

# TECHNICAL DATA SHEET



## EVODRAIN HARD R2 HDPE SN8

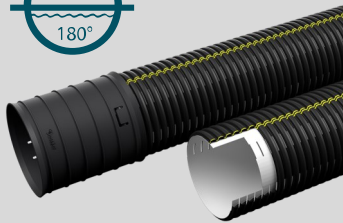
DN/OD series R2 type drainage pipe  
with corrugated external and smooth internal surface

According to DIN 4262-1  
Pipe profile type: R2  
Perforation classes:  
TP(360°); LP(180°±10°);  
MP(≤120°); UP

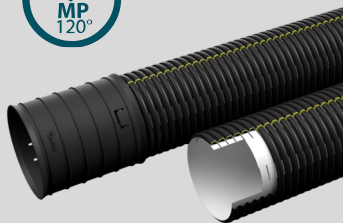
### PRODUCT DESCRIPTION



Totally perforated pipe TP(360°)



Locally perforated pipe LP(180°±10°)



Multipurpose pipe MP(≤120°)

Ring stiffness:

**SN8**

Open product

Drainage pipe with corrugated external wall and smooth internal surface according to product standard DIN 4262-1 conforms to profile type R2 and perforation classes TP (360° totally perforated drainage pipe), LP (180°±10° locally perforated pipe), MP (≤120° multipurpose pipe) and UP (unperforated transport pipe). Water filtration inlet perforation opening area ≥50 [cm<sup>2</sup>/m] (for perforated pipes). Pipes are available in bars- with a pipe length of 6 [m]. Every bar is supplied with a double sleeve. Standard set for LP, MP and UP perforation class pipes includes a double sleeve and a sealing ring (which conforms to EN 681-1/A3 standard requirements). The supplied sealing ring grants a hermetic seal with a pressure rating of <0,5 bar (for coupling area). LP and MP perforation class pipes are marked with a permanent yellow double-lining on the outside surface, for easier identification of perforation area. DN/OD drainage pipes are available with a nominal ring stiffness class of SN8: Pipes can be supplied with oil resistant sealing rings acc. to requirements of EN 681-2 p.5.10.

Pipe outer surface color is black (RAL 9004) but internal surface is white, UP perforation class pipe has a blue internal surface color.

Pipe material: HDPE (high density polyethylene).

Sealing ring material: EPDM (ethylene-propylene-diene rubber (terpolymer)).

Pipe produced according to standard: DIN 4262-1

Sealing rings conform to standard: EN 681-1/A3

### APPLICATION AREA

Corrugated drainage pipes are best suited for establishing hidden horizontal drainages to ensure dehumidification of the landfills. Drainage is to be installed on the land where ground-water depth is less than dehumidification norm, i.e. where high humidity saturation in the ground may result in slower drying of the productive soil at spring, as well as in destruction of basements of the building, road elution, etc. EVODRAIN HARD R2 type SN8 class drainage pipes are applicable for areas:

- In agriculture, forestry, in parks, squares and peat fields;
- Stadiums and sport complexes;
- Temporary and permanent drainage systems at construction sites;
- Landfills (liquid and biogas collection);
- For civil and industrial buildings and construction areas;
- Airport territory construction;
- Harbour and dock territory construction;
- Road construction application:
  - Without transport load (pavements, pedestrian and bicycle paths);
  - With transport load (railroad, tunnel and highway construction)

Storage of sealing rings according to standards ISO 2230 and EN 681-1/A3 D.

Installation performance in accordance with standard EN 1610; CEN/TR 1046.

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## EVODRAIN HARD R2 HDPE SN8

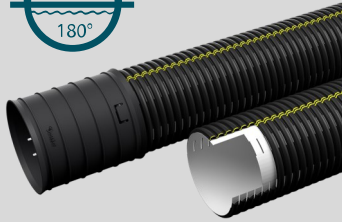
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with corrugated external and smooth internal surface

According to DIN 4262-1  
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Perforation classes:  
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MP(≤120°); UP

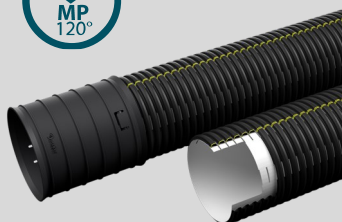
### PRODUCT DIMENSIONS



Totally perforated pipe TP(360°)



Locally perforated pipe LP(180°±10°)



Multipurpose pipe MP(≤120°)

Ring stiffness:

**SN8**

Open product

#### Pipe dimensions

	63	75	90	110	125	160
Nominal size	63	75	90	110	125	160
Inside ID, mm	51,70	62,70	76,20	94,10	106,70	137,60
Profile height (h), mm	5,65	6,15	6,90	7,95	9,15	11,20
Pipe bar length (L), m	6	6	6	6	6	6

#### Perforation opening parameters for perforation classes- TP, MP un LP

	60°	60°	60°	60°	60°	60°
Perforation angle (α)	60°	60°	60°	60°	60°	60°
Perforation opening width <sup>1</sup> (a), mm	1,20	1,20	1,40	1,20	1,20	1,40
Perforation opening area, cm <sup>2</sup> /m	≥50	≥50	≥50	≥50	≥50	≥50

#### Perforation opening parameters for perforation class TP (360°)

Perforation opening length (b), mm	13,22	13,30	13,20	9,16	10,11	11,19
Perforation opening quantity on transverse plane normal to profile foot, pcs	3	3	3	6	6	6

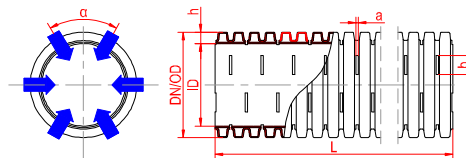
#### Perforation opening parameters for perforation class LP (180°±10°)

Perforation opening length (b), mm	17,68	17,7	17,66	13,75	15,27	16,66
Perforation opening quantity on transverse plane normal to profile foot, pcs	2	2	2	4	4	4

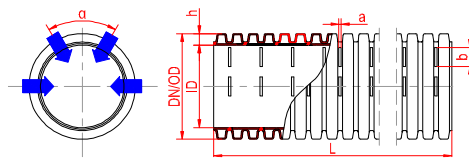
#### Perforation opening parameters for perforation class MP (≤120°)

Perforation opening length (b), mm	13,22	13,30	13,20	18,40	20,40	22,50
Perforation opening quantity on transverse plane normal to profile foot, pcs	3	3	3	3	3	3

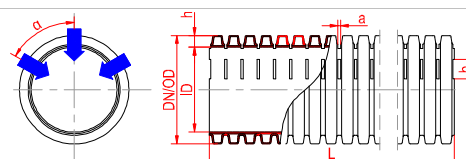
<sup>1</sup> Perforation tolerances according to DIN 4262-1 paragraph 6.2.2.2. specifications.



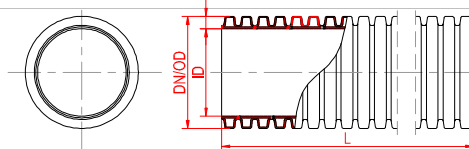
TP class 360° totally perforated pipe. Water inlets are evenly distributed along pipes circumference.



LP class 180°±10° locally perforated pipe. Water inlets are located in the upper part of the pipe symmetric to pipes vertical axis in 180°±10° area, but flow line (used for collection and transportation of liquids) is not perforated and stands opposed to inlet area.



MP class ≤120° multipurpose pipe. Water inlets are located in the upper part of the pipe symmetric to pipes vertical axis in max of 120° area, but flow line (used for collection and transportation of liquids) is not perforated and stands opposed to inlet area.



UP class unperforated transport pipe is used for transportation of water.

# TECHNICAL DATA SHEET



## EVODRAIN HARD R2 HDPE SN8

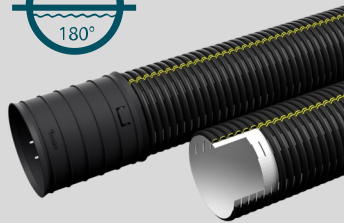
DN/OD series R2 type drainage pipe  
with corrugated external and smooth internal surface

According to DIN 4262-1  
Pipe profile type: R2  
Perforation classes:  
TP(360°); LP(180°±10°);  
MP(≤120°); UP

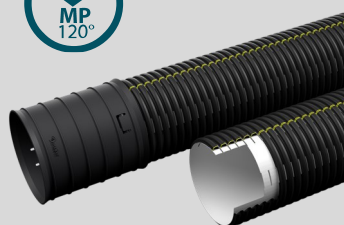
### PRODUCT PARAMETERS



Totally perforated pipe TP(360°)



Locally perforated pipe LP(180°±10°)



Multipurpose pipe MP(≤120°)

Ring stiffness:

**SN8**

Open product

#### Pipe physical and mechanical properties

Parameter	Value	Test method
Material	HDPE	DIN 4262-1
Ring stiffness, kN/m <sup>2</sup>	8	EN 9969
Resistance to external blows, by applying staircase method: d90, 0.8 ±0.005kg, Hmin 0.8m, t=(±0)°C	H <sub>50</sub> >1,2m	EN ISO 11173

#### Sealing ring physical and mechanical properties for LP, MP un UP class pipes

##### WCL type rubber sealing ring

Parameter	Value	Test method
Material	EPDM	ISO 1629
Durability in low temperature, at t= -25°C	72 h	ISO 815
	168 h	ISO 3387
Chemical resistance	pH2<pH<pH12	ISO/TR 7620
Permeability pressure	<0,5 bar	EN ISO 13254 EN ISO 13259 Condition B and C
Oil resistance <sup>2</sup>	Conforms	EN 681-2

#### Pipe flushing (cleaning) allowance parameters

Max pressure, bar	120
Minimum flow rate, l/min	80

<sup>2</sup> Oil resistant seal acc. to requirements of EN 681-2 p.5.10; conformity determined by Volume change in oil test acc. to ISO 1817

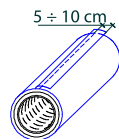
### FILTER MATERIAL APPLICATION OPTIONS

Drainage pipes EVODRAIN HARD R2 are produced without filter material overlay. If it is necessary then application of filter material must be done on site. Recommended application of filter material overlay is demonstrated in the tables below.

#### Class TP 360° totally perforated pipe recommended filter material overlaying options

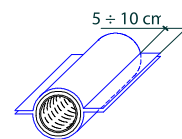
##### A variant

Pipe is covered fully along it's circumference with a single sheet of filter material overlay



##### B variant

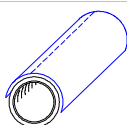
Pipe is covered along it's circumference with two identical sheets of filter material overlays



#### Class LP 180°±10° locally perforated pipes and class MP ≤120° multipurpose pipe recommended filter material overlaying options

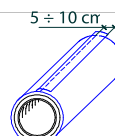
##### A variant

Only perforated area is overlaid with a single filter sheet



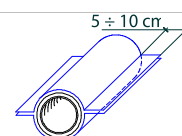
##### B variant

Pipe is fully covered along it's circumference with a single filter sheet



##### C variant

Pipe is covered along it's circumference with two identical sheets of filter material overlays



# TECHNICAL DATA SHEET

## STANDARDS APPLICABLE TO PIPES

Standard	Description
DIN 4262-1	Pipes and fittings for subsoil drainage of trafficked areas and underground engineering - Part 1: Pipes, fittings and their joints made from PVC-U, PP and PE
EN 13476-3+A1	Plastics piping systems for non-pressure underground drainage and sewerage. Structured-wall piping systems of unplasticized polyvinyl chloride (PVC-U), polypropylene (PP) and polyethylene (PE). Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B
<b>Pipe geometric parameters according to:</b>	
EN 3126	Plastic piping systems - Plastic components - Determination of dimensions
<b>Pipe mechanical parameters according to:</b>	
EN ISO 9969	Thermoplastics pipes - Determination of ring stiffness
EN 9967	Thermoplastics pipes - Determination of creep ratio
EN ISO 11173	Plastics piping and ducting systems - Thermoplastics pipes - Determination of resistance to external blows by staircase method

## APPLICATION BY SUBSTANCE TYPE

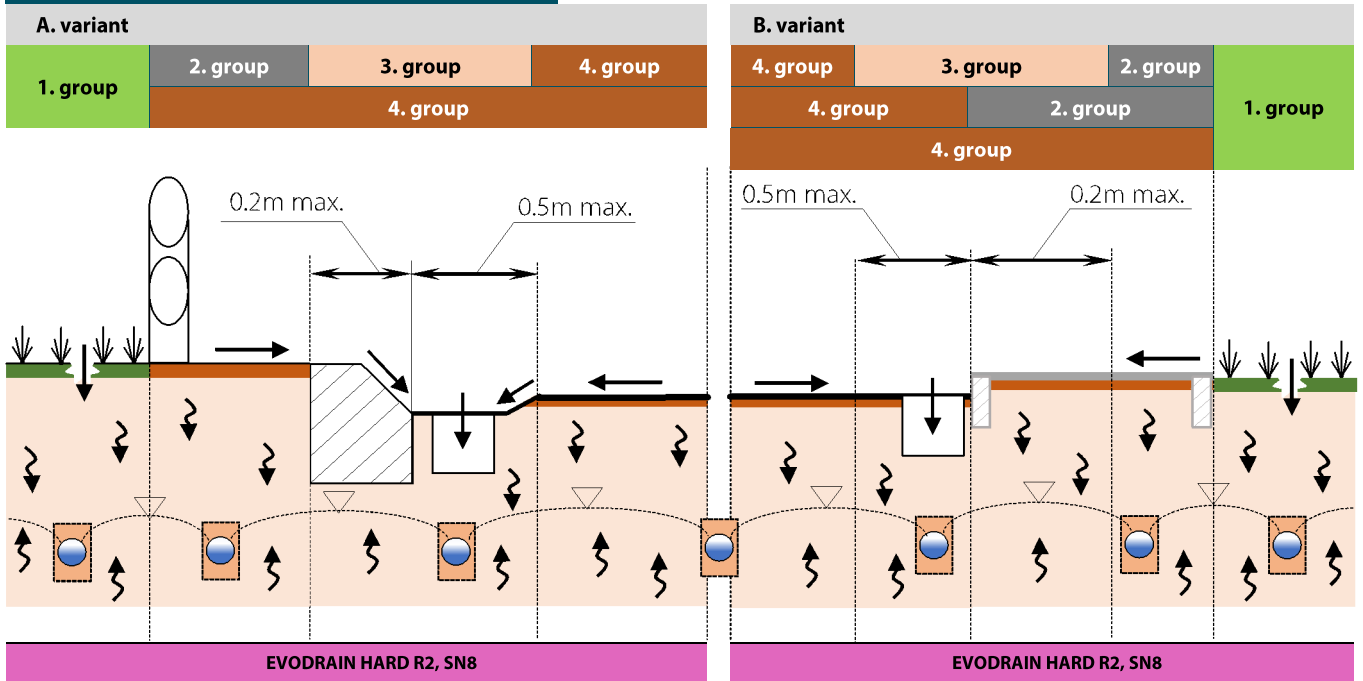
Substance type	Without filter material overlay	With A type filter material overlay <sup>3</sup>	With coco fiber filter material overlay <sup>3</sup>
<b>Binding- poorly filtering ground</b>			
Clay	No	No	Yes
Dense sandstone	No	No	Yes
Sandstone	No	Yes	Yes
<b>Non-binding- poorly filtering ground</b>			
Loam	No	Yes	No
<b>Binding-well filtering ground</b>			
Coarse sand	Yes	Yes	No
Binding sand	No	Yes	No
Non-binding sand (loose)	No	Yes	No
Gravel	Yes	Yes	No
Turf	No	Yes	Yes

<sup>3</sup> If substance requires a filter material overlay then application of filter overlay must be done on site.

# TECHNICAL DATA SHEET

EVODRAIN HARD R2 SN8 and SN16 pipes application for drainage piping systems

## ROAD CONSTRUCTION APPLICATION



A. variant

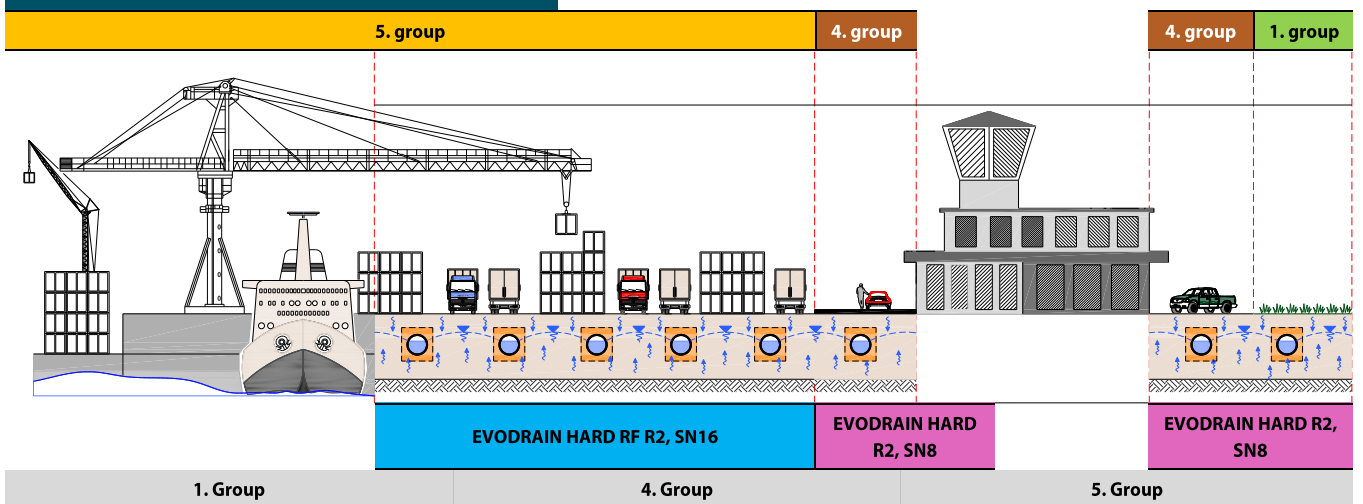
Typical highway cross-section, split into groups according to nominal strength (SN) class application of EVODRAIN HARD pipes.

B. variant

Representative cross section of city street (carriageway) and pavement (sidewalk) or a hard shoulder, split into groups according to nomi-

1. Group	2. Group	3. Group	4. Group
Areas which can only be used by pedestrians and pedal cyclists.	Pedestrian areas and comparable areas, car parks or car parking decks.	Areas of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0.5m into the carriageway and maximum of 0.2m into the pedestrian area.	Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all types of road vehicles.

## HARBOR AND DOCK APPLICATION



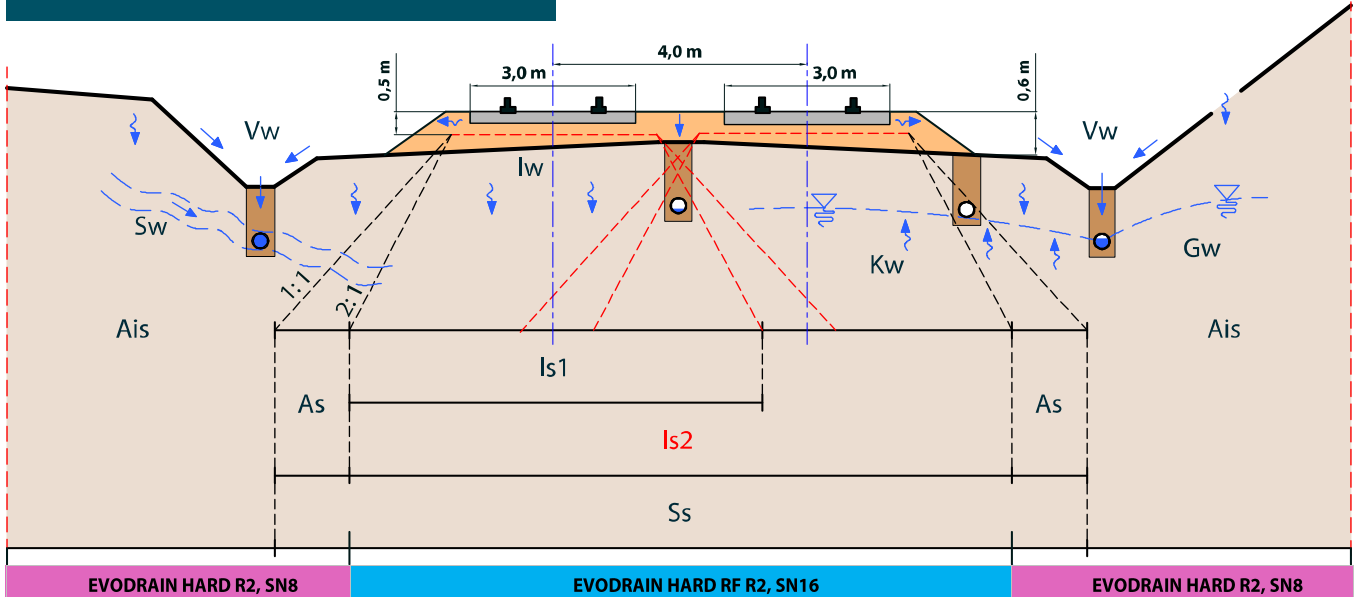
1. Group  
Areas which can only be used by pedestrians and pedal cyclists.

4. Group  
Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all types of road vehicles.

5. Group  
Areas imposing high wheel loads, e.g. docks, aircraft pavements.

# TECHNICAL DATA SHEET

## RAILWAY CONSTRUCTION APPLICATION



### Description of used terms

**Vw** - terrestrial water;  
**Lw** - infiltration water;  
**Kw** - capillary water;  
**Sw** - water layer;  
**Dw** - groundwater, still water

**Is 1** - inside traffic load influence area (from 1 track)  
**Is 2** - inside traffic load influence area (from 2 tracks)  
**As** - outside traffic load influence area  
**Ss** - traffic load influence area  
**Ais** - area outside of traffic load influence

### Drainage pipe nominal ring stiffness class (SN) selection by usage area and ground group

Ais	As	Is 1 and Is 2
<b>EVODRAIN HARD R2 type SN8</b>	<b>EVODRAIN HARD R2 type SN8</b>	<b>EVODRAIN HARD RF R2 type SN16</b>
Applicable to all ground groups <sup>4</sup>	Applicable to all ground groups <sup>4</sup>	Applicable to G1, G2 and G3 ground groups <sup>4</sup>

<sup>4</sup> Ground groups according to ATV-A 127

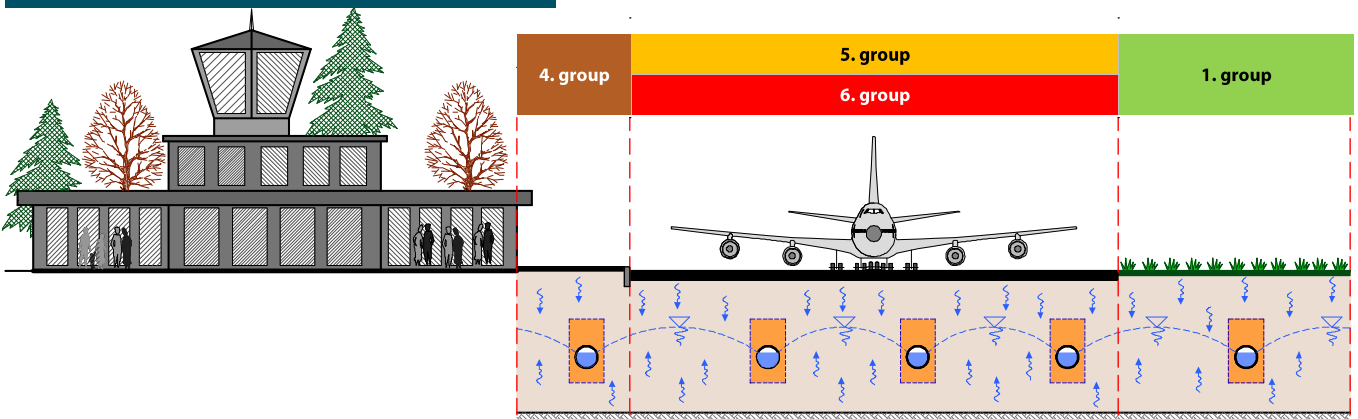
G1 - non-binding sand and gravel

G2 - well binding sand and gravel

G3 - binding mixed ground and coarse sand

G4 - binding ground (e.g. clay)

## AIRPORT TERRITORY APPLICATION



1. Group	4. Group	5. Group	6. Group
<b>EVODRAIN HARD R2, SN8</b>	<b>EVODRAIN HARD R2, SN8</b>	<b>EVODRAIN HARD RF R2, SN16</b>	<b>EVODRAIN HARD R2, SN8</b>
Areas which can only be used by pedestrians and pedal cyclists.	Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all types of road vehicles.	Areas imposing high wheel loads, e.g. docks, aircraft pavements.	Areas imposing particularly high wheel loads, e.g. aircraft pavements.