5,0	6,0
30	2,7	3,8	5,5	6,6
35	3,0	4,1	5,9	7,1
40	3,2	4,4	6,3	7,6
45	3,4	4,7	6,7	8,0
50	3,5	4,9	7,1	8,5
60	3,9	5,4	7,7	9,3
70	4,2	5,9	8,4	10,0

Sum of Discharge Units	K 0,5	K 0,7	K 1,0	K 1,2
SDU	Qww	Qww	Qww	Qww
	l/s	l/s	l/s	l/s
80	4,5	6,3	8,9	10,7
90	4,7	6,6	9,5	11,4
100	5,0	7,0	10,0	12,0
110	5,2	7,3	10,5	12,6
120	5,5	7,7	11,0	13,1
130	5,7	8,0	11,4	13,7
140	5,9	8,3	11,8	14,2
150	6,1	8,6	12,2	14,7
160	6,3	8,9	12,6	15,2
170	6,5	9,1	13,0	15,6
180	6,7	9,4	13,4	16,1
190	6,9	9,6	13,8	16,5
200	7,6	9,9	14,1	17,0
220	7,4	10,4	14,8	17,8
240	7,7	10,8	15,5	18,6
260	8,1	11,3	16,1	19,3
280	8,4	11,7	16,7	20,1
300	8,7	12,1	17,3	20,8
320	8,9	12,5	17,9	21,5
340	9,2	12,9	18,4	22,1
360	9,5	13,3	19,0	22,8
380	9,7	13,6	19,5	23,4
400	10,0	14,0	20,0	24,0

Table AGD 7

Calculation of Total flowrate (Qtot)

Qtot is the design flowrate in a part or in the whole drainage system where sanitary appliances, appliances with continuous flow and/or waste water pumps are connected to the system.

Continuous flows and pump discharge rates shall be added to the waste water flowrate without any reduction.

Qtot = Qww + Qc + Qp
Qtot = Total flowrate (l/s)
Qww = Waste water flowrate (l/s)
Qc = Continuous flowrate (l/s)
Qp = Pumped water flowrate (l/s)

Layout of branches

Unventilated discharge branches
Below table can be used for sizes and limitations upon the use of unventilated discharge branches are given in Tables AGD 8 and AGD 9. Where the limitations cannot be met, discharge branches shall be ventilated.

Table AGD 8 — Hydraulic capacity (Qmax) and nominal diameter (DN)

*Q*max	System I	System II	System IV
l/s	DN	DN	DN
0,40	*	30	30
0,50	40	40	40
0,80	50	*	*
1,00	60	50	50
1,50	70	60	60
2,00	80**	70**	70**
2,25	90***	80****	80****
2,50	100	90	100

* Not permitted.
** No WC's.
*** Not more than two WC's and a total change in directions of not more than 90°.
**** Not more than one WC.

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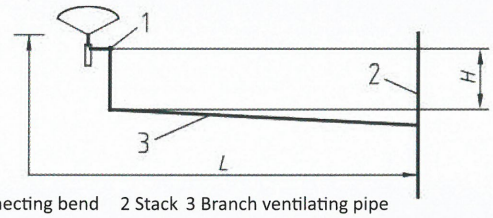
Table AGD 9 - Limitations

Limitations	System I	System II	System IV
Maximum length (L) of pipe	4,0 m	10,0 m	10,0 m
Maximum number of 90° bends	3*	1*	3*
Maximum drop (H) (45° or more inclination)	1,0 m	**6,0 m DN > 70 **3,0 m DN = 70	1,0 m
Minimum gradient	1 %	1,5 %	1 %

* Connection bend not included.

** If DN < 100 mm and a WC is connected to the branch no other appliances can be connected more than 1 m above the connection to a ventilated system.



1 Connecting bend 2 Stack 3 Branch ventilating pipe

Table AGD 10 — Limitations for unventilated branch - discharge - pipes in system III.

Appliance	Diameter	Min. trap seal depth	Max. length (L) of pipe from trap outlet to stack	Pipe gradient	Max number of bends	Max. drop (H)
	DN	mm	m	%	No.	m
Washbasin, bidet (30 mm diameter trap)	30	75	1,7	2,2[1])	0	0
Washbasin, bidet (30 mm diameter trap)	30	75	1,1	4,4[1])	0	0
Washbasin, bidet (30 mm diameter trap)	30	75	0,7	8,7[1])	0	0
Washbasin, bidet (30 mm diameter trap)	40	75	3,0	1,8 to 4,4	2	0
Shower, bath	40	50	No Limit[2])	1,8 to 9,0	No Limit	1,5
Bowl urinal	40	75	3,0[3])	1,8 to 9,0	No Limit[4])	1,5
Trough urinal	50	75	3,0[3])	1,8 to 9,0	No Limit[4])	1,5
Slab urinal[5])	60	50	3,0[3])	1,8 to 9,0	No Limit[4])	1,5
Kitchen sink (40 mm diameter trap)	40	75	No Limit[2])	1,8 to 9,0	No Limit	1,5
Household dishwasher or washing machine	40	75	3,0	1,8 to 4,4	No Limit	1,5
WC with outlet up to 80 mm[6])	75	50	No Limit	1,8 Min.	No Limit[4])	1,5
WC with outlet greater than 80 mm[6])	100	50	No Limit	1,8 Min.	No Limit[4])	1,5
Food waste disposal[7])	40 Min.	75[8])	3,0[3])	13,5 Min.	No Limit[4])	1,5
Sanitary towel disposal unit	40 Min.	75[8])	3,0[3])	5,4 Min.	No Limit[4])	1,5
Floor drain	50	50	No Limit[3])	1,8 Min.	No Limit	1,5
Floor drain	70	50	No Limit[3])	1,8 Min.	No Limit	1,5
Floor drain	100	50	No Limit[3])	1,8 Min.	No Limit	1,5
4 basins	50	75	4,0	1,8 to 4,4	0	0
Bowl urinals[8])	50	75	No Limit[3])	1,8 to 9,0	No Limit[4])	1,5
Maximum of 8 WC's[6])	100	50	15,0	0,9 to 9,0	2	1,5
Up to 5 spray tap basins[9])	30 Max.	50	4,5[3])	1,8 to 4,4	No Limit[4])	0

1) Steeper gradient permitted if pipe is less than maximum permitted length.
2) If length is greater than 3 m noisy discharge may result with an increased risk of blockage.
3) Should be as short as possible to limit problems with deposition.
4) Sharp throated bend should be avoided.
5) For slab urinal for up to 7 persons. Longer slabs to have more than one outlet.
6) Swept-entry branches serving WC's.
7) Includes small potato-peeling machines.
8) Tubular not bottle or resealing traps.
9) Spray tap basin shall have flush-grated wastes without plugs.

Ventilated discharge branches

Below table can be used sizes and limitations upon the use of ventilated discharge branches are given in Table AGD 11 and AGD 12. Limitations .

Table AGD 11 — Hydraulic capacity (Qmax) and nominal diameter (DN)

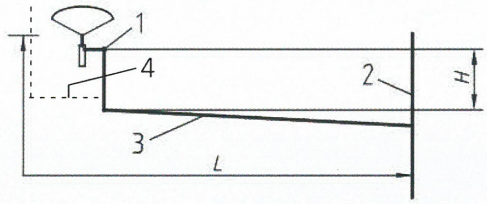
Qmax	System I	System II	System IV
l/s	DN	DN	DN
	Branch/Vent	Branch/Vent	Branch/Vent
0,60	*	30/30	30/30
0,75	50/40	40/30	40/30
1,50	60/40	50/30	50/30
2,25	70/50	60/30	60/30
3,00	80/50**	70/40**	70/40**
3,40	90/60***	80/40****	80/40****
3,75	100/60	90/50	90/50

* Not permitted.
** No WC's.
*** Not more than two WC's and a total change in directions of not more than 90°.
**** Not more than one WC.

Table AGD 12 — Limitations

Limitations	System I	System II	System IV
Maximum length (L) of pipe	10,0 m	No Limit	10,0 m
Maximum number of 90° bends*	No Limit	No Limit	No Limit
Maximum drop (H) (45° or more inclination)	3,0 m	3,0 m	3,0 m
Minimum gradient	0,5 %	1,5 %	0,5 %

* Connection bend not included.



1 Connection bend 2 Stack
3 Branch discharge pipe 4 Branch ventilating pipe

Figure AGD 13 — Limitations for ventilated discharge branches in system I, II and IV

Table AGD 14 — Limitations for ventilated branch discharge pipes in system III

Appliance	Diameter	Min. trap seal depth	Max. length (L) of pipe from trap outlet to stack	Pipe gradient	Max number of bends	Max. drop (H)
	DN	mm	m	%	No.	m
Washbasin, bidet (30 mm diameter trap)	30	75	3,0	1,8 Min.	2	3,0
Washbasin, bidet (30 mm diameter trap)	40	75	3,0	1,8 Min.	No Limit	3,0
Shower, bath	40	50	No Limit[2])	1,8 Min.	No Limit	No Limit
Bowl urinal	40	75	3,0[3])	1,8 Min.	No Limit[4])	3,0
Trough urinal	50	75	3,0[3])	1,8 Min.	No Limit[4])	3,0
Slab urinal5)	60	50	3,0[3])	1,8 Min.	No Limit[4])	3,0
Kitchen sink (40 mm diameter trap)	40	75	No Limit[2])	1,8 Min.	No Limit	No Limit
Household dishwasher or washing machine	40	75	No Limit[3])	1,8 Min.	No Limit	No Limit

Appliance	Diameter	Min. trap seal depth	Max. length (L) of pipe from trap outlet to stack	Pipe gradient	Max number of bends	Max. drop (H)
	DN	mm	m	%	No.	m
WC with outlet up to 80 mm[6]) and [14])	75	50	No Limit	1,8 Min.	No Limit[4])	1,5
WC with outlet greater than 80 mm[6]) and [14])	100	50	No Limit	1,8 Min.	No Limit[4])	1,5
Food waste disposal[7])	40 Min.	75[8])	3,0[3])	13,5 Min.	No Limit[4])	3,0
Sanitary towel disposal unit	40 Min.	75[8])	3,0[3])	5,4 Min.	No Limit[4])	3,0
Bath drain, floor drain	50	50	No Limit[3])	1,8 Min.	No Limit	No Limit
Floor drain	70	50	No Limit[3])	1,8 Min.	No Limit	No Limit
Floor drain	100	50	No Limit[3])	1,8 Min.	No Limit	No Limit
4 basins[9])	50	75	7,0	1,8 to 4,4	[2])	0
10 basins[9]) and [10])	50	75	10,0	1,8 to 4,4	No Limit	0
Bowl urinals[9]) and [11])	50	75	No Limit[3])	1,8 Min.	No Limit[4])	No Limit
More than 8 WC's[6])	100	50	No Limit	0,9 Min.	No Limit	No Limit
Up to 5 spray-tap basins[12])	30 Max.	50	No Limit[3])	1,8 to 4,4	No Limit[4])	0

1) For maximum distance from trap to vent;
2) If length is greater than 3 m, noisy discharge may result with an increased risk of blockage.
3) Should be as short as possible to limit problems with deposition.
4) Sharp throated bends should be avoided.
5) For slab urinal for up to 7 persons. Longer slabs to have more than one outlet.
6) Swept-entry branches serving WC's.
7) Includes small potato-peeling machines.
8) Tubular not bottle or resealing traps.
10) Every basin shall be individually ventilated.
11) Any number.
12) Spray tap basins shall have flush-grated wastes without plugs.
13) The size of ventilating pipes to branches from appliances can be DN 25 but, if they are longer than 15 m or contain more than five bends, a DN 30 pipe shall be used.
14) If the connection of the ventilating pipe is liable to blockage due to repeated splashing or submergence, it should be DN 50, up to 50 mm above the spill-over level of the appliance.

Layout of discharge stacks

Primary ventilated discharge stacks
Below table can be used sizes and limitations of primary ventilated discharge stacks.

Table AGD 15 — Hydraulic capacity (*Q*max) and nominal diameter (DN)

Stack and Stack Vent	System I, II, III, IV	*Q*max (l/s)
DN	Square Entries	Swept Entries
60	0,5	0,7
70	1,5	2,0
80*	2,0	2,6
90	2,7	3,5
100**	4,0	5,2
125	5,8	7,6
150	9,5	12,4
200	16,0	21,0

* Minimum size where WC's are connected in system II.
** Minimum size where WC's are connected in system I, III, IV.

Secondary ventilated discharge stacks
Sizes and limitations of secondary ventilated discharge stacks are given in Table AGD 16.

Table AGD 16 — Hydraulic capacity (*Q*max) and nominal diameter (DN)

Stack and Stack Vent	Secondary Vent	System I, II, III, IV	*Q*max (l/s)
DN	DN	Square Entries	Swept Entries
60	50	0,7	0,9
70	50	2,0	2,6
80*	50	2,6	3,4
90	50	3,5	4,6
100**	50	5,6	7,3
125	70	7,6	10,0
150	80	12.4	18,3
200	100	21,0	27,3

* Minimum size where WC's are connected in system II.
** Minimum size where WC's are connected in system I, III, IV.

Capacities of drains pipes

Table AGD 17 — Capacity of drains Filling degree 50 %, (h/d = 0,5)

Slope	DN 100		DN 125		DN 150		DN 200		DN 225		DN 250		DN 300	
i	Qmax	v	Qmax	v	Qmax	v	Qmax	v	Qmax	v	Qmax	v	Qmax	v
cm/m	L/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s
0,50	1,8	0,5	2,8	0,5	5,4	0,6	10,0	0,8	15,9	0,8	18,9	0,9	34,1	1,0
1,00	2,5	0,7	4,1	0,8	7,7	0,9	14,2	1,1	22,5	1,2	26,9	1,2	48,3	1,4
1,50	3,1	0,8	5,0	1,0	9,4	1,1	17,4	1,3	27,6	1,5	32,9	1,5	59,2	1,8
2,00	3,5	1,0	5,7	1,1	10,9	1,3	20,1	1,5	31,9	1,7	38,1	1,8	68,4	2,0
2,50	4,0	1,1	6,4	1,2	12,2	1,5	22,5	1,7	35,7	1,9	42,6	2,0	76,6	2,3
3,00	4,4	1,2	7,1	1,4	13,3	1,6	24,7	1,9	389,2	2,1	46,7	2,2	83,9	2,5
3,50	4,7	1,3	7,6	1,5	14,4	1,7	26,6	2,0	42,3	2,2	50,4	2,3	90,7	2,7
4,00	5,0	1,4	8,2	1,6	15,4	1,8	28,5	2,1	45,2	2,4	53,9	2,5	96,9	2,9
4,50	5,3	1,5	8,7	1,7	16,3	2,0	30,2	2,3	48,0	2,5	57,2	2,7	102,8	3,1
5,00	5,6	1,6	9,1	1,8	17,2	2,1	31,9	2,4	50,6	2,7	60,3	2,8	108,4	3,2

Table AGD 18 — Capacity of drains Filling degree 70 %, (h/d = 0,7)

Slope	DN 100		DN 125		DN 150		DN 200		DN 225		DN 250		DN 300	
i	Qmax	v	Qmax	v	Qmax	v	Qmax	v	Qmax	v	Qmax	v	Qmax	v
cm/m	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s
0,50	2,9	0,5	4,8	0,6	9,0	0,7	16,7	0,8	26,5	0,9	31,6	1,0	56,8	1,1
1,00	4,2	0,8	6,8	0,9	12,8	1,0	23,7	1,2	37,6	1,3	44,9	1,4	80,6	1,6
1,50	5,1	1,0	8,3	1,1	15,7	1,3	29,1	1,5	46,2	1,6	55,0	1,7	98,8	2,0
2,00	5,9	1,1	9,6	1,2	18,2	1,5	33,6	1,7	53,3	1,9	63,6	2,0	114,2	2,3
2,50	6,7	1,2	10,8	1,4	20,3	1,6	37,6	1,9	59,7	2,1	71,1	2,2	127,7	2,6
3,00	7,3	1,3	11,8	1,5	22,3	1,8	41,2	2,1	65,4	2,3	77,9	2,4	140,0	2,8
3,50	7,9	1,5	12,8	1,6	24,1	1,9	44,5	2,2	70,6	2,5	84,2	2,6	151,2	3,0
4,00	8,4	1,6	13,7	1,8	25,8	2,1	47,6	2,4	75,5	2,7	90,0	2,8	161,7	3,2
4,50	8,9	1,7	14,5	1,9	27,3	2,2	50,5	2,5	80,1	2,8	95,5	3,0	171,5	3,4
5,00	9,4	1,7	15,3	2,0	28,8	2,3	53,3	2,7	84,5	3,0	100,7	3,1	180,8	3,6

where:

Qmax = Capacity of drains (l/s)

v = Velocity (m/s)

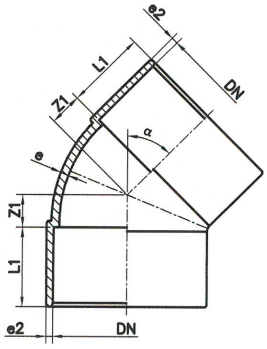
Above calculation based on
effective roughness of kb = 1.0 mm
clean water with a viscosity of n = 1.31 x 10^{-6} m^2/s

Qplast

Standard: BSEN 1329 B & BD
Colour: Light Grey RAL 7042
Application: BD (SN4) Above ground and under ground
B Above ground

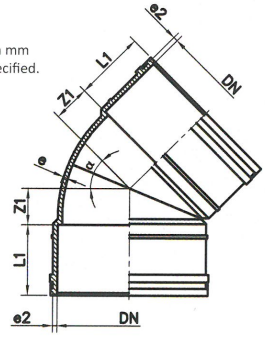
F/F: Female/Female socket
M/F: Male/Female socket
RRJ: Rubber Ring Joint
SCJ: Solvent Cement Joint

Note : All dimensions are in mm unless otherwise specified.



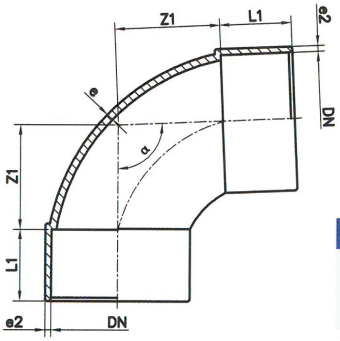
Elbow 45° Unswept F/F SCJ - B

DN	α	e	e2	L1	Z1
43	45°	3	2.3	28	17
56	45°	3	2.3	30.5	12.5



Elbow 45°Unswept F/F SCJ - BD

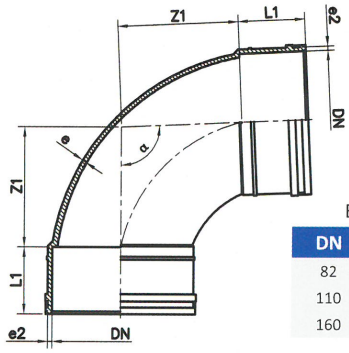
DN	α	e	e2	L1	Z1
82	45°	3	2.3	45	22
110	45°	3.2	2.4	54	28
160	45°	4	3	76	44



Bend 92.5° Swept F/F SCJ - B

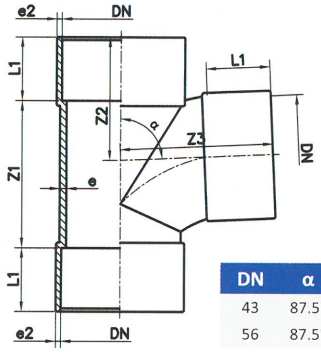
DN	α	e	e2	L1	Z1
*36	92.5°	3	2.3	26	24
43	92.5°	3	2.3	28	33
56	92.5°	3	2.3	30.5	44.5

** Unswept type*



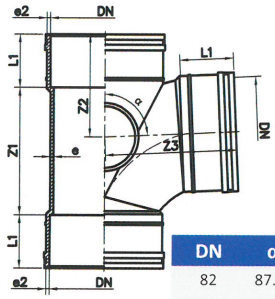
Bend 92.5° Swept F/F SCJ - BD

DN	α	e	e2	L1	Z1
82	92.5°	3	2.3	45	56
110	92.5°	3.2	2.4	54	97
160	92.5°	4	3	76	127



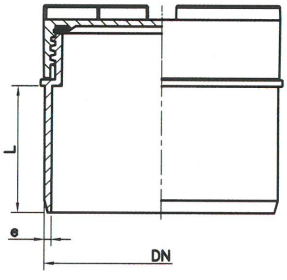
TEE 87.5° Swept F/F SCJ - B

DN	α	e	e2	L1	Z1	Z2	Z3
43	87.5°	3	2.3	28	59	50	62
56	87.5°	3	2.3	30.5	70.5	57.5	73



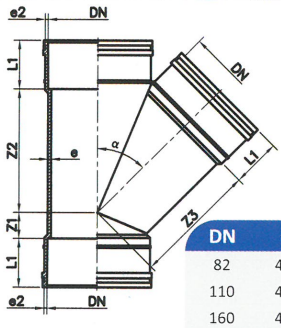
TEE 87.5° Swept F/F SCJ - BD

DN	α	e	e2	L1	Z1	Z2	Z3
82	87.5°	3	2.3	45	110	88.5	108
110	87.5°	3.2	2.4	54	127	104	133
160	87.5°	4	3	76	212	162	200



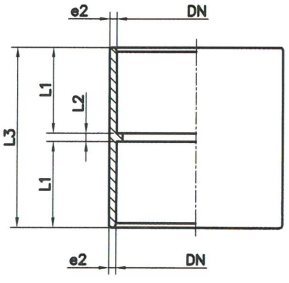
Access Cap SCJ -B

DN	e	L
36	3	28
43	3	30
56	3	32.5
82	3	47
110	3.2	56



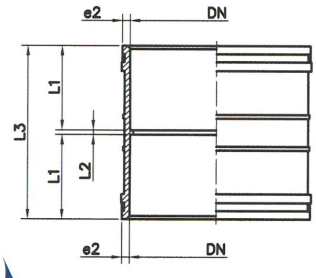
TEE 45° F/F SCJ - BD

DN	α	e	e2	L1	Z1	Z2	Z3
82	45°	3	2.3	45	24	102	102
110	45°	3.2	2.4	54	29	137	137
160	45°	4	3	76	44	197	197



Coupler F/F SCJ - B

DN	e2	L1	L2	L3
36	2.3	24	2.6	50.6
43	2.3	28	2.6	58.6
56	2.3	30.5	3	64

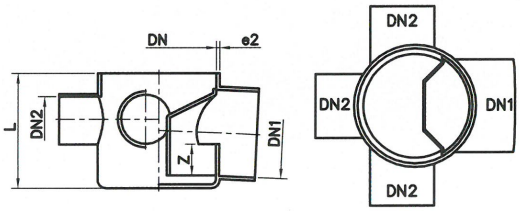


Coupler F/F SCJ - BD

DN	e2	L1	L2	L3
82	2.3	45	3	93
110	2.4	54	3	111
160	3	78	4	160

Qplast

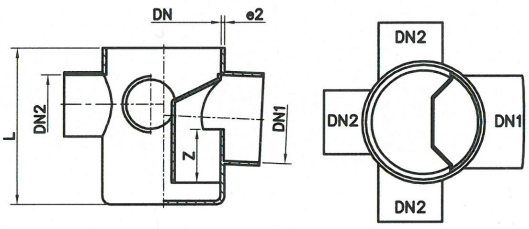
Note : All dimensions are in mm unless otherwise specified.



Trapped Floor Gully - Water Seal 30mm SCJ

DN	DN1	DN2	e2	L	Z
110	82	43/56	2.4	110	30

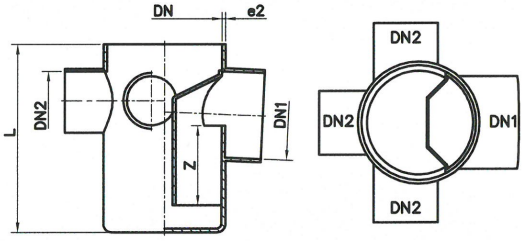
DN2 can be customized as per requirement. BD application.



Trapped Floor Gully - Water Seal 50mm SCJ

DN	DN1	DN2	e2	L	Z
110	82	43/56	2.4	150	50

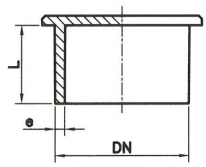
DN2 can be customized as per requirement. BD application.



Trapped Floor Gully - Water Seal 76mm SCJ

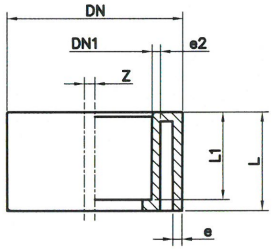
DN	DN1	DN2	e2	L	Z
110	82	43/56	2.4	180	76

DN2 can be customized as per requirement. BD application.



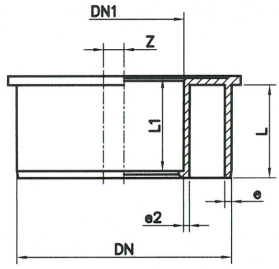
End Plug SCJ - B

DN	e	L
43	3	30
56	3	32.5



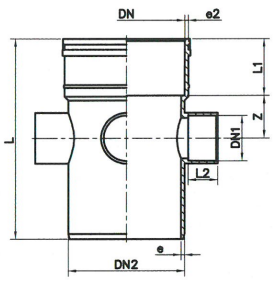
Reducing Bush M/F SCJ -B

SIZE	DN	DN1	e	e2	L	L1	Z
56x43	56	43	3	2.3	31.5	28	3.4
43x36	43	36	3	2.3	28	24.5	0



Reducing Bush M/F SCJ -BD

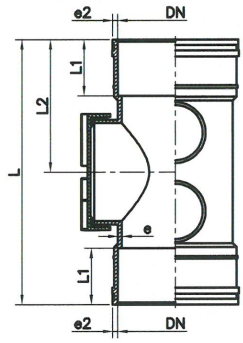
SIZE	DN	DN1	e	e2	L	L1	Z
160x110	160	110	4	2.4	76.8	54	20.63
110x82	110	82	3.2	2.3	47.5	46	10.65
82x56	82	56	3	2.3	44.8	43.3	9.9



Boss Pipe M/F SCJ -BD

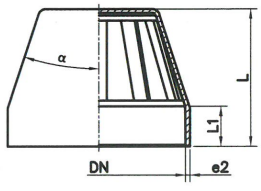
DN	DN1	DN2	e	e2	L	L1	L2	Z
110	43/56	110	3.2	2.4	190	54	28	40.5

DN1 can be customized as per requirement.



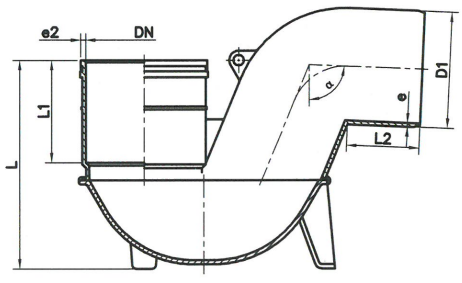
Access Pipe Coupler F/F SCJ - BD

DN	e	e2	L	L1	L2
110	3.2	2.4	254	54	127



Vent Cowl SCJ-B

DN	α	e2	L	L1
110	18°	2.4	88	25.7



P Trap M/F RRJ - BD

DN	D1	α	e	e2	L	L1	L2
110	110	87.5°	3.2	2.9	197	97	68

Qplast