



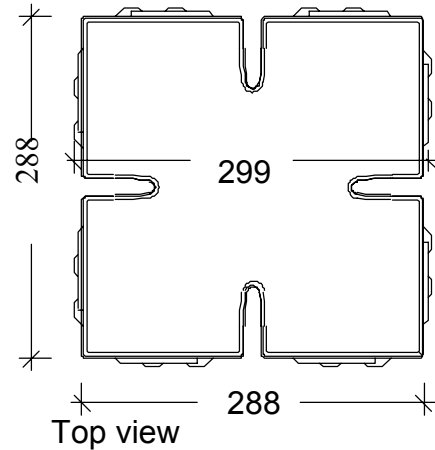
# VS 5™ DRAIN

(all dimensions in mm)

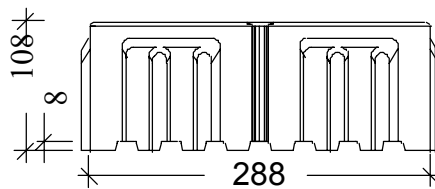
**Permeable paving system with shift protection and drainage openings for road surfaces**

## Shape and dimensions, normal stone

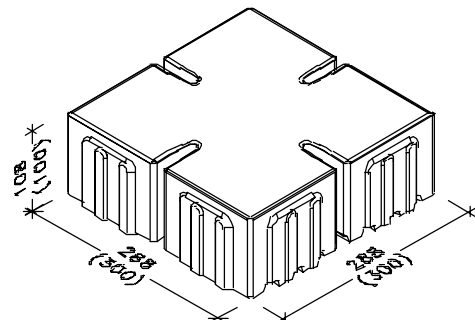
<b>Grid size</b>	300 mm x 300 mm (different grid sizes available)
<b>Nominal size</b>	288 mm (±2 mm)
<b>Outside dimension</b>	299 mm (±2 mm) incl. spacing aids
<b>Nominal thickness</b>	100 mm (±3mm)
<b>Stone thickness, overall</b>	108 mm (±3mm) (including profiling on underside)
<b>Weight</b>	approx. 20 kg/stone; approx 226 kg/m <sup>2</sup>
<b>Opening proportion</b>	approx. 9 % drainage openings
<b>Joint width</b>	visible: 12 mm
<b>Chamfer</b>	2 mm vertical, 3 mm horizontal
<b>shift protection support</b>	7 mm interlocking spacer support for shift resistance
<b>Top side</b>	according to plan, even
<b>Stone side</b>	according to plan, even with interlocking protection support
<b>Underside</b>	profiled, 8 mm



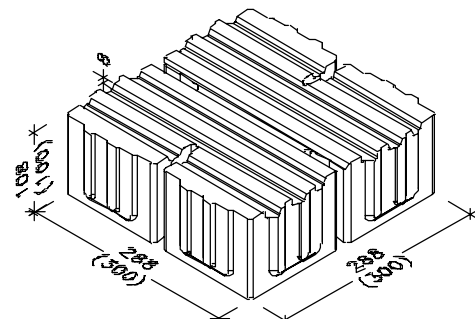
Top view



Side view



Top view



Stone underside

Product  
**VS 5 DRAIN**

Product group  
**Permeable Pavements**

Page  
**1 of 7**

as of  
**September 2007**



# VS 5 DRAIN

**Permeable paving system with shift protection and drainage openings for road surfaces**

## Installation tips

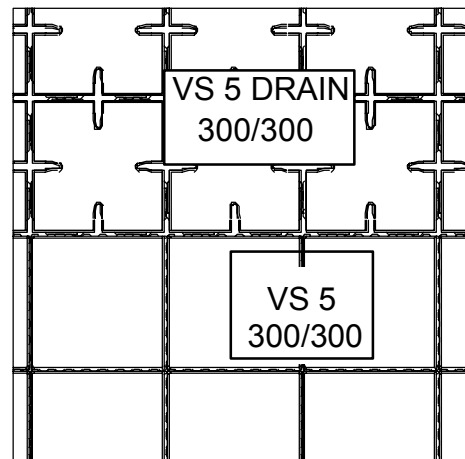
**Stone requirement**

11.1 stones/m<sup>2</sup>

**Application**

Permeable pavement for vehicle or pedestrian traffic in private, commercial or public areas. For public surfaces with light and slow traffic, walkways and cycle paths.  
Due to the high shift protection, VS 5 DRAIN is particularly suitable for road surfaces subject to high horizontal stresses such as curves, intersections with braking and acceleration of vehicles.

VS5 DRAIN is not suitable for frequent heavy truck loads.



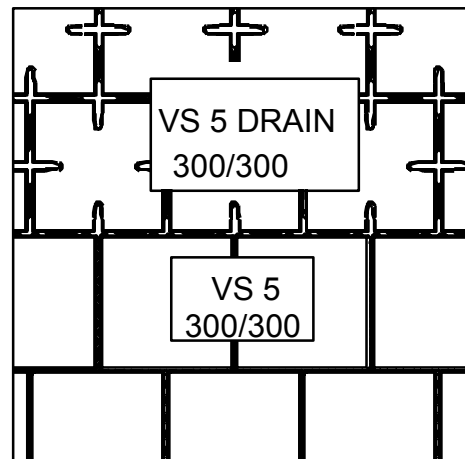
Combination in cross-joint bond (for non-vehicle surfaces)

**Recommended Installation pattern**

The best possible shift protection is achieved by laying in stretcher or half-bond patterns. The profiling on the underside should run in the main traffic direction.

**Combination with VS 5 300/300**

VS 5 DRAIN in grid size 300 mm is combinable via the interlocking spacers with VS 5 stones in raster size of 300 mm. Therefore, the shift protection is maintained across both types of stone.



Combination in half bond

Product  
**VS 5 DRAIN**

Product group  
**Permeable Pavements**

Page  
**2 of 7**

as of  
**September 2007**

**Info sheet technical data**



# VS 5 DRAIN

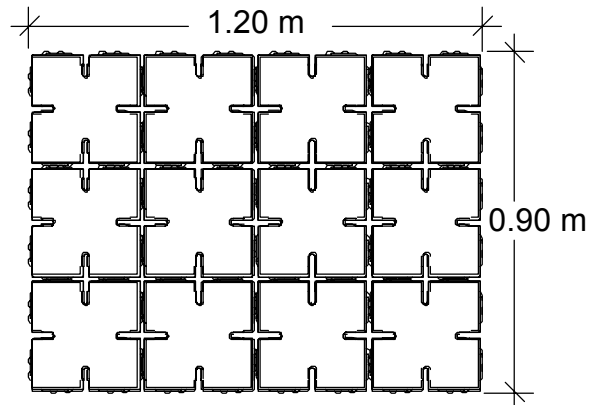
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## Shipping formations

VS 5 DRAIN can be installed manually or by machine.

**Shipping formation**

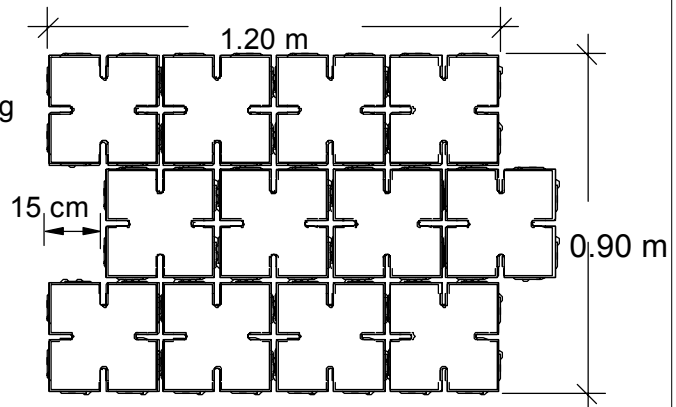
Shipping formation with 12 stones in cross bond



Shipping formation in cross bond

**Trafficked areas**

For traffic thoroughfares and for a better interlocking performance, half-bond laying is to be recommended.



Stone row shifting in the laying caliper.

**Mechanical laying in trafficked areas**

With machine installation, clamps with automatic row adjustment should be used or the adjustment should be done manually.

The shifting degree should be adjusted carefully by prior testing.

Product  
**VS 5 DRAIN**

Product group  
**Permeable Pavements**

Page  
**3 of 7**

as of  
**September 2007**



# VS 5 DRAIN

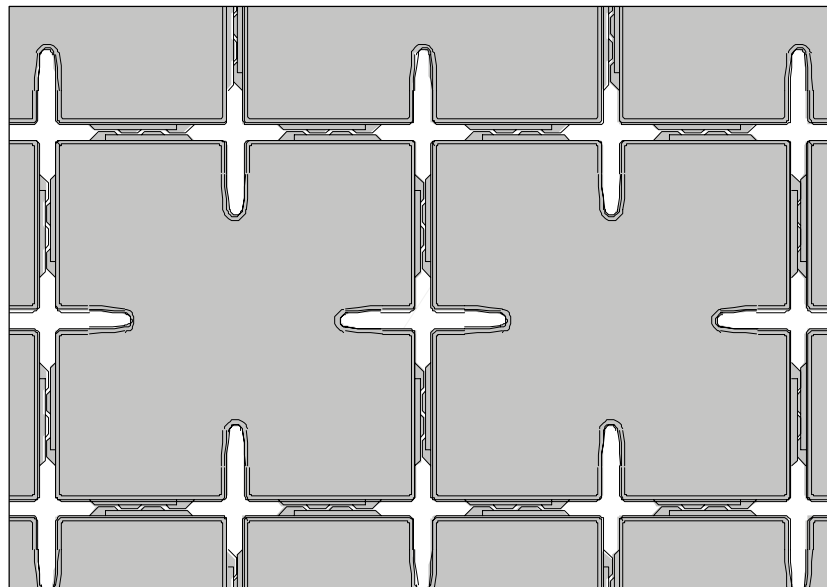
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## References for design

### Drainage capability

VS 5 DRAIN offers high drainage performance due to its high opening proportion of 9%.

The prerequisite for this is the use of suitable joint and bedding material.



approx. 9 % joint proportion

High drainage capability

With the VS 5 DRAIN, the precipitation amounts of the reference rain of 270 l/(s x ha) (3 inches/hour) for the construction of water permeable road surfaces can also be completely drained, even in the long-term, if the correct aggregates are used for joints, bedding and base layer and the basic principles for regular execution of construction work are complied with. Notes on the planning and execution of construction work on the following page.

VS 5 DRAIN is not intended to be used as a grass/turf pavement.

Product	VS 5 DRAIN
Product group	Permeable Pavements

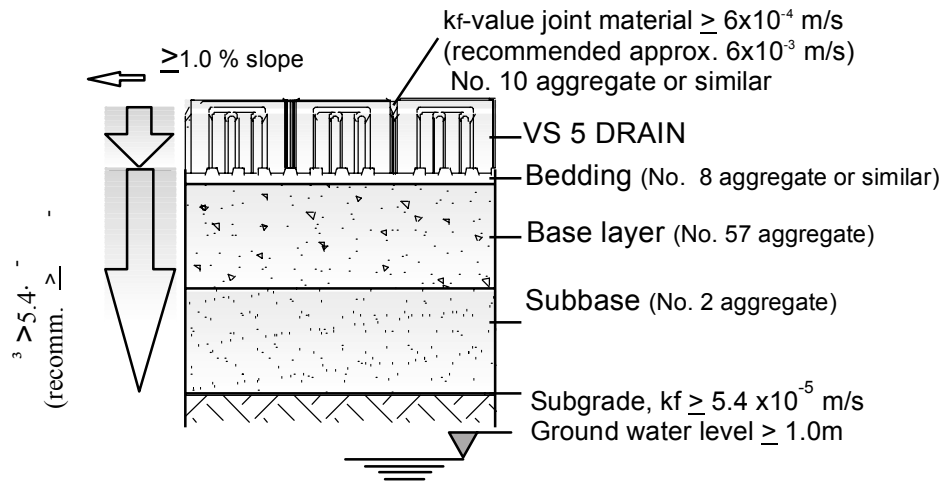
Page	4 of 7
as of	September 2007



# VS 5 DRAIN

**Permeable paving system with shift protection and drainage openings for road surfaces**

## Construction



**Construction design of permeable pavements**

**Joint material**

The water permeability  $k_f$  of the joint material must be at least  $6 \times 10^{-4}$  m/s. A 1/3mm broken aggregate with a  $k_f$ -value of approx.  $6 \times 10^{-3}$  m/s is recommended. (No. 10 aggregate or similar).

**Bedding material**

The water permeability  $k_f$  of the bedding material must be  $\geq 5.4 \times 10^{-5}$  m/s. A 1/5 mm or 1/3 mm broken aggregate with a  $k_f$ -value of approx.  $5 \times 10^{-4}$  m/s is recommended. (No. 8 aggregate or similar).

**Base and subbase layers**

The water permeability  $k_f$  of the base and subbase layer must be at least  $5.4 \times 10^{-5}$  m/s. A permeability value of  $5.4 \times 10^{-4}$  m/s is recommended, composed of 0/32 or 0/45 mm broken aggregate with a max. fines content of 5% mass ( $\leq 0.063$  mm grain diameter) in the delivery condition. For the grain composition, the lower area of the sieve lines is to be aimed for. The deformation modulus  $E_{V2}$  must not exceed  $120 \text{ MN/m}^2$ , with a ratio  $E_{V2}/E_{V1}$  of between 2.2 und 2.5. In the case of higher individual loads, bound water permeable base layers with filter fleece can also be used.

**Subgrade and sub-soil**

The sub-grade and the sub-soil must be prepared with a sufficient gradient and water permeability. The distance to the highest groundwater must be at least 1.0 m.

Product  
**VS 5 DRAIN**

Product group  
**Permeable Pavements**

Page  
**5 of 7**

as of  
**September 2007**



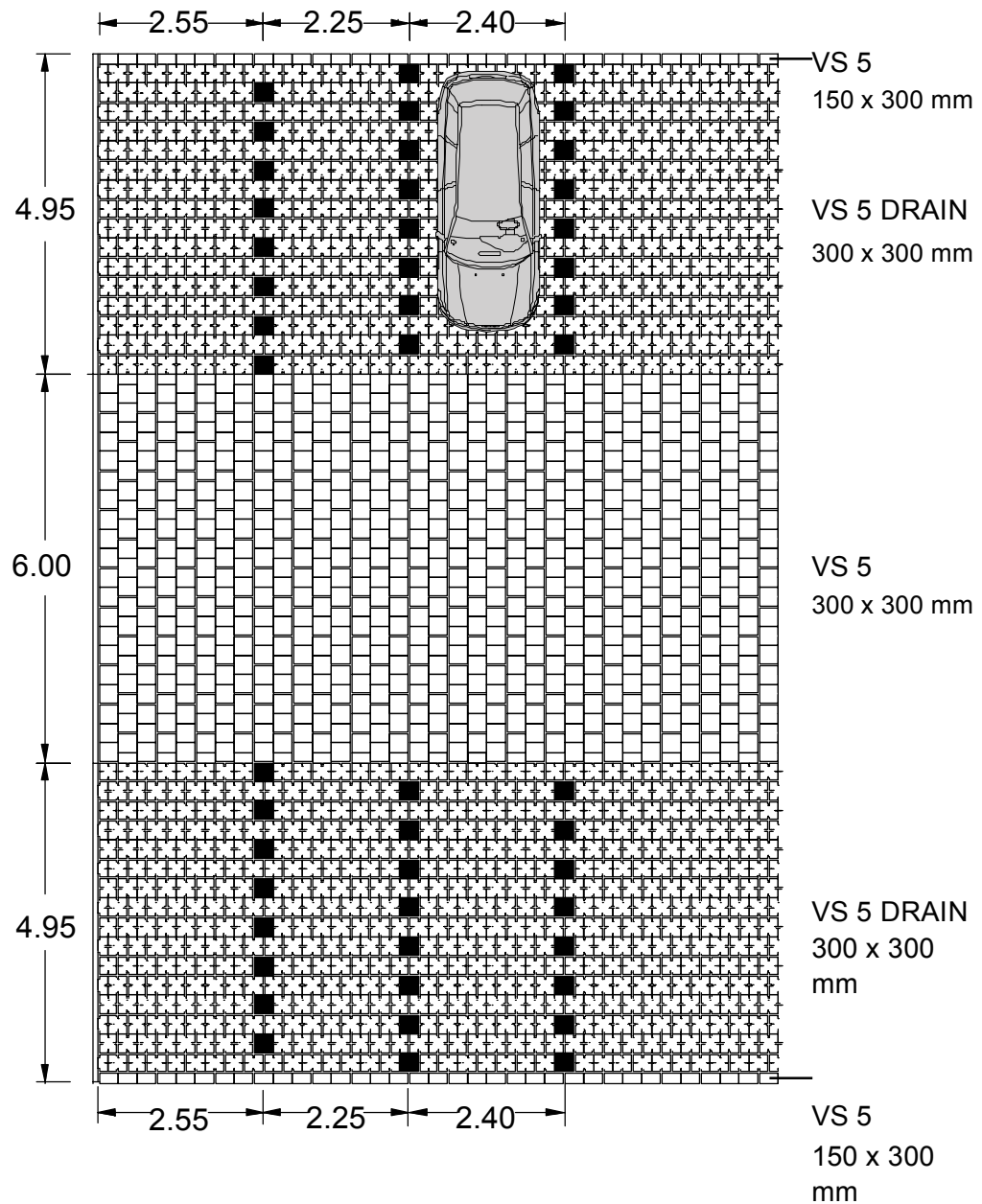
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Permeable paving system with shift protection and drainage openings for road surfaces

Parking lot with bays of varying widths

Info sheet technical

Example of Parking lot Design



Product	VS 5 DRAIN
Product group	Permeable Pavements

Page	6 of 7
As of	September 2007

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# VS DRAIN

**Permeable paving system with shift protection and drainage openings for road surfaces**

**Product data sheet**

<b>VS 5 DRAIN 288 / 288 / 100</b>	
	<b>Regular stone</b>
Nominal sizes and tolerances	
- Length [mm]	288 ±2
- Width [mm]	288 ±2
- Thickness [mm]	100 ±2
Grid size [mm]	300
Stone size [mm]	288 / 288 / 100
Stone thickness overall [mm]	108 ±2
Joint ratio	approx. 9 %
Chamfer	2 mm vertical, 3 mm horizontal
Spacer	Projection size: min 4 mm, max 7 mm
Conicity	according to plan, none, max. 1 mm
Top side	according to plan, even
Underside	profiled
Lateral surfaces	according to plan, even with spacer
Colors	in accordance with manufacturers specification
surface treatment	in accordance with manufacturers specification
Composition and Manufacture	VS 5 Drain is made of a “no slump” concrete mix. Compressive strength is greater than 8000 psi, a water absorption maximum of 5% and will meet or exceed ASTM C-936 and freeze-thaw testing per Section 8 of ASTM C-67.

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Product  
**VS 5 DRAIN**

Page  
**7 of 7**

Product group  
**Permeable Pavements**

as of  
**September 2007**