

# TECHNICAL DATA SHEET

## EVODRAIN HARD RF DN/OD 200 - 400 mm

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

DIN 4262-1  
 EN 13476-3  
 Material: polypropylene: **(PP)**  
 Ring stiffness: **SN16**

### PRODUCT DESCRIPTION

Drainage pipe with profiled (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° or 220°±10° locally perforated pipe), MP (≤120° multipurpose pipe) and UP (unperforated liquid transport pipe). Pipes are available in bars - with a pipe length of 6 [m]. Standard set for DN/OD series drainage pipes, with LP, MP and UP perforation class, is equipped with welded-on solid PP coupling and oil resistant sealing ring. The sealing ring is resistant to oil according to the requirements of EN 681-2 p.5.10. The supplied sealing ring grants a hermetic seal with a pressure rating of ≥0,5 bar (for the coupling area). These pipes are reinforced with a nominal ring stiffness class of SN16.

Outer surface color is dark brown but internal surface is white (RAL 9016).

Pipe material: PP (polypropylene).

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

Pipe produced according to standard: DIN 4262-1, EN 13476-3.

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:

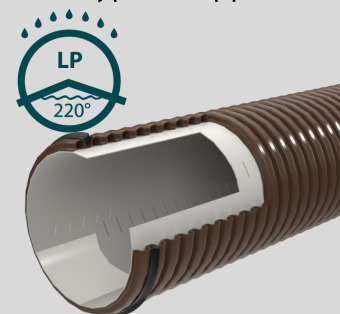
- In agriculture, forestry, in parks, squares and peat fields;
- Stadiums and sport complexes;
- Temporary and permanent drainage systems at construction sites;
- Landfills (liquid and biogas collection);
- For civil and industrial buildings and construction areas;
- Airport territory construction;
- 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.

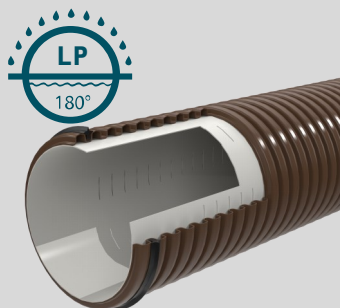
Installation performance in accordance with standard EN 1610; CEN/TR 1046.



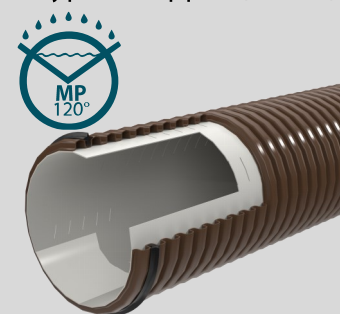
Totally perforated pipe TP(360°)



Locally perforated pipe LP(220°±10°)



Locally perforated pipe LP(180°±10°)

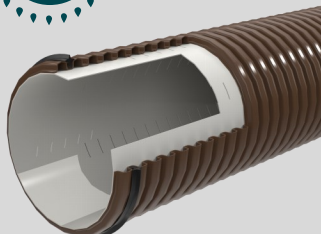


Multipurpose pipe MP(≤120°)

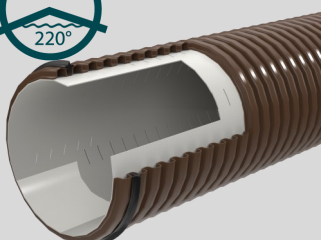
Ring stiffness: **SN16**

**Open product**

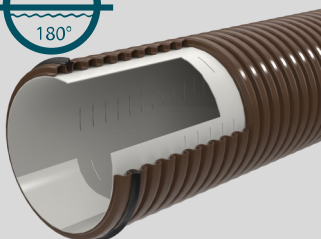
# TECHNICAL DATA SHEET



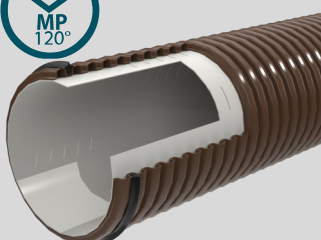
Totally perforated pipe TP(360°)



Locally perforated pipe LP(220°±10°)



Locally perforated pipe LP(180°±10°)



Multipurpose pipe MP(≤120°)

Ring stiffness: **SN16**

**Open product**

## EVODRAIN HARD RF DN/OD 200 - 400 mm

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

DIN 4262-1  
EN 13476-3  
Material: polypropylene: (PP)  
Ring stiffness: **SN16**

### PRODUCT PARAMETERS

#### Pipe physical and mechanical properties

Parameter	Value	Test method
Material	PP	DIN 4262-1
Ring stiffness, kN/m <sup>2</sup>	16	EN 9969
Impact resistance 0°C (staircase method)	H <sub>50</sub> ≥ 1200mm No break below 500 mm	EN 11173

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

##### WCL type rubber sealing ring

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*	Conforms	EN 681-2

#### Pipeflushing (cleaning) allowance parameters

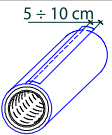
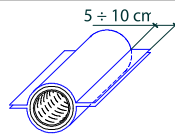
Max pressure, bar	120
Minimum flow rate, l/min	80

\*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

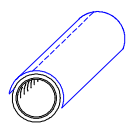
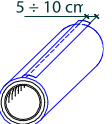
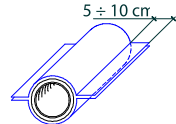
### FILTER MATERIAL APPLICATION OPTIONS

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.

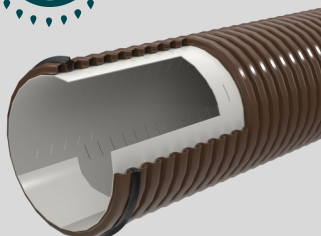
#### Class TP 360° totally perforated pipe recommended filter material overlaying options

Option A	Option B
Pipe is covered fully along it's circumference with a single sheet of filter material overlay	Pipe is covered along it's circumference with two identical sheets of filter material overlays
	

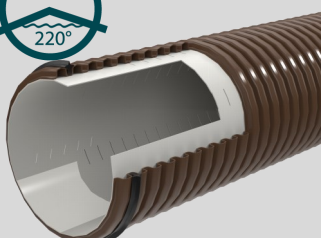
#### Class LP 180°±10° or 220°±10° locally perforated pipes and class MP ≤120° multipurpose pipe recommended filter material overlaying options

Option A	Option B	Option C
Only perforated area is overlaid with a single filter sheet	Pipe is fully covered along it's circumference with a single filter sheet	Pipe is covered along it's circumference with two identical sheets of filter material overlays
		

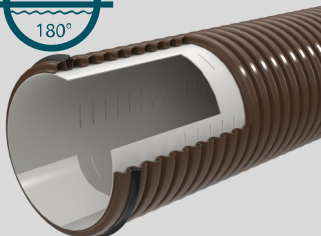
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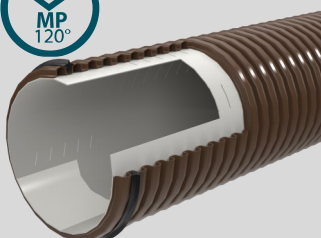
Totally perforated pipe TP(360°)



Locally perforated pipe LP(220°±10°)



Locally perforated pipe LP(180°±10°)



Multipurpose pipe MP(≤120°)

Ring stiffness: **SN16**

**Open product**

## EVODRAIN HARD RF DN/OD 200 - 400 mm

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

DIN 4262-1  
EN 13476-3  
Material: polypropylene: (PP)  
Ring stiffness: **SN16**

### PRODUCT DIMENSIONS

#### Pipe dimensions

Nominal size	DN/OD 200	DN/OD 250	DN/OD 315	DN/OD 400
Outside/Inside OD/ID, mm	200/174,6	250/215,9	315/274,1	400/349,8
Pipe bar length, m	6	6	6	6

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

Perforation opening area (PO), cm <sup>2</sup> /m	50 ≤ PO ≤ 100			
Perforation opening quantity on transverse plane normal to profile foot, pcs	3	3	3	6

#### Perforation opening parameters for perforation class LP (220°±10°)

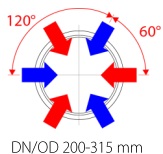
Perforation opening area (PO), cm <sup>2</sup> /m	50 ≤ PO ≤ 100			
Perforation opening quantity on transverse plane normal to profile foot, pcs	2	2	2	2

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

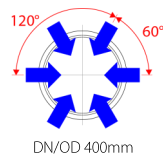
Perforation opening area (PO), cm <sup>2</sup> /m	50 ≤ PO ≤ 100			
Perforation opening quantity on transverse plane normal to profile foot, pcs	2:1	2:1	2:1	4

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

Perforation opening area (PO), cm <sup>2</sup> /m	50 ≤ PO ≤ 100			
Perforation opening ratio on transverse plane normal to profile foot, pcs	1	1	1	1

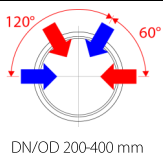


DN/OD 200-315 mm



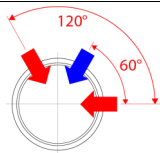
DN/OD 400 mm

**TP (360°)**, totally perforated pipe. Water inlets are evenly distributed along pipes circumference.

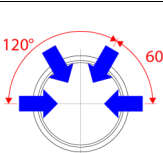


DN/OD 200-400 mm

**LP (220°±10°)**, locally perforated pipe. Water inlets are located in the upper part of the pipe symmetric to pipes vertical axis in 220°±10° area, but flow line (used for collection and transportation of liquids) is not perforated and stands opposed to inlet area.

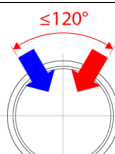


DN/OD 200-315 mm



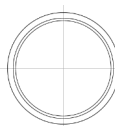
DN/OD 400 mm

**LP (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.



DN/OD 200-400 mm

**MP (≤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.



DN/OD 200-400 mm

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

# 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

## Pipe geometric parameters according to:

EN 3126	Plastic piping systems - Plastic components - Determination of dimensions
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## Pipe mechanical parameters according to:

EN ISO 9969	Thermoplastics pipes - Determination of ring stiffness
EN 9967	Thermoplastics pipes - Determination of creep ratio
EN 11173	Plastics piping and ducting systems - Thermoplastics pipes - Determination of resistance to external blows by staircase method

## APPLICATION BY SUBSTANCE TYPE

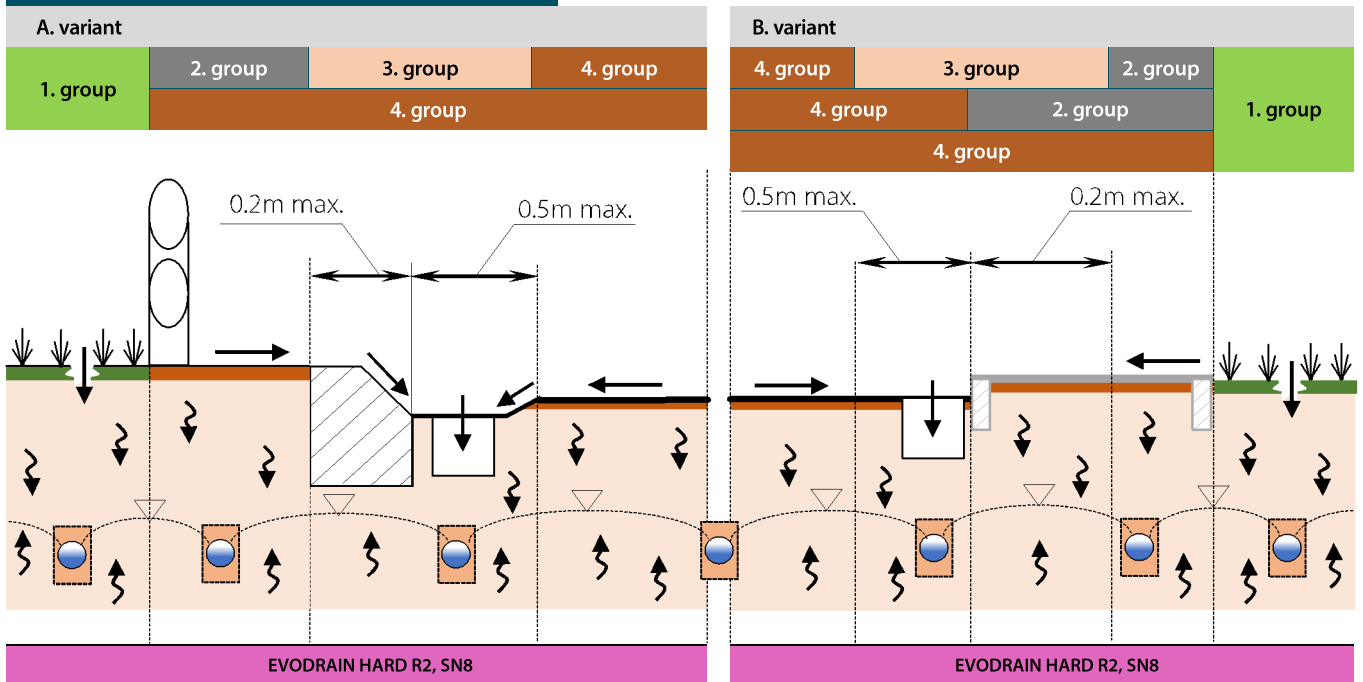
Substance type	Without filter material overlay	With A type filter material overlay*	With coco fiber filter material overlay*
<b>Binding- poorly filtering ground</b>			
Clay	No	No	Yes
Dense sandstone	No	No	Yes
Sandstone	No	Yes	Yes
<b>Non-binding- poorly filtering ground</b>			
Loam	No	Yes	No
<b>Binding-well 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

\*- 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

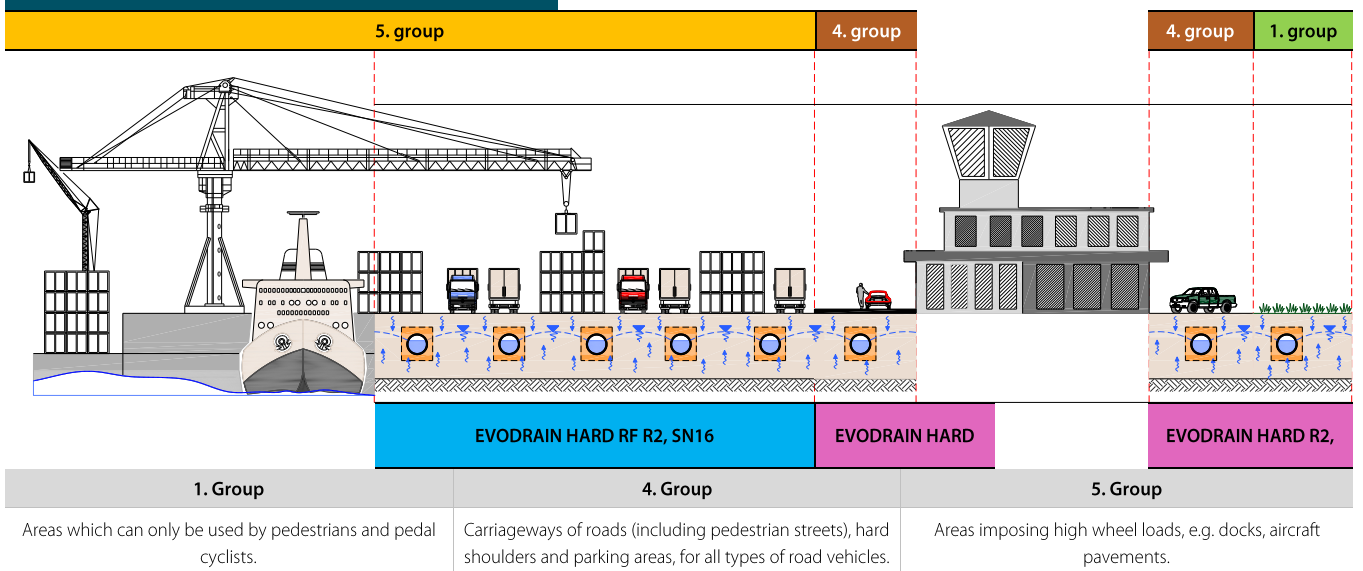
Typical highway cross-section, split into groups according to nominal strength (SN) class application of EVODRAIN HARD pipes.

B. variant

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

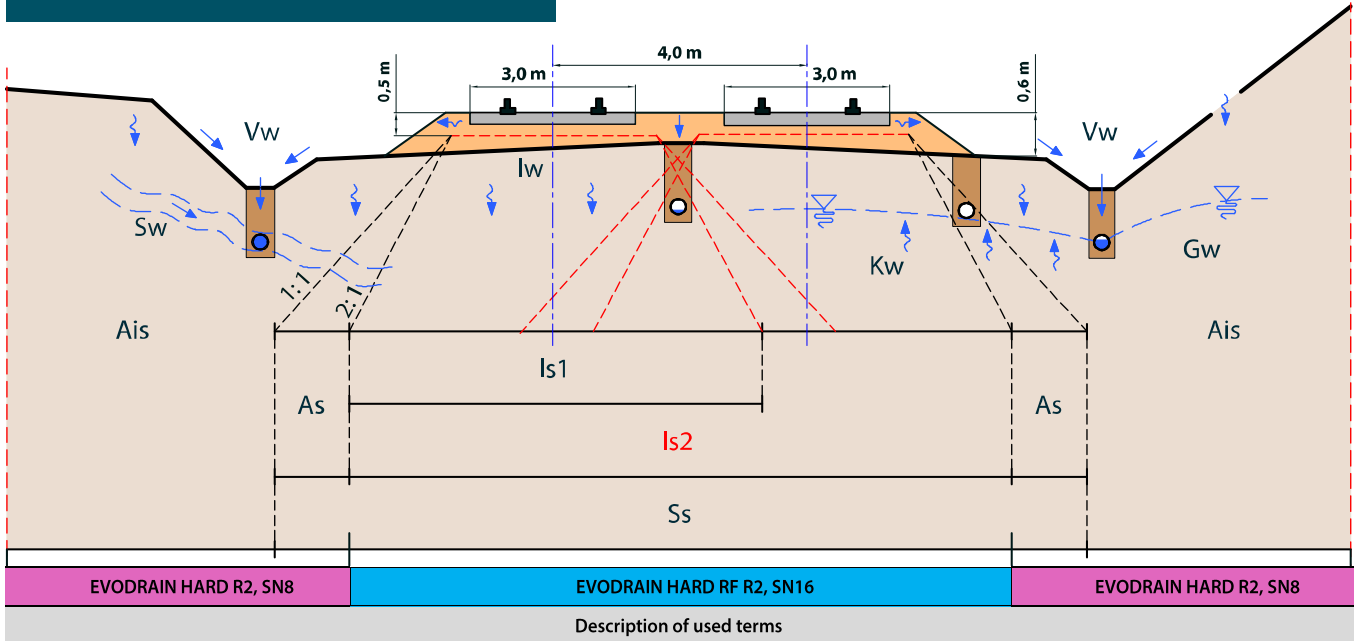
1. Group	2. Group	3. Group	4. Group
Areas which can only be used by pedestrians and pedal cyclists.	Pedestrian areas and comparable areas, car parks or car parking decks.	Areas of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0.5m into the carriageway and maximum 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



# 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*	Applicable to all ground groups*	Applicable to G1, G2 and G3 ground groups*

\*Ground groups according to ATV-A 127

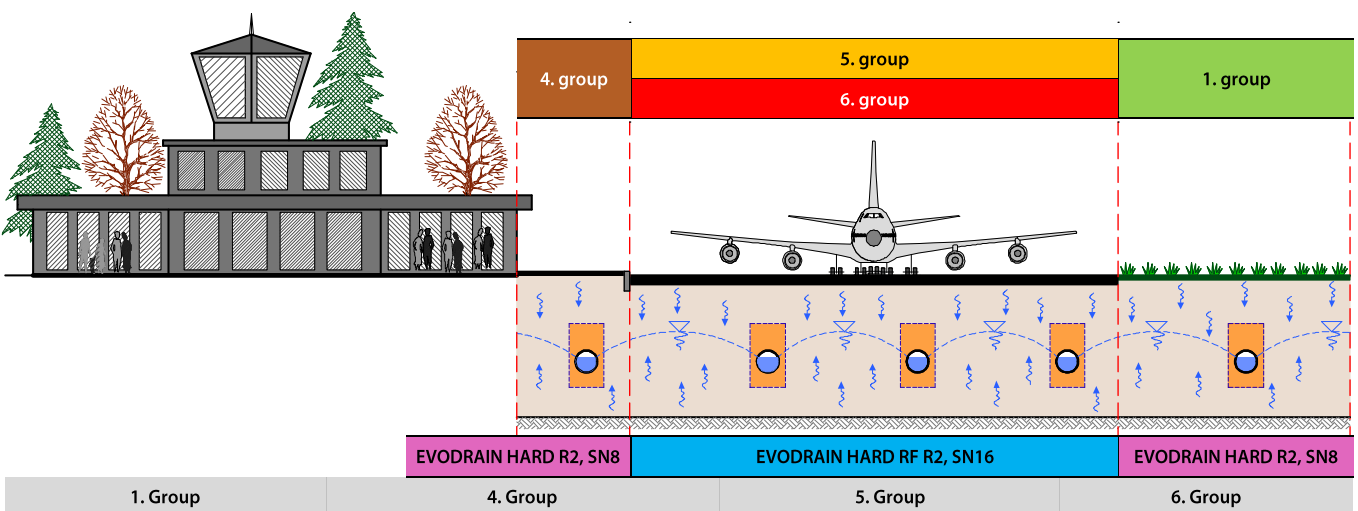
G1 - non-binding sand and gravel

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
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.