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TECHNICAL DATA SHEET

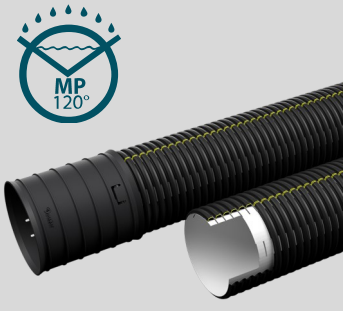
EVODRAIN HARD R2 HDPE SN8

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

Totally perforated pipe TP(360°)

Locally perforated pipe LP(180°±10°)



Multipurpose pipe MP(≤120°)

Ring stiffness:

SN8

PRODUCT DESCRIPTION

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^2/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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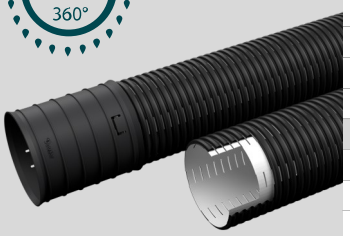
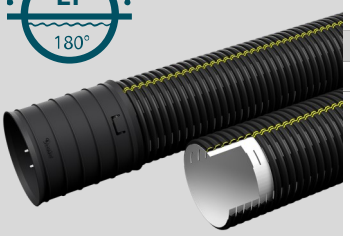
TP 360°



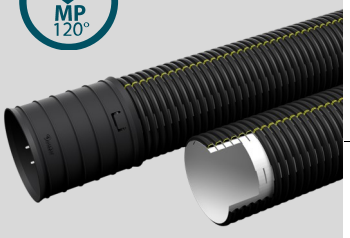
Totally perforated pipe TP(360°)

LP 180°



Locally perforated pipe LP(180°±10°)

MP 120°



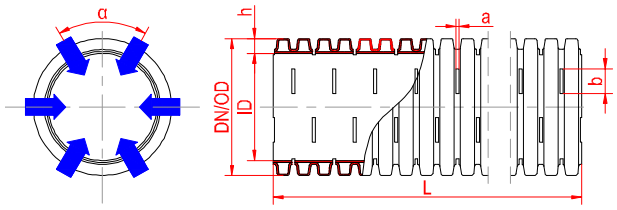
Multipurpose pipe MP(≤120°)

Ring stiffness:

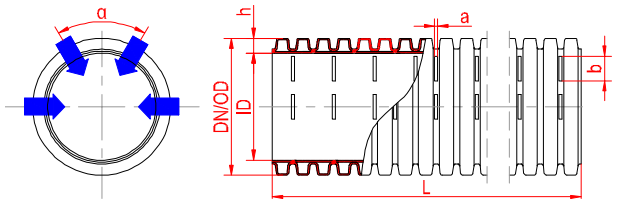
SN8

PRODUCT DIMENSIONS

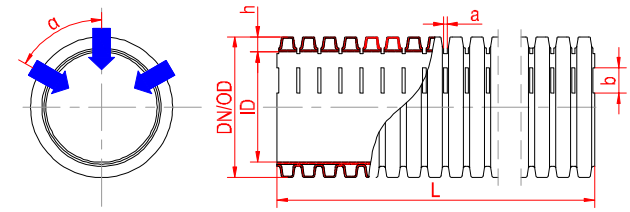
Pipe dimensions						
Nominal size	63	75	90	110	125	160
Inside ID, mm	51,70	62,70	76,20	94,10	106,70	137,60
Profile height (h), mm	5,65	6,15	6,90	7,95	9,15	11,20
Pipe bar length (L), m	6	6	6	6	6	6
Perforation opening parameters for perforation classes- TP, MP un LP						
Perforation angle (α)	60°	60°	60°	60°	60°	60°
Perforation opening width (a), mm	1,20	1,20	1,40	1,20	1,20	1,40
Perforation opening area, cm²/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



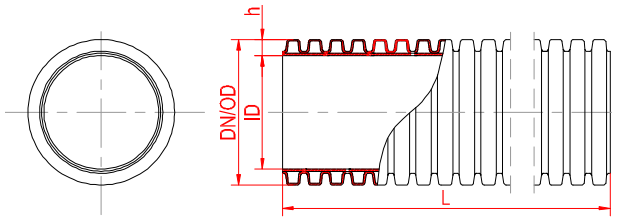
TP class 360° totally perforated pipe. Water inlets are evenly distributed along pipes circumference.



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.

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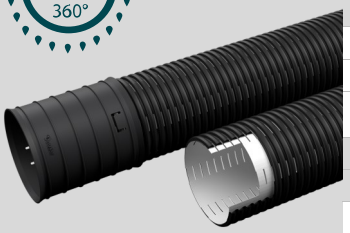
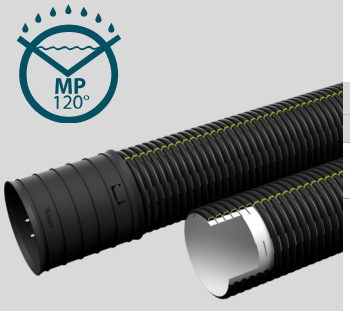


Totally perforated pipe TP(360°)

Locally perforated pipe LP(180°±10°)



Multipurpose pipe MP(≤120°)

Ring stiffness:

SN8

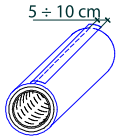
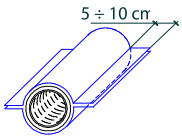
PRODUCT PARAMETERS

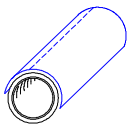
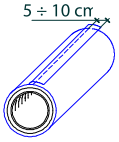
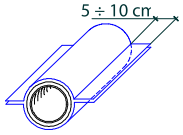
Pipe physical and mechanical properties		
Parameter	**Value**	**Test method**
Material	HDPE	DIN 4262-1
Ring stiffness, kN/m²	8	EN 9969
Resistance to external blows, by applying staircase method: d90, 0.8 ±0.005kg, Hmin 0.8m, t=(±0)°C	H_{50}>1,2m	EN ISO 11173
Sealing ring physical and mechanical properties 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
Pipe flushing (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 bellow.

Class TP 360° totally perforated pipe recommended filter material overlaying options	
A variant	**B variant**
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° locally perforated pipes and class MP ≤120° multipurpose pipe recommended filter material overlaying options		
A variant	**B variant**	**C variant**
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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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). Specifica-
Pipe geometric parameters according to:	
EN 3126	Plastic piping systems - Plastic components - Determination of dimensions
Pipe mechanical parameters according to:	
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*	With coco fiber filter material overlay*
Binding– poorly filtering ground			
Clay	No	No	Yes
Dense sandstone	No	No	Yes
Sandstone	No	Yes	Yes
Non-binding– poorly filtering ground			
Loam	No	Yes	No
Binding–well filtering ground			
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.

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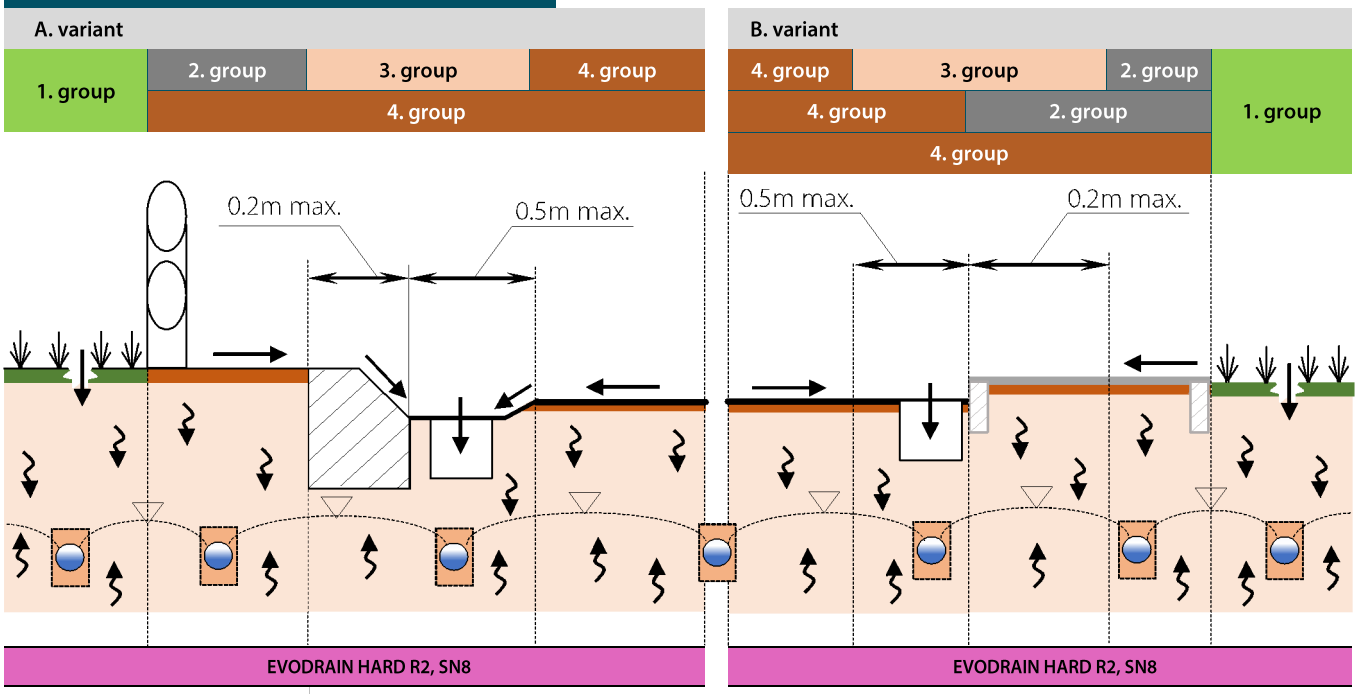
EVODRAIN HARD R2 SN8 and SN16 pipes application for drainage piping systems

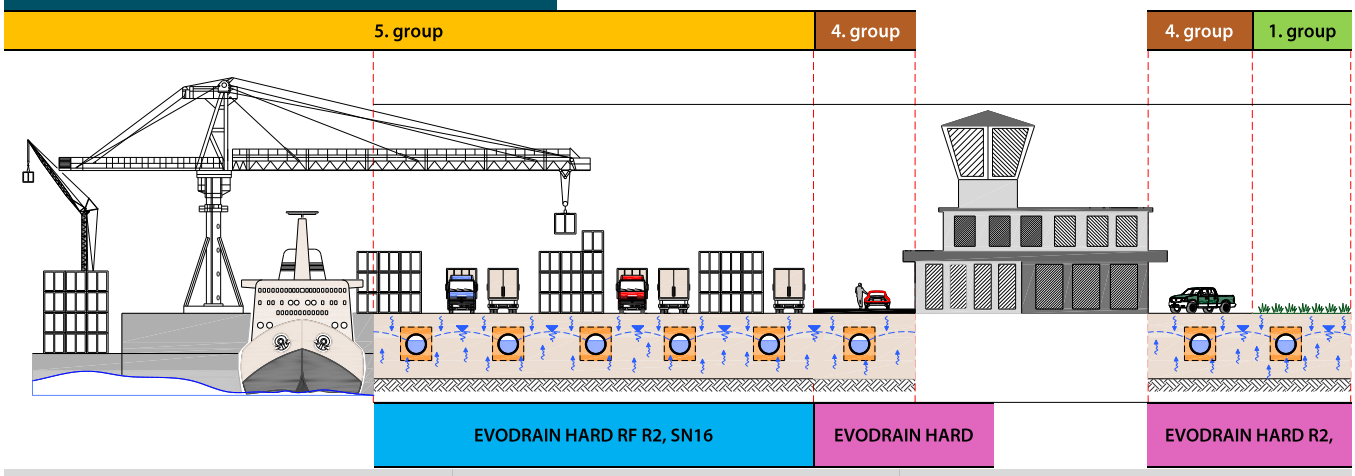
ROAD CONSTRUCTION APPLICATION



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 nominal strength (SN) class application of EVODRAIN HARD pipes.

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	4. Group	5. 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.

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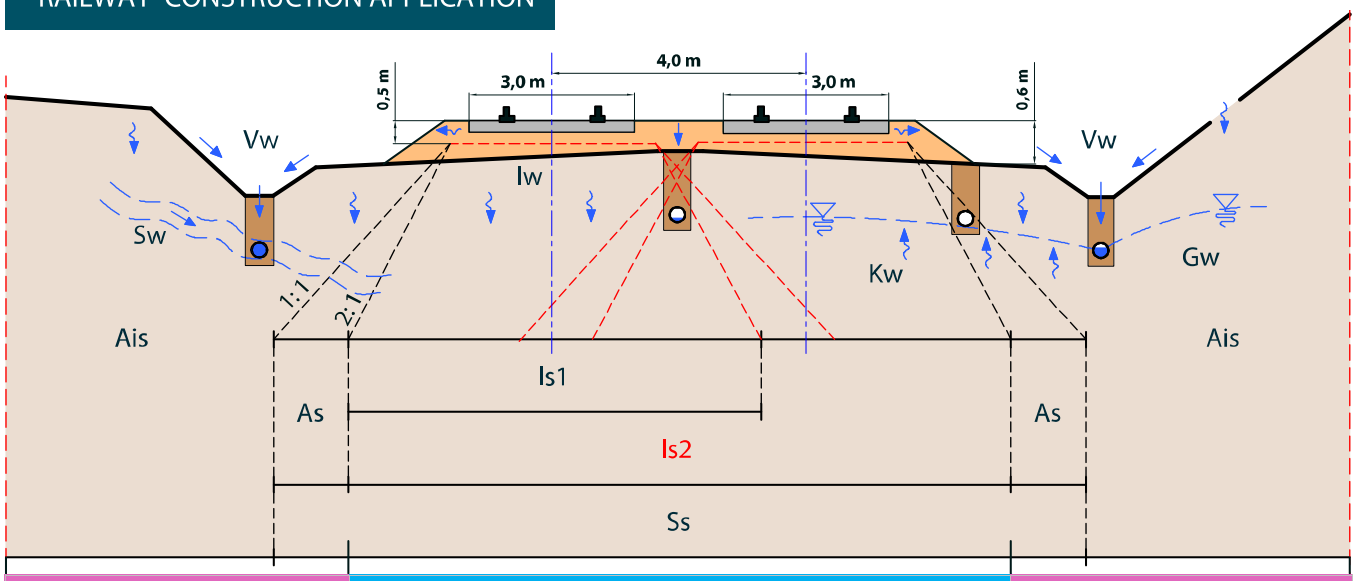
RAILWAY CONSTRUCTION APPLICATION



EVODRAIN HARD R2, SN8	EVODRAIN HARD RF R2, SN16	EVODRAIN HARD R2, SN8

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

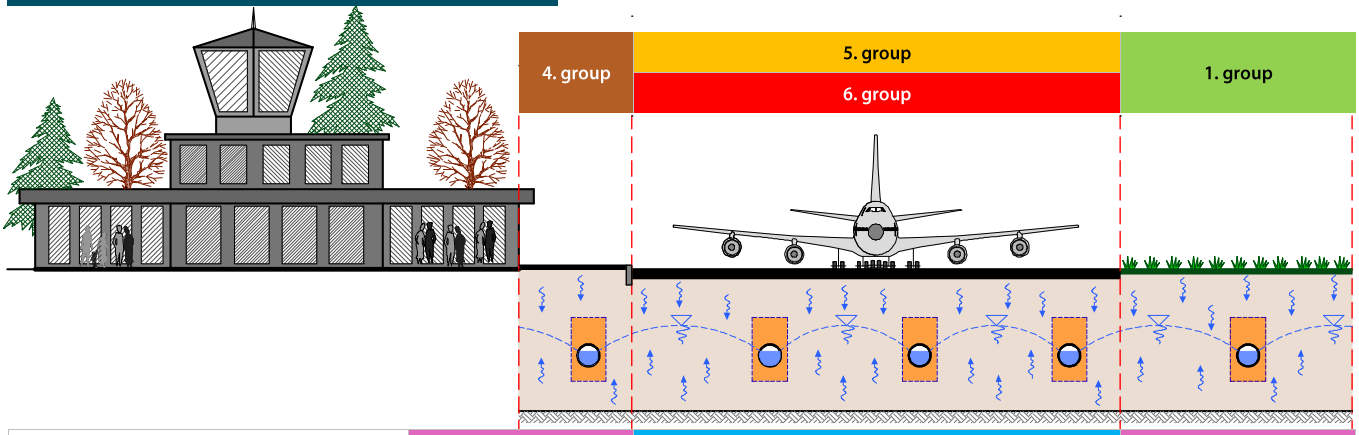
Drainage pipe nominal ring stiffness class (SN) selection by usage area and ground group

Ais	As	Is 1 and Is 2
EVODRAIN HARD R2 type SN8	EVODRAIN HARD R2 type SN8	EVODRAIN HARD RF R2 type SN16
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



	EVODRAIN HARD R2, SN8	EVODRAIN HARD RF R2, SN16	EVODRAIN HARD R2, SN8

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.