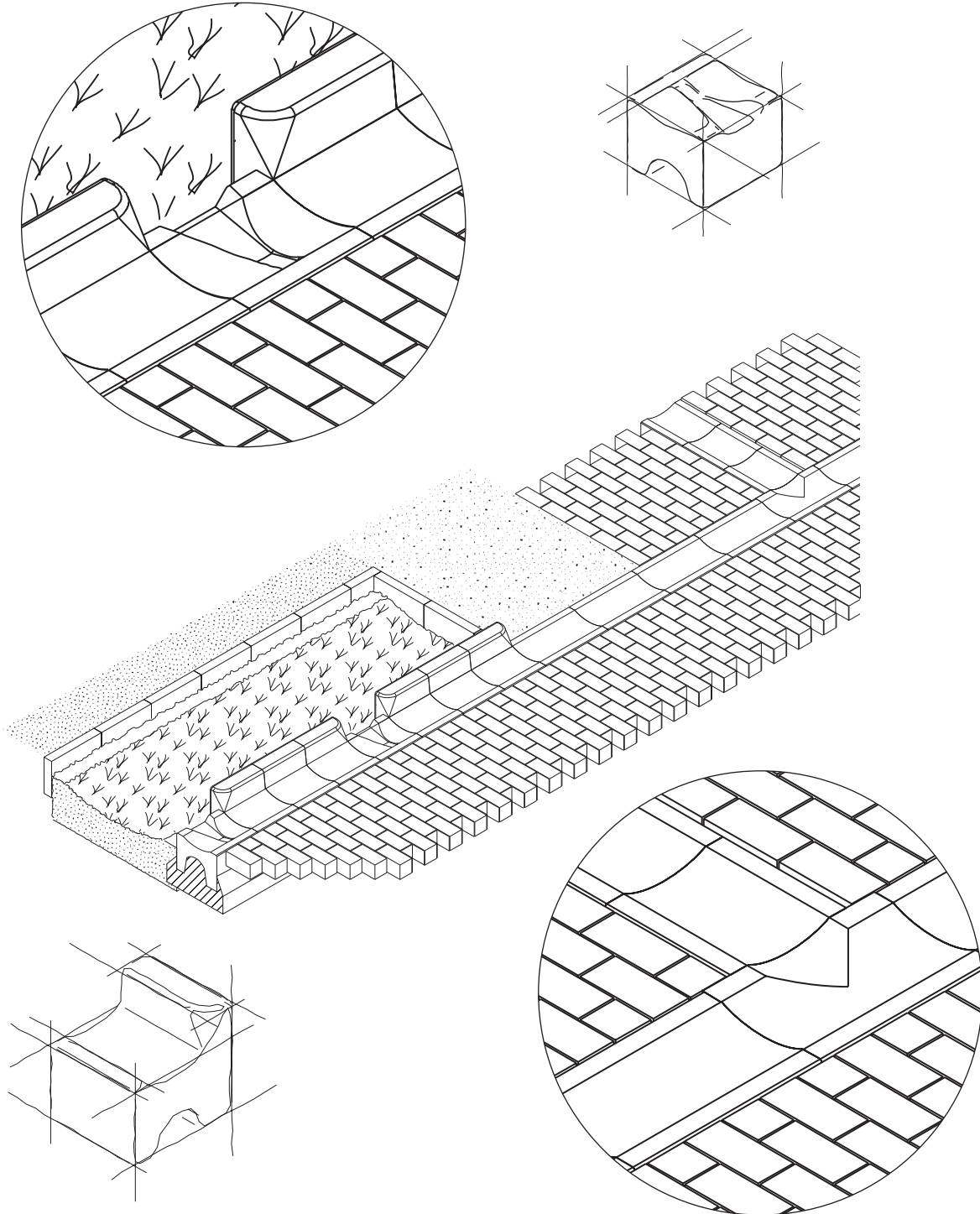




# SF EcoDuct

## Spec Sheet



as of 27 March 2000



<b>SF EcoDuct</b>		<b>Sheet</b>
<b>Contents</b>		
	Table of Contents	1
<b>General</b>	Requirements, weights, property rights,...	2
<b>In-house</b>	Production, mould capacities, mould references	3
	Mould rents, product fees, price recommendation	3
	Calculation of drain pit	4
	Leaflet modules, PR material, CD ROM	4
<b>Product</b>	Product description	5
	Applications and constraints	5
	System solution	6
	System solution with cross section	7
<b>Single blocks</b>	Guttered ducts	8
	Duct with stopping edge	9 - 11
	Unguttered duct	12
	Scooped block, scooped T block	13
<b>Grid</b>	Drains with stopping Edge	14 - 17
	Unguttered ducts	18
	Guttered ducts	19
<b>Installation</b>	Placing on a concrete base	20
	Connecting the pavement with the ducts	21
	Interface between guttered duct and drain pit	21
	Drain pit	22
	Calculating the dam spacings	23
	Additional reservoir	23
	Parking bays with longitudinal section of drain pit	24
	Detail of parking bays	25
	Example of a parking lot	26
<b>Marketing</b>	Selling and marketing points	27 - 28
<b>Appendix</b>	Notes on safety and industrial hygiene	29
	Further reading, standards, rules and regulations	30
	Product	Sheet
	SF EcoDuct	1 of 30
	Product group	Correct as of
	Hydroactive pavements / Drainage	27 March 2000



<b>Product</b>	<b>SF EcoDuct</b>		
	SF EcoDuct is a system solution to drain stormwater into adjacent drain pits; it consists of a guttered duct, a guttered duct with a stopping edge, an unguttered duct, a scooped block and a scooped T block.		
<b>Material</b>	Concrete		
<b>Manufacturing dimensions</b>	Guttered duct :	330 x 320 x 250 mm	
	Guttered duct :	500 x 320 x 250 mm	
	Guttered duct with stopping edge:	330 x 390 x 370 mm	
	Unguttered duct:	500 x 320 x 250 mm	
	Scooped block:	330 x 320 x 120 mm	
	Scooped T block:	460 x 320 x 120 mm	
<b>Allowances</b>	Length $\pm$ 3 mm	Width $\pm$ 3 mm	Height $\pm$ 3 mm
<b>Weight</b>	Guttered duct (330 mm):	approx. 40 kg	
	Guttered duct (500 mm):	approx. 62 kg	
	Guttered duct with stopping edge:	approx. 60 kg	
	Unguttered duct:	approx. 64 kg	
	Scooped block:	approx. 26 kg	
	Scooped T block:	approx. 30 kg	
<b>Requirement</b>	Guttered duct (330 mm):	} see also pages 14 to 19	
	Guttered duct with stopping edge:		
	Guttered duct (500 mm):		
	Unguttered duct :		
	Scooped block:		
<b>Standard, quality</b>	Compliant with the German Rules on the production and quality assurance of non-standardised concrete products (published October 1998) Compressive strength: 50 N/mm <sup>•</sup>		
<b>Industrial property rights</b>	Patent filed in Germany (No.: 19832126.0), International Priority (No.: 99/04389); SF-Ökorinne is a registered trademark of SF-Kooperation GmbH		
<b>Application</b>	To accept and to evenly distribute stormwater into drain pits next to roads, squares, etc.		
<b>Installation</b>	Machine or manual installation by qualified contractors, in accordance with applicable legislation on safety and health protection at work		
	Product	Sheet	
	SF EcoDuct	2 of 30	
	Product group	Correct as of	
	Hydroactive pavements / Drainage	27 March 2000	



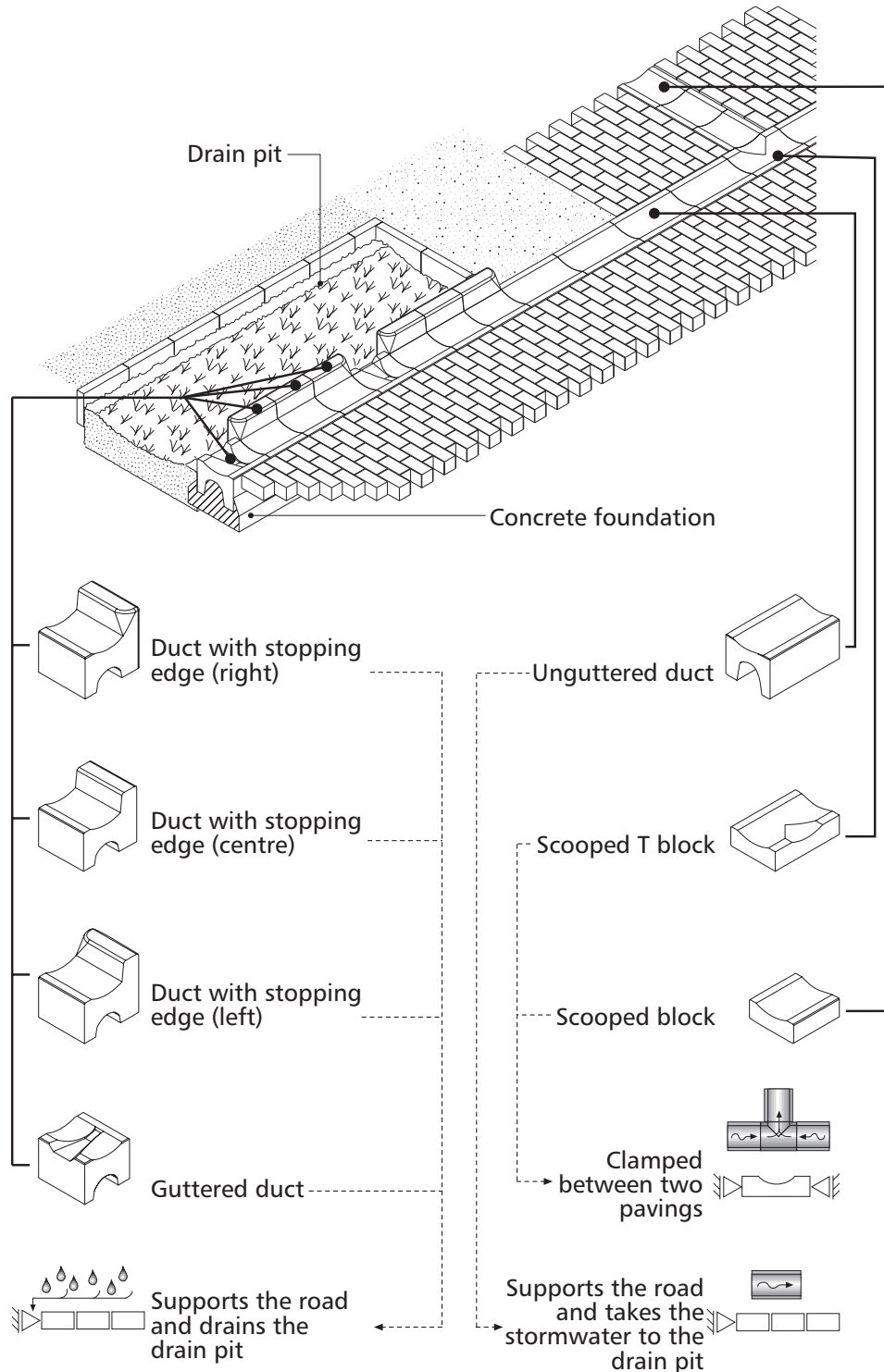
<p><b>Product description</b></p>	<h2 style="text-align: center;">SF EcoDuct</h2> <p>The SF EcoDuct system operates as a border on the side of roads, collecting stormwater flowing off the road, guiding it along the road and then taking it at regular intervals to an adjacent drain pit. This surface drainage is both an efficient and low-cost alternative to an expensive storm sewer.</p> <p>The SF EcoDuct system solution provides the user with all elements required to achieve a decentralised drainage according to the German ATV - ArbeitsSheet A 138.</p> <p>Scooped blocks, clamped between two pavements, and ducts without gutter, take the stormwater to the drain pit. Here, the stormwater flows through gutters into the drain pit. To prevent traffic or parking on the drain pit, ducts with stopping edges are installed between the gutters. Wherever a duct with stopping edge appears unnecessary, ducts without gutters may be used instead.</p>	
<p><b>Constraints to usage</b></p>	<p>..."In order to largely rule out the risk of letting pollutants contaminate the ground water such construction may only be applied in parking areas with a low load (lanes, parking lots, parking areas), hence with a low contamination load contained in the falling rain, i.e. construction category V and VI, cycling paths and walkways according to the German RstO and equivalent private traffic areas." (translated from the German MerkSheet for hydroactive pavements on traffic areas, published 1998, FGSV No. 947)</p>	
<p><small>Datenblatt SF-Okorinne_englisch.fh8, Fresemann / Köster</small></p>	<p>Product <b>SF EcoDuct</b></p>	<p>Sheet <b>5 of 30</b></p>
	<p>Product group <b>Hydroactive pavements / Drainage</b></p>	<p>Correct as of <b>27 March 2000</b></p>



# SF EcoDuct

System solution

Sketch 1



Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

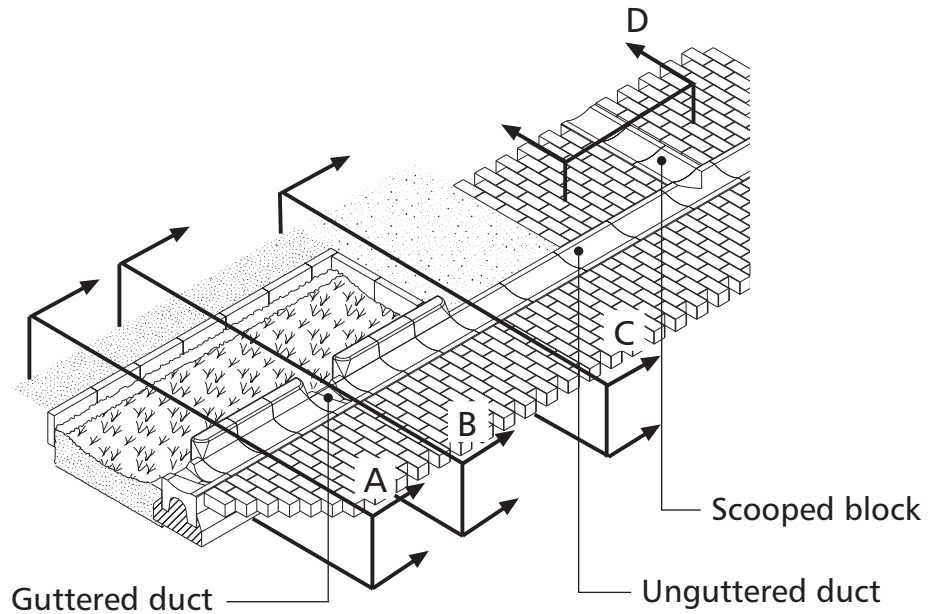
Sheet  
**6 of 30**

Correct as of  
**27 March 2000**



# SF EcoDuct

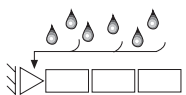
System solution with sectional view



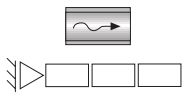
Sketch 2



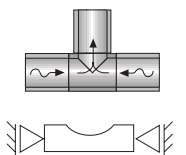
Ducts with stopping edge support the road. They serve as a road border and as a protection against driving on the drain pit.



Guttered ducts support the road. They serve as a road boarder and drain the drain pits.

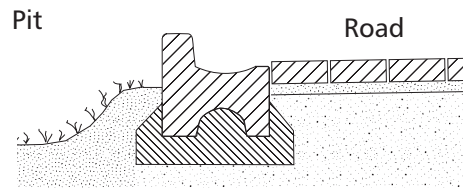


The un-guttered duct supports the road, serves as a road border and helps longitudinal drainage.

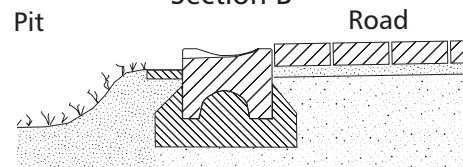


Scooped blocks are clamped between two pavements and take the stormwater to the drain pit.

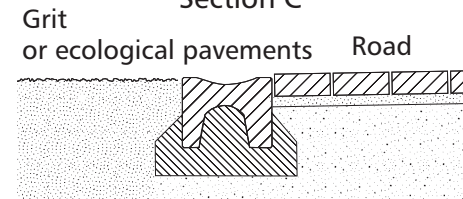
Section A



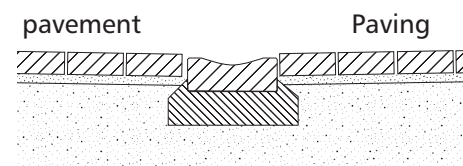
Section B



Section C



Section D



Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**7 of 30**

Correct as of  
**27 March 2000**

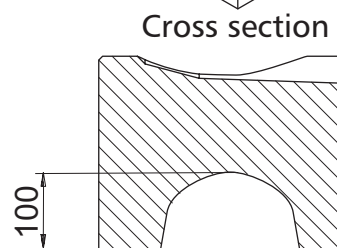
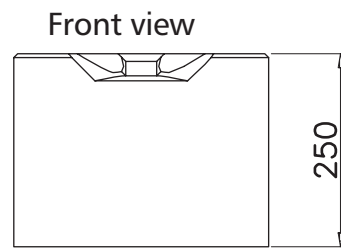
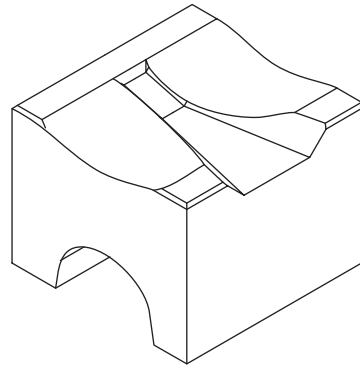
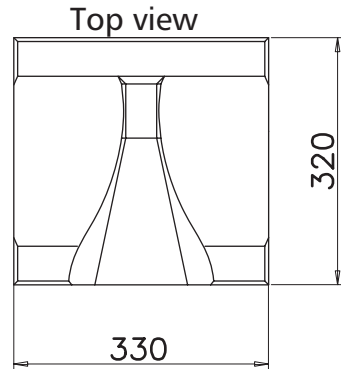


# SF EcoDuct

All dimensions in mm

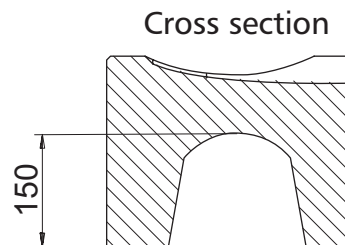
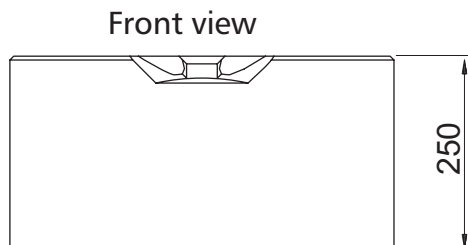
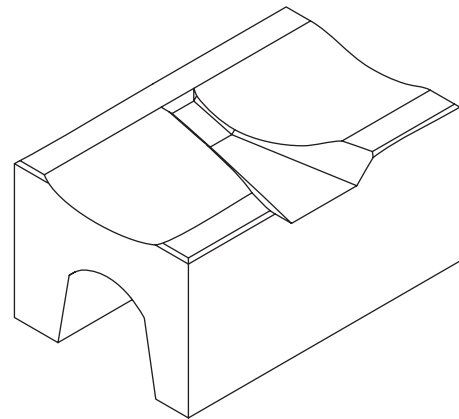
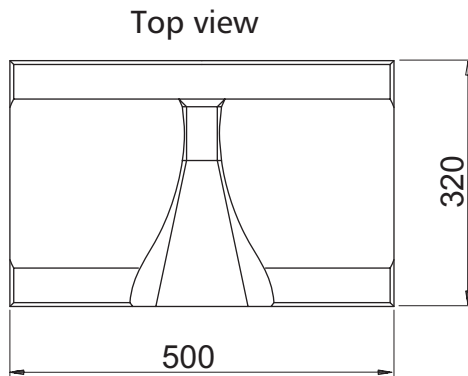
Single blocks

Guttered duct  
L = 330mm  
Manufg. dimensions



Sketch 3

Guttered duct  
L = 500mm  
Manufg. dimensions



Sketch 4

For mouldmaking, drawings and dimensions are available for these products.

Product  
SF EcoDuct

Sheet  
8 of 30

Product group  
Hydroactive pavements / Drainage

Correct as of  
27 March 2000



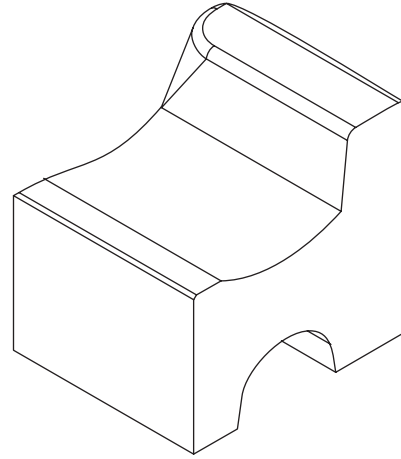
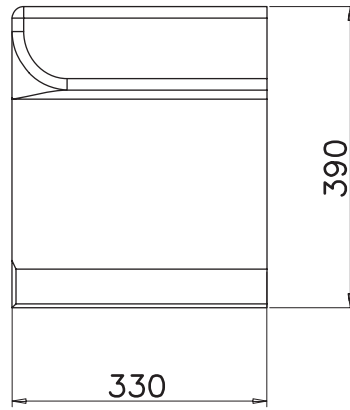
All dimensions in mm

# SF EcoDuct

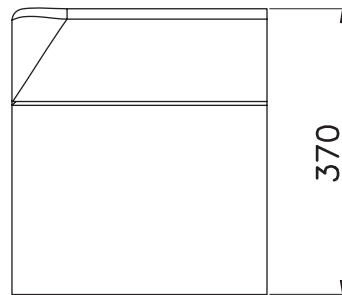
Duct with  
stopping  
edge  
(left)  
Manufg.  
dimensions

Sketch 5

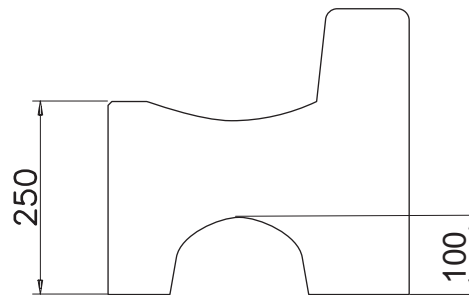
Top view



Front view



Lateral view



For mouldmaking, drawings and dimensions are available for these products.

SF-Kooperation GmbH  
 Beton-Konzepte  
 Postfach 77 03 10  
 D-28703 Bremen/Germany  
 Phone: + +49+421 / 63 70 61  
 Telefax: / 6 93 53 99  
 e-mail: sf-kooperation@t-online.de  
 internet: www.sf-kooperation.de

Product  
SF EcoDuct

Sheet  
9 of 30

Product group  
Hydroactive pavements / Drainage

Correct as of  
27 March 2000



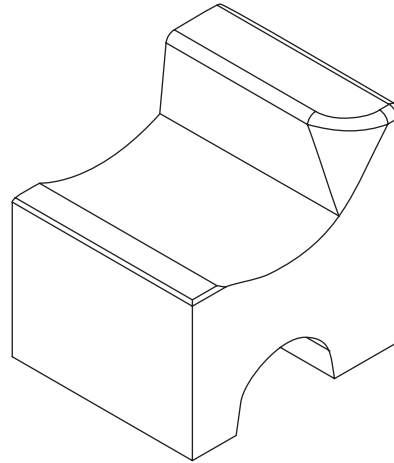
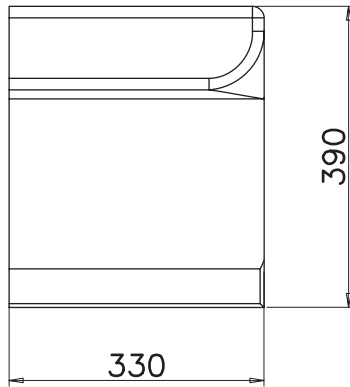
All dimensions in mm

# SF EcoDuct

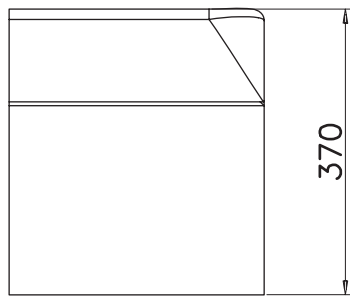
Duct with  
stopping  
edge  
(right)  
Manufg.  
dimensions

Sketch 6

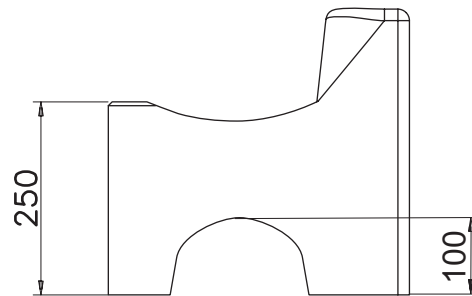
Top view



Front view



Lateral view



For mouldmaking, drawings and dimensions are available for these products.

SF-Kooperation GmbH  
 Beton-Konzepte  
 Postfach 77 03 10  
 D-28703 Bremen/Germany  
 Phone: + +49+421 / 63 70 61  
 Telefax: / 6 93 53 99  
 e-mail: sf-kooperation@t-online.de  
 internet: www.sf-kooperation.de

Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**10 of 30**

Correct as of  
**27 March 2000**



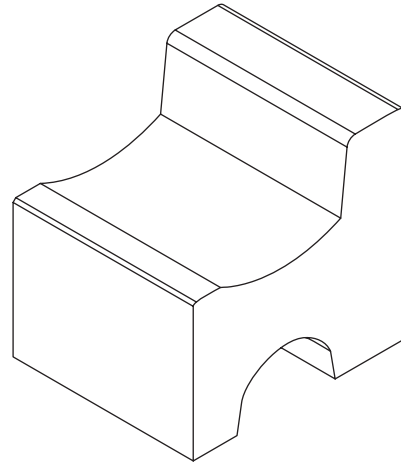
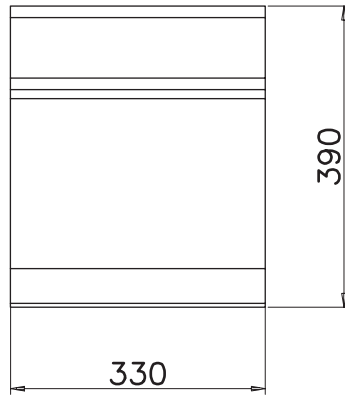
All dimensions in mm

# SF EcoDuct

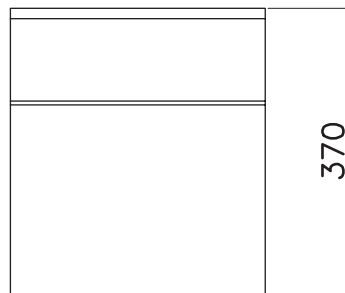
Duct with stopping edge (center) Manufg. dimensions

Sketch 7

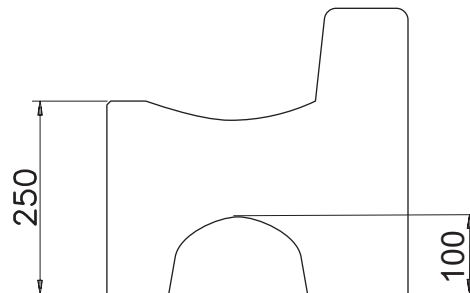
Top view



Front view



Lateral view



For mouldmaking, drawings and dimensions are available for these products.

SF-Kooperation GmbH  
 Beton-Konzepte  
 Postfach 77 03 10  
 D-28703 Bremen/Germany  
 Phone: + +49+421 / 63 70 61  
 Telefax: / 6 93 53 99  
 e-mail: sf-kooperation@t-online.de  
 internet: www.sf-kooperation.de

Product  
**SF EcoDuct**

Sheet  
**11 of 30**

Product group  
**Hydroactive pavements / Drainage**

Correct as of  
**27 March 2000**



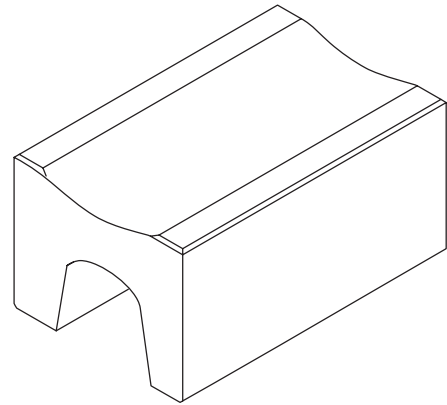
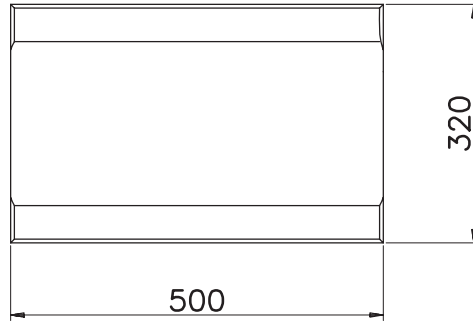
All dimensions in mm

# SF EcoDuct

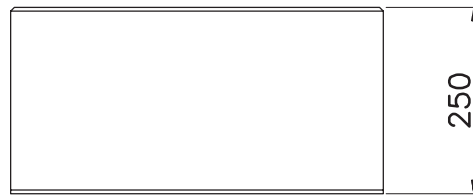
Unguttered duct  
Manufg. dimensions

Sketch 8

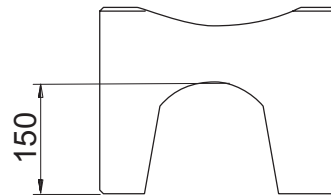
Top view



Front view



Lateral view



For mouldmaking, drawings and dimensions are available for these products.

Datenblatt SF-Okorinne\_englisch.fh8,  
Fresemann / Köster

Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**12 of 30**

Correct as of  
**27 March 2000**

SF-Kooperation GmbH  
 Beton-Konzepte  
 Postfach 77 03 10  
 D-28703 Bremen/Germany  
 Phone: + +49+421 / 63 70 61  
 Telefax: / 6 93 53 99  
 e-mail: sf-kooperation@t-online.de  
 internet: www.sf-kooperation.de

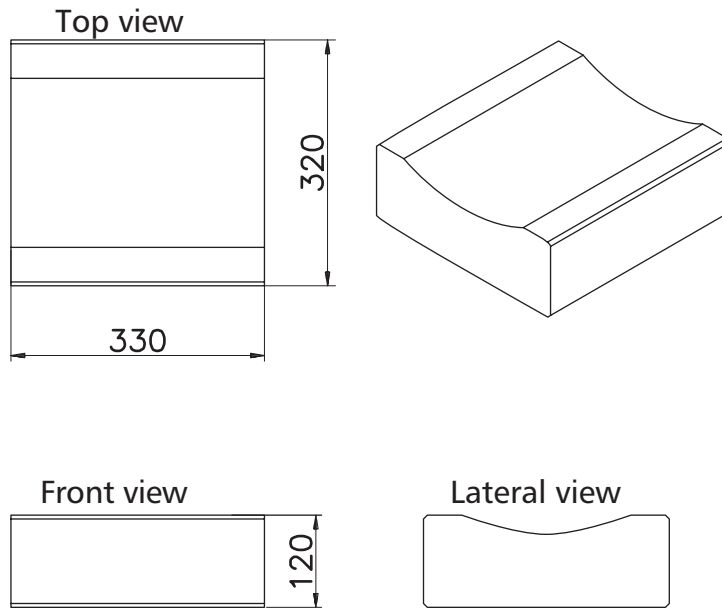


All dimensions in mm

# SF EcoDuct

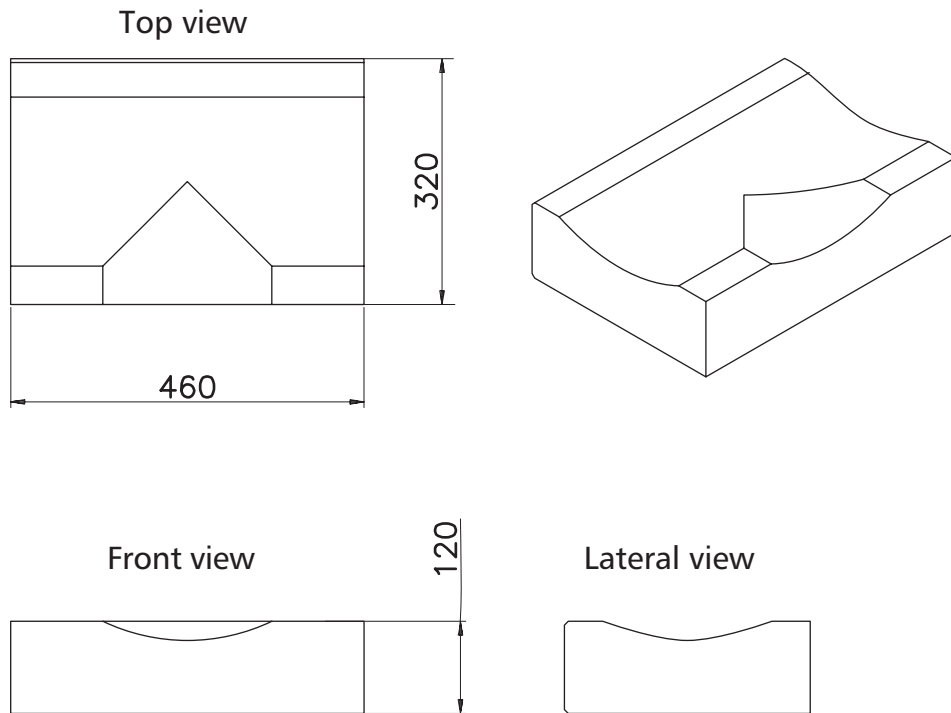
**Scooped block**  
Manufg. dimensions

Sketch 9



**Scooped T block**  
Manufg. dimensions

Sketch 10



For mouldmaking, drawings and dimensions are available for these products.

Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**13 of 30**

Correct as of  
**27 March 2000**



All dimensions in mm

# SF EcoDuct

**Grid**

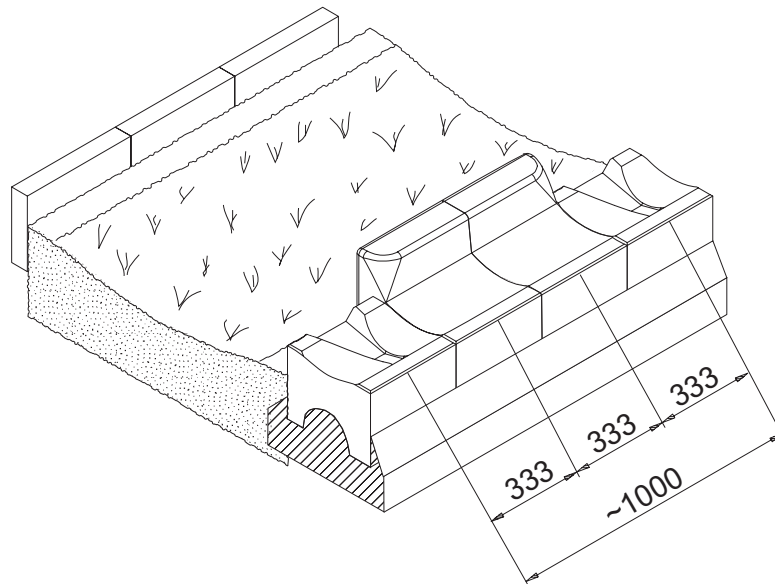
Application of ducts with a stopping edge

The spacing at which stormwater is guided to the drain pit may be varied by the number of ducts with a stopping edge installed. The minimum spacing is ~1000 mm. This spacing may be increased by a grid partition of 333 mm. There is a joint of approx. 3 mm between the individual elements of the SF EcoDuct.

Ducts with stopping edge

Grid dimension = mfg. dimension + joint dimension			
333 mm	=	330 mm	+ ~3 mm

Sketch 11



Application

Recommended installation to sketch 11:  
For a longitudinal slope > 3%

Datenblatt SF-Okorinne\_englisch.fh8,  
Fresemann / Köster

Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**14 of 30**

Correct as of  
**27 March 2000**



All dimensions in mm

# SF EcoDuct

## Grid

Requirement for installation to sketch 11

The following formula applies when ducts with a stopping edge are used at the beginning and at the end of an SF EcoDuct construction:

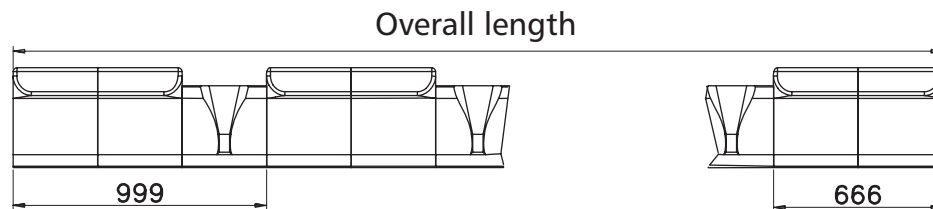
$$\text{Overall length} = Y \times 999 \text{ mm} + 666 \text{ mm}$$

Number of guttered ducts = Y

Number of ducts with left stopping edge = Y + 1

Number of ducts with right stopping edge = Y + 1

## Sketch 11.1



## Example

Overall length of the drain pit = 35,80 m

$$35,80 \text{ m} = Y \times 999 \text{ mm} + 666 \text{ mm}$$

$$Y = \frac{35,80 \text{ m}}{0,999 \text{ m}} - 0,666 \text{ m} = 35,17$$

1st option: round off to Y = 35, i.e.

Number of guttered ducts = 35

Number of ducts with left stopping edge = 36

Number of ducts with right stopping edge = 36

Sum = 107 units

107 units produce an overall length of  $107 \times 0.333 \text{ m} = 35.631 \text{ m}$

2nd option: round up to Y = 36, i.e.

110 units with an overall length of 36.63 m

Product  
SF EcoDuct

Product group  
Hydroactive pavements / Drainage

Sheet  
15 of 30

Correct as of  
27 March 2000



# SF EcoDuct

All dimensions in mm

**Grid**

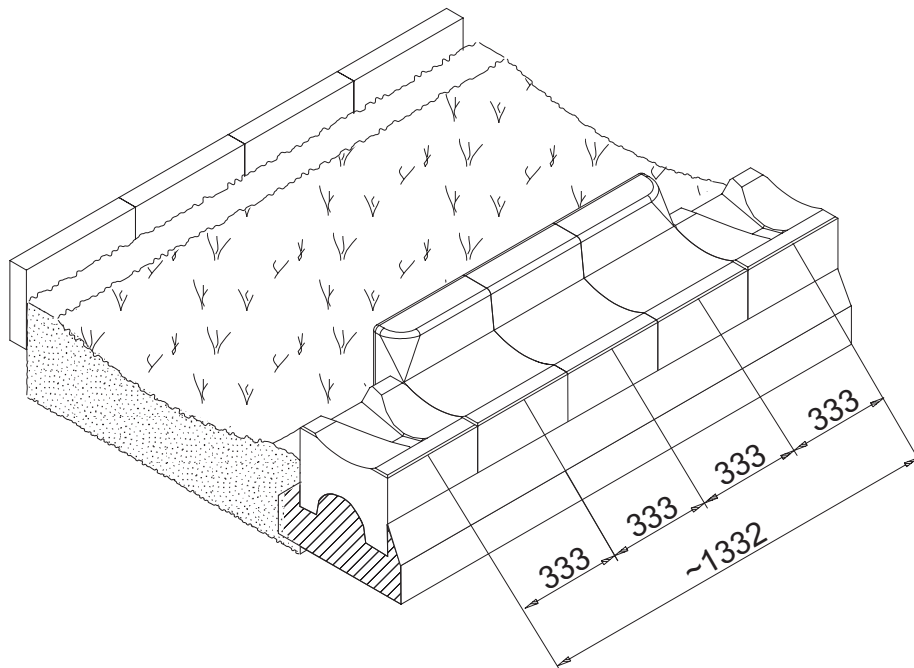
Sketch 12 shows another variation. Here, three ducts with stopping edge are placed between the outlets.

Ducts with stopping edge

Grid dimension = manufacturing dimension + joint dimension			
333 mm	=	330 mm	+ ~3 mm

Installing a centre unit

Sketch 12



Application

Recommended installation to sketch 12:  
For a longitudinal slope ≤ 3%

Datenblatt SF-Okorinne\_englisch.fh8,  
Fresemann / Köster

Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**16 of 30**

Correct as of  
**27 March 2000**



All dimensions in mm

# SF EcoDuct

## Grid

Requirement for installation to sketch 12

The following formula applies when ducts with a stopping edge are used at the beginning and at the end of an SF EcoDuct construction:

$$\text{Overall length} = Y \times 1332 \text{ mm} + 999 \text{ mm}$$

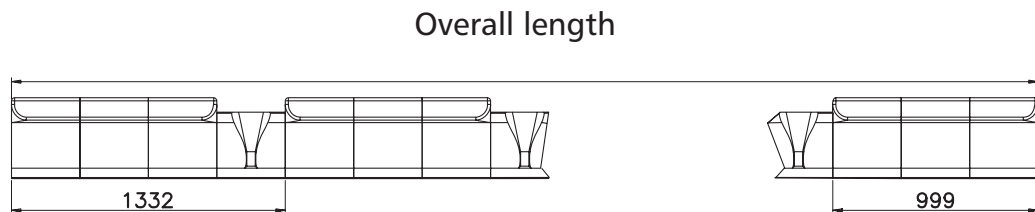
Number of guttered ducts = Y

Number of ducts with left stopping edge = Y + 1

Number of ducts with right stopping edge = Y + 1

Number of ducts with central stopping edge = Y + 1

## Sketch 12.1



## Example

Overall length of the drain pit = 35,80 m

$$35,80 \text{ m} = Y \times 1332 \text{ mm} + 999 \text{ mm}$$

$$Y = \frac{35,80 \text{ m}}{1,332 \text{ m}} - 0,999 \text{ m} = 25,88$$

1st option: round off to Y = 25, i.e.

Number of guttered ducts = 25

Number of ducts with left stopping edge = 26

Number of ducts with right stopping edge = 26

Number of ducts with central stopping edge = 26

Total = 103 units

107 units produce an overall length of  $103 \times 0.333 \text{ m} = 34.299 \text{ m}$

2nd option: round up to Y = 26, i.e.

107 elements with an overall length of 35,631 m

Product

SF EcoDuct

Product group

Hydroactive pavements / Drainage

Sheet

17 of 30

Correct as of

27 March 2000



All dimensions in mm

# SF EcoDuct

**Grid**

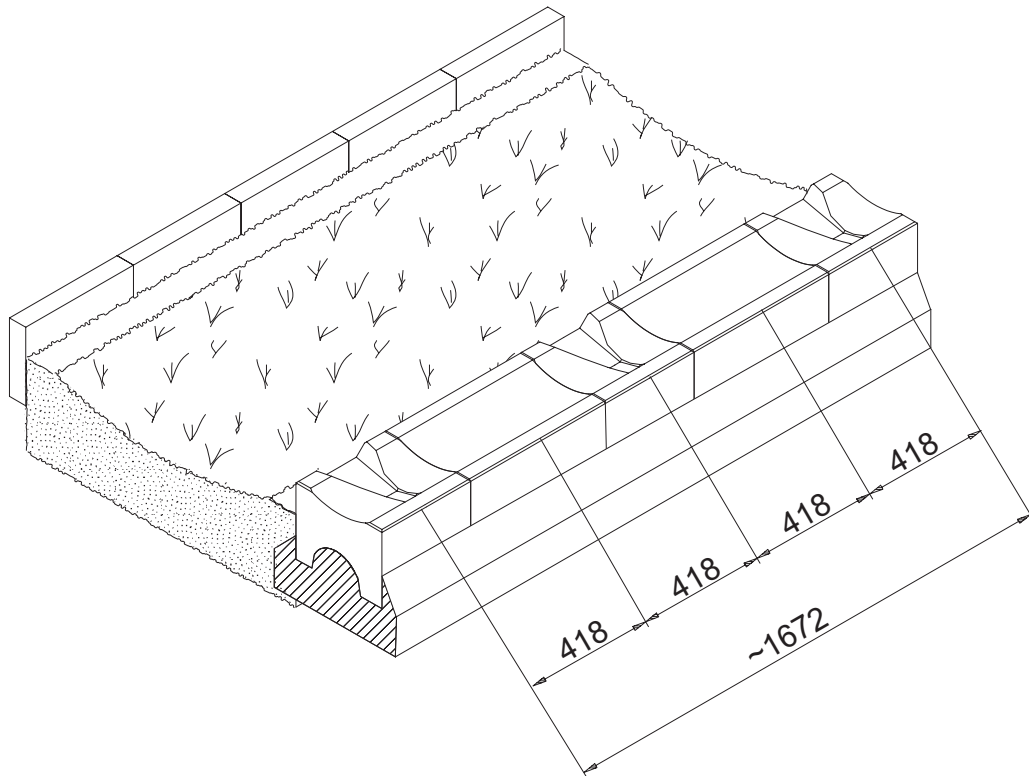
The spacing at which the water is guided to the drain pit is  $2 \times 418 \text{ mm} = 836 \text{ mm}$ .

How to use unguttered ducts

$$\begin{aligned} \text{Grid dimension} &= \text{manufg. dim.} + \text{joint. dim.} \\ 418 \text{ mm} &= (500/2 + 330/2) \text{ mm} + \sim 3 \text{ mm} \end{aligned}$$

Installation of an unguttered duct between outlets

Sketch 13



Application

Recommended installation to sketch 13:  
For a longitudinal slope of  $\leq 3\%$

Requirements

$$\text{Overall length} = Y \times 836 \text{ mm}$$

Number of guttered ducts = Y  
Number of unguttered ducts = Y

Datenblatt SF-Okorinne\_englisch.fh8,  
Freeseemann / Köster

Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**18 of 30**

Correct as of  
**27 March 2000**

**SF-Kooperation GmbH**  
 Beton-Konzepte  
 Postfach 77 03 10  
 D-28703 Bremen/Germany  
 internet: [www.sf-kooperation.de](http://www.sf-kooperation.de)  
 Phone: + +49+421 / 63 70 61  
 Telefax: / 6 93 53 99  
 e-mail: [sf-kooperation@t-online.de](mailto:sf-kooperation@t-online.de)



All dimensions in mm

# SF EcoDuct

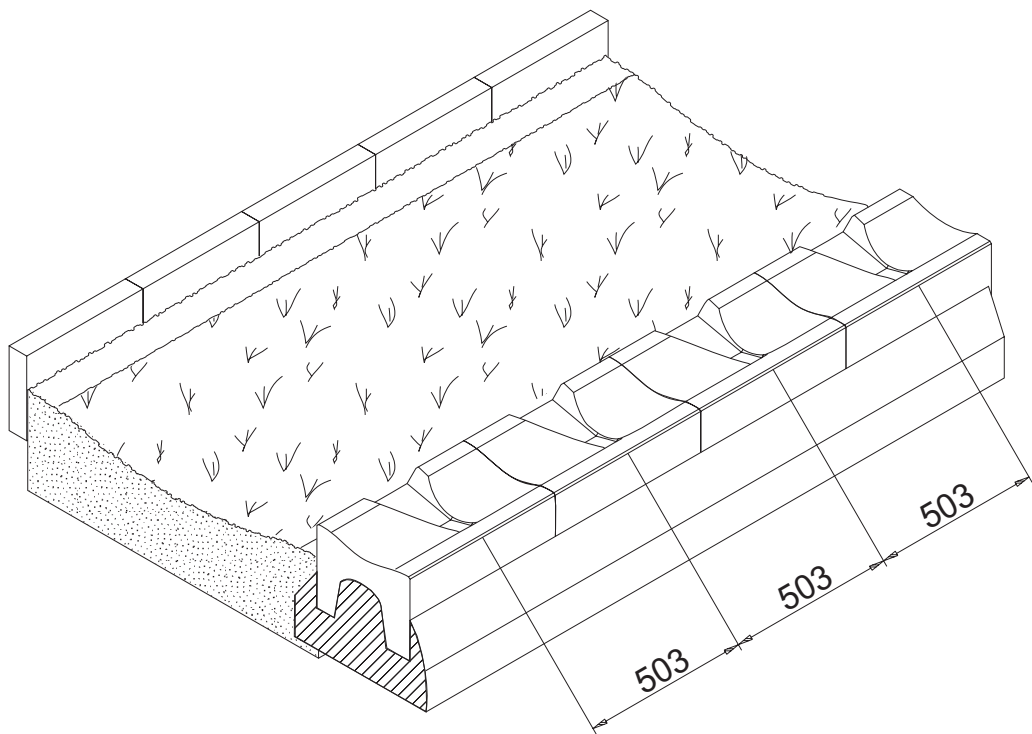
**Grid**

How to use  
500 mm  
guttered  
ducts

If the original EcoDuct is used the stormwater is taken to the drain pit at spacings of 503 mm.  
This element may be used in repair work or follow-on jobs of established sites.

Grid dims. = mfg. dims. + joint. dims. 503 mm = 500 mm + ~3 mm
---

Sketch 14



**Application**

Recommended installation to sketch 14:  
For a longitudinal slope of > 3%

**Requirements**

Overall length = Y x 503 mm
-----------------------------

Number of unguttered ducts = Y

Product  
SF EcoDuct

Product group  
Hydroactive pavements / Drainage

Sheet  
19 of 30

Correct as of  
27 March 2000



All dimensions in mm

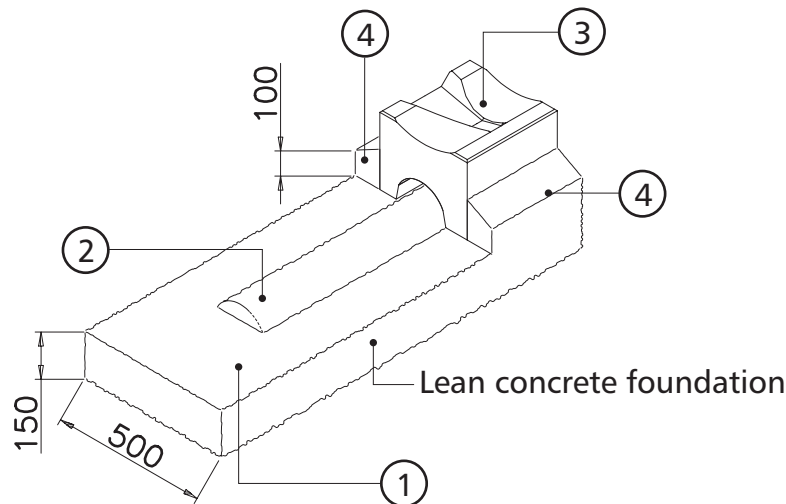
# SF EcoDuct

## Installation

Sketch 15 illustrates an example of how the guttered duct (as one of the elements of the SF EcoDuct System solution) is installed.

### Installation on a concrete foundation

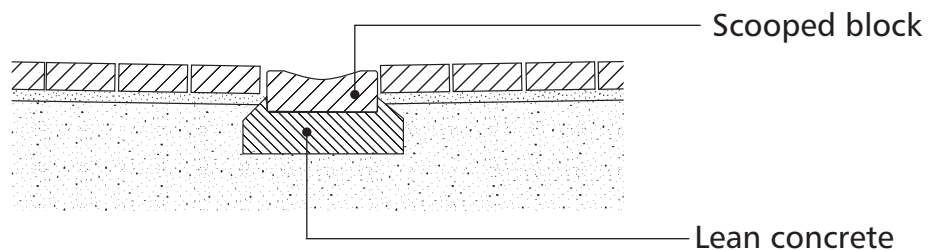
#### Sketch 15



- ① First, a 150 mm high and 500 mm wide concrete foundation is made of lean concrete.
- ② A "bead" of the same material is heaped in the centre to mate the duct's cavity, blocking a horizontal shift.
- ③ Finally, the duct element is placed onto the "bead" using border placing prongs on the centre of the bead and tapped with a paver's hammer.
- ④ To finish, a lean concrete backrest is made on both sides of the duct.

Sketch 16 illustrates scooped blocks being installed in a concrete foundation.

#### Sketch 16



Product  
SF EcoDuct

Product group  
Hydroactive pavements / Drainage

Sheet  
20 of 30

Correct as of  
27 March 2000



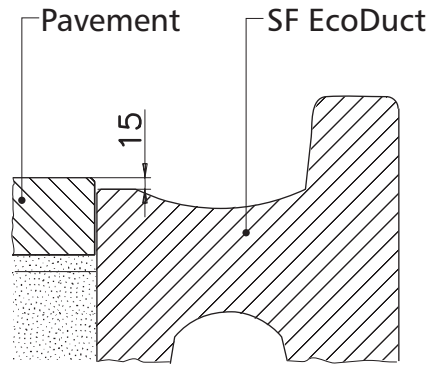
All dimensions in mm

# SF EcoDuct

## Installation

How to connect pavement and ducts

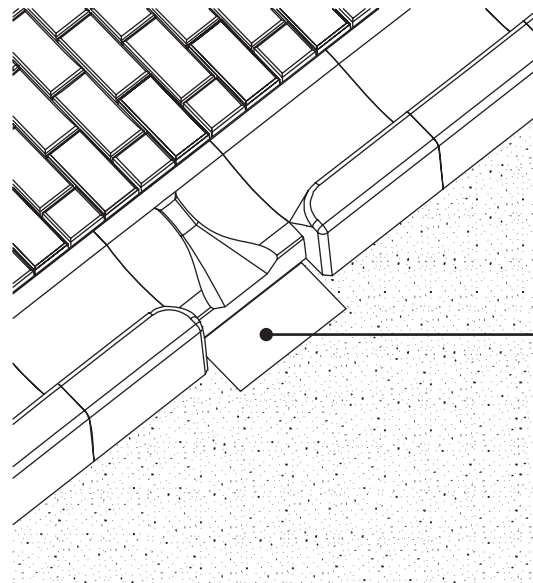
Sketch 17



Sketch 17 illustrates the transition from the pavement to the duct elements.  
The pavement is inclined towards the ducts; after compaction, the pavement should be approx. 15mm above the SF EcoDuct level. This will ensure a proper stormwater outlet and stop the stormwater from flowing back to the pavement.

Transition from the guttered duct to the drain pit

Sketch 18



**Concrete slab / block installed in a mortar bed!**  
Recommended dimensions:  
300 x 150 mm.

In order to avoid erosion in the drain pit, a flag may be placed in the drain pit behind the guttered duct. These flags are installed in lean concrete and should have a slope of approx. 2% towards the drain pit.



# SF EcoDuct

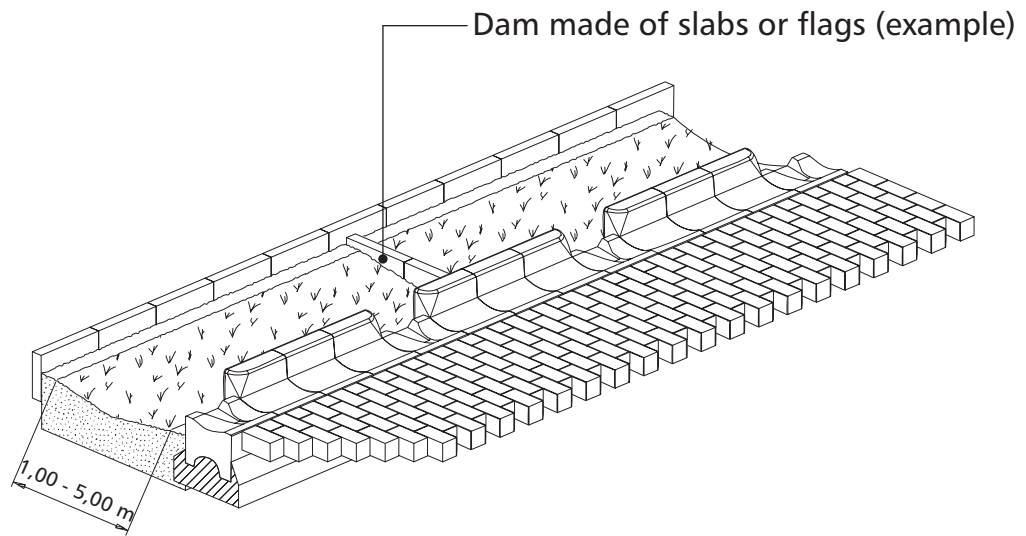
**Installation**

According to ATV - A 138, the width of a drain pit is 1.00 - 5.00 m. In order to stop the stormwater from flowing within the drain pit, dams are built into the drain pit, using slabs, for instance.

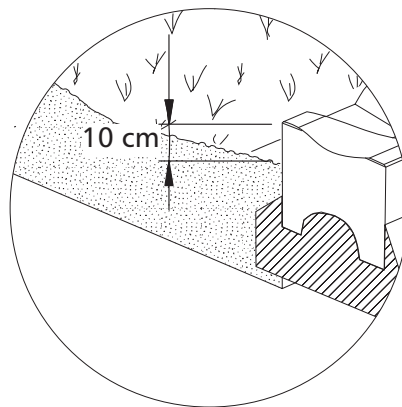
**Drain pit**

The greater the longitudinal slope within the drain pit, the shorter the spacing between the dams (see Page 23).

**Sketch 19**



**Detail**



The top level of the drain pit should be approx. 10 cm below the top level of guttered ducts.

Datenblatt SF-Okorinne\_englisch.fh8,  
Fresemann / Köster

Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**22 of 30**

Correct as of  
**27 March 2000**

**SF-Kooperation GmbH**  
 Beton-Konzepte  
 Postfach 77 03 10  
 D-28703 Bremen/Germany  
 Phone: + +49+421 / 63 70 61  
 Telefax: / 6 93 53 99  
 e-mail: sf-kooperation@t-online.de  
 internet: www.sf-kooperation.de

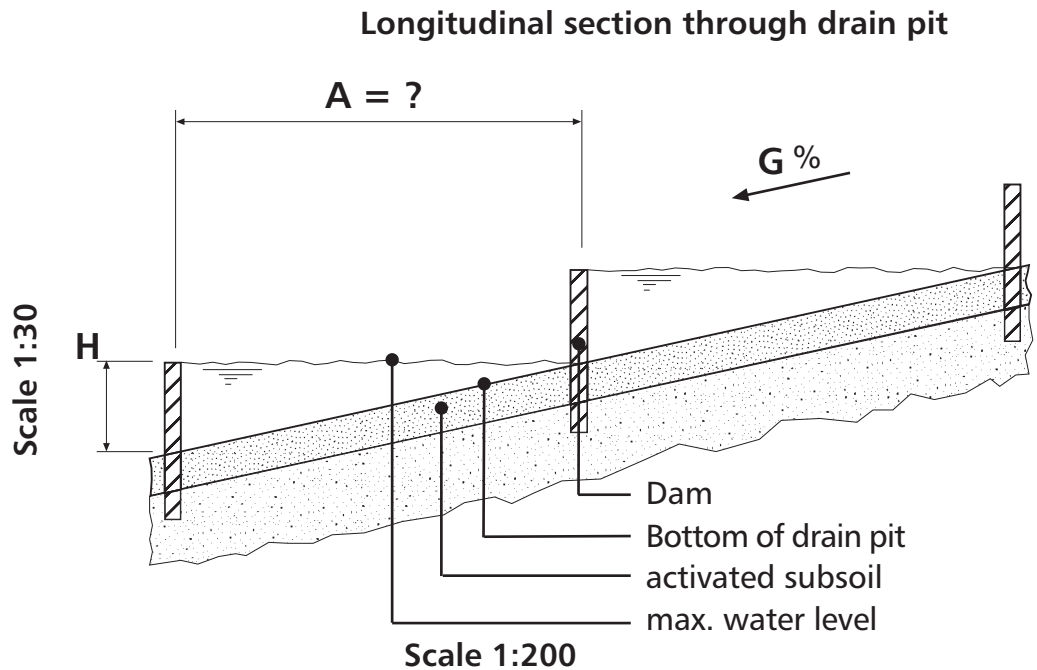


# SF EcoDuct

**Installation**

How to calculate the spacing between dams

Sketch 20



A = Dam spacing [m]  
 H = Dam height (from bottom of drain pit) [m]  
 G = Gradient [%]

$$A = \frac{H}{G \cdot 0,01} \text{ [m]}$$

**Example:** A = Dam spacing = ?  
 H = Dam height = 0,4 m  
 G = Gradient = 3%

$$A = \frac{0,4 \text{ m}}{3 \cdot 0,01} = 13,33 \text{ m}$$

In this example, dams will be installed in the drain pit approx. every 13 m.

**Additional reservoir**

An additional space for storing stormwater may be gained by a horizontal design of the drain pit base, whereby the stormwater may spread more evenly within the drain pit. (see also Sketch 21 on Page 24)

Product  
 SF EcoDuct

Product group  
 Hydroactive pavements / Drainage

Sheet  
 23 of 30

Correct as of  
 27 March 2000



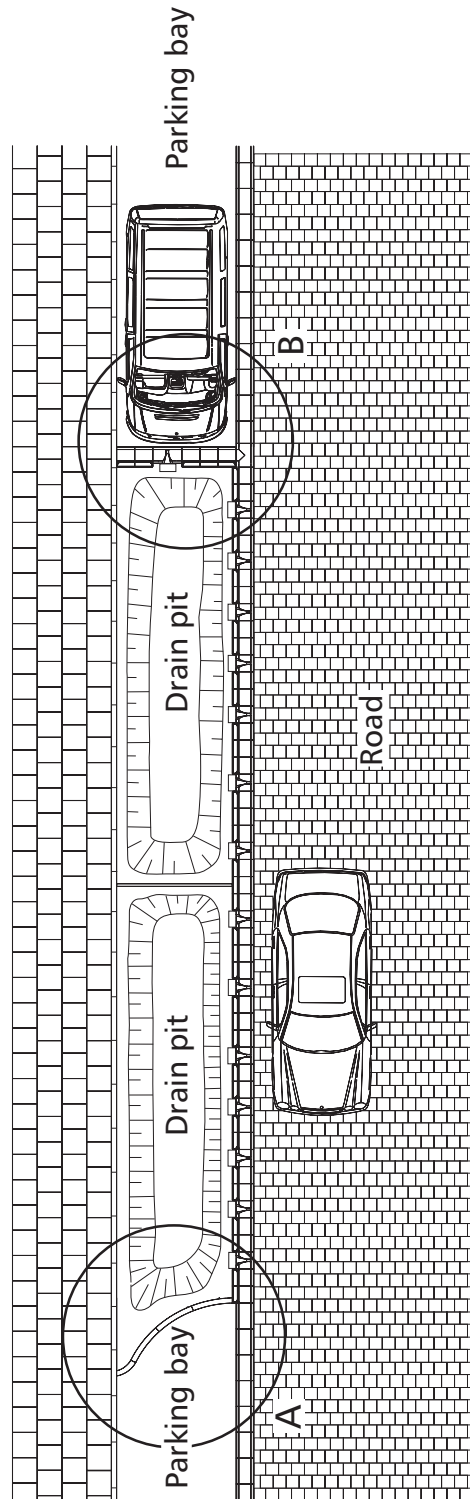
Installation

Parking bays with longitudinal section through the drain pit

Sketch 21

# SF EcoDuct

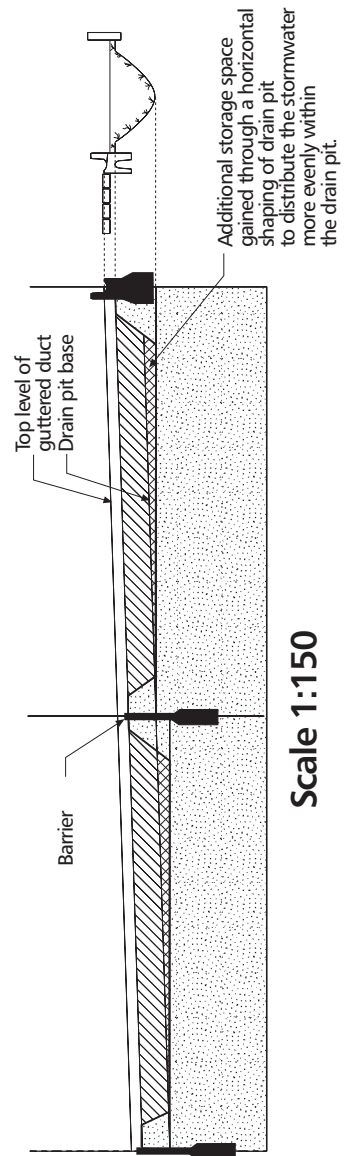
Top view



Cross section

Scale 1:75

Longitudinal section of drain pit



Scale 1:150

Product  
SF EcoDuct

Product group  
Hydroactive pavements / Drainage

Sheet  
24 of 30

Correct as of  
27 March 2000

Datenblatt SF-Okorinne\_englisch.fh8,  
Fresemann / Köster



# SF EcoDuct

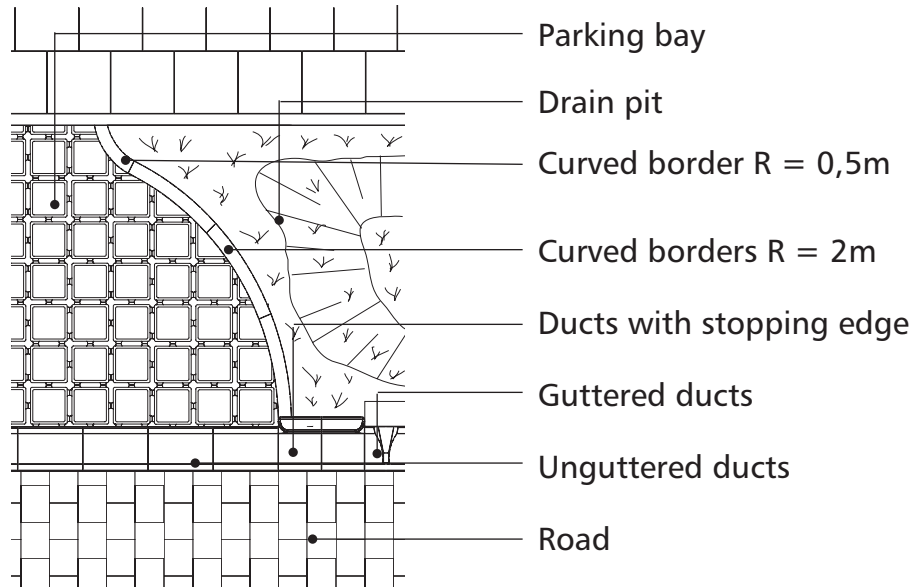
## Installation

Detail  
Parking bays

Sketch 22

Parking bay  
with curved  
borders

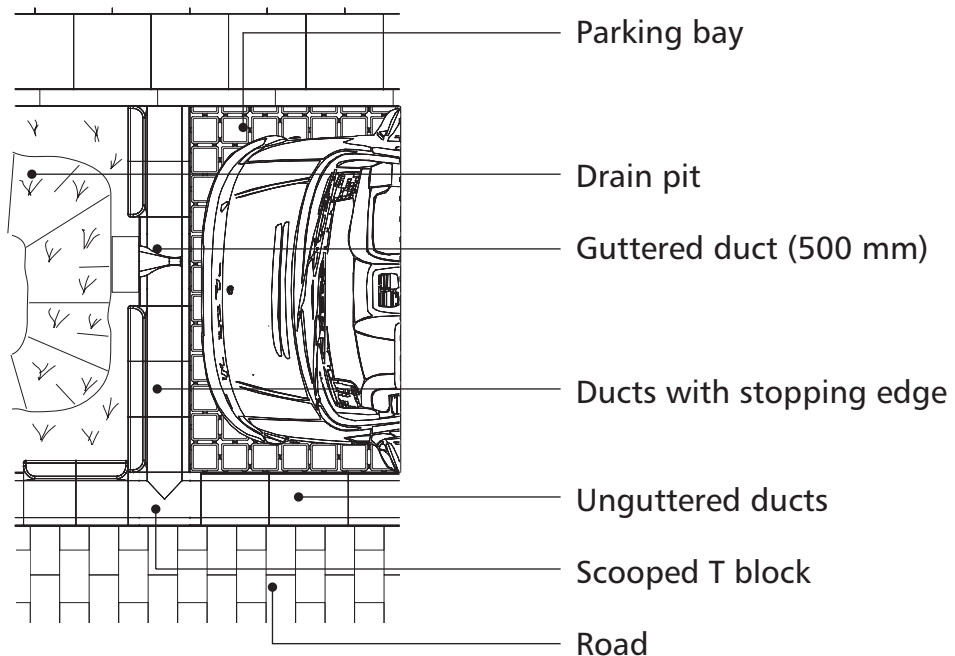
Detail A



Sketch 23

Parking bay  
with  
SF EcoDuct  
elements

Detail B



Product  
**SF EcoDuct**

Product group  
**Hydroactive pavements / Drainage**

Sheet  
**25 of 30**

Correct as of  
**27 March 2000**



# SF EcoDuct

**Installation**

When using the SF EcoDuct system elements for "draining a parking lot", the spacing between guttered ducts may be wider because no stormwater is flowing parallel to the road.

Example  
Parking lot

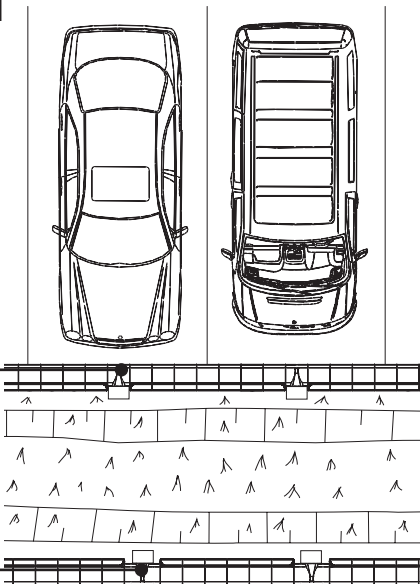
According to EAE, the spacing of parking lots is approx. 2,50 m. The width of individual parking spaces may be varied in the grid. Another possibility is to use guttered ducts of different lengths.

**Variation A:**

Each parking space has 7 ducts with a stopping edge plus one guttered duct (330 mm).

~2,66 m

Guttered duct  
330 mm long



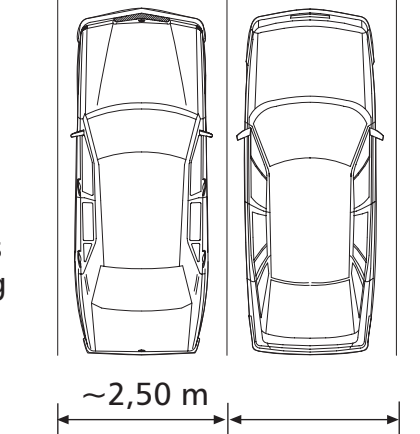
Cross section

Guttered duct  
500 mm long

**Variation B:**

Each parking space has 6 ducts with a stopping edge plus a guttered duct (500mm).

~2,50 m



Sketch 24

Product  
SF EcoDuct

Sheet  
26 of 30

Product group  
Hydroactive pavements / Drainage

Correct as of  
27 March 2000



## Selling points

# SF EcoDuct

## Selling and Marketing points

In Germany, the area covered by roads and buildings is growing by 120 hectares every day. This intense use leads to what may be called "sealing" of land, to stormwater polluting the sewage systems, rising water levels in rivers, as well as a general lowering of the groundwater table. Such disadvantages may be reduced by allowing, wherever possible and admissible, the installation of hydroactive pavements and a distributive drainage system including drain pits. Proper surface drainage has been demonstrated and proven in traffic areas, industrial areas, as well as all paved residential areas; concrete pavement combines the benefits of allowing stormwater to be drained and discharged either into drain pits or into larger areas.

**It must be noted**, however, that only non-toxic stormwater shall be allowed to percolate through paved traffic areas or industrial sites. The distributed drainage system with a mighty 30 cm top soil cover acts as a cleaning filter for the stormwater. Therefore such a system is able to absorb the stormwater from many different areas.

### SF EcoDuct – a complete water drainage system for traffic areas

The different elements of the SF EcoDuct system channel the stormwater from the traffic areas to the drain pits and/or soakaways. The SF EcoDuct also acts as a border by supporting the side of the road structure.

### SF EcoDuct - a water drainage system for all types of covered surfaces

A surface covering is not a drainage system in itself but, depending on the type of construction, can only reduce the amount of stormwater by allowing part of it to percolate through the pavement. All other stormwater ought to be drained across a wider area or into a drain pit.

Product

SF EcoDuct

Sheet

27 of 30

Product group

Hydroactive pavements / Drainage

Correct as of

27 March 2000



## Selling points

# SF EcoDuct

## Selling and marketing points

According to the German "Guideline for hydroactive pavements in traffic areas", a requirement for drainage needs to be considered in all cases including hydroactive pavements. Their drain coefficient is  $= 0.5$ . According to DIN 1986, Section 1, the corresponding drain coefficient for pavements using blocks and slabs is  $= 0.7$  and for black top  $= 1.0$ .

### SF EcoDuct enables a complete and sustained stormwater drainage without a connected sewer system

The drain pit is managed safely and effectively because the stormwater is evenly channelled to the drain pit and discharged at regular intervals. This ecological stormwater management system makes a storm drain system superfluous and/or any such system can be disconnected when an SF EcoDuct is constructed at a later point in time.

### SF EcoDuct for many different applications

The SF EcoDuct is applied in connection with drain pits which are built parallel to the carriageway. In this application, SF EcoDuct serves to support the road, to channel and distribute the stormwater. The stopping edges prevent tires from rolling into the drain pit.

#### SF EcoDuct in parking areas

Wherever drain pits are arranged at the top of parking bays, SF EcoDuct serves to support the parking area, to channel and distribute the stormwater into the drain pit. The stopping edges at kerb height prevent tires from rolling into the drain pit.

### SF Eco Duct – a complete system solution for distributed drainage systems

The SF EcoDuct system consists of the following concrete elements to serve multiple purposes: guttered duct, duct with stopping edge, un-guttered duct, scooped block, and scooped T block. The system therefore combines all the elements required to construct a distributed drainage system according to the German guideline ATV A 138.

### SF EcoDuct with an initial design program

SF Kooperation has developed a software program to dimension the size of drain pits and to calculate the drainage capacity of hydroactive concrete pavements. .

Product

SF EcoDuct

Sheet

28 of 30

Product group

Hydroactive pavements / Drainage

Correct as of

27 March 2000



## Appendix

Safety and health protection hints

# SF EcoDuct

## Notes on safety and industrial hygiene

Placing and installing the SF EcoDuct shall be done in accordance with applicable legislation on safety-at-work and industrial hygiene, as well as rules and regulations concerning safety and industrial hygiene at construction sites.

This also includes the application of EC Directive 90/269/EEC concerning safety and industrial hygiene in the manual handling of loads.

Notes quoted from a publication of the German federal states committee on industrial safety and hygiene on "How to assess load handling and lifting, based on characteristic parameters":

Time-weighting	Regular repetition of short lifting and placing motions	Prolonged carrying or holding
1	< 10 times per shift	Total period < 30 min.
2	10 bis < 40 times per shift	Total period 30 min to < 1 h
4	40 bis < 200 times per shift	Total period 1 h to < 3 h

Load weighting	Posture weighting	Ausf.-wichtung	$\Sigma$ 1 - 3	x time-weighting	Points
4	2	1	7	4	28
4	2	1	7	2	14
4	2	1	7	1	7

### Conclusion:

28 points = Considerably increased strain, potential physical stress even for normally able persons. Ergonomic assistance indicated.

14 points = Increased strain, potential stress for less able persons. Ergonomic assistance makes sense for this group of persons.

7 points = Low stress, a health risk based on physical strain is improbable.

The studies are based on the assumption that the SF EcoDuct is installed by two persons using commercially available border placing prongs. Wherever possible, machine installation is generally recommended.

Product  
SF EcoDuct

Product group  
Hydroactive pavements / Drainage

Sheet  
29 of 30

Correct as of  
27 March 2000