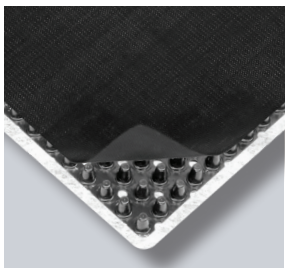
TECHNICAL DATA SHEET

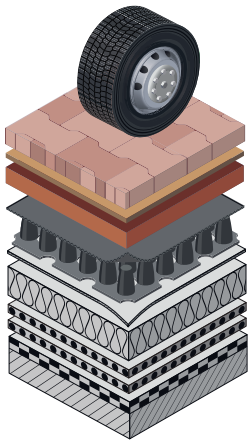
ND 600hdsv Drainage System



ND 600hdsv Drainage System

High-performance CE-marked drainage system with an innovative dimple design made out of recycled high impact polystyrene. The core of the ND Drainage System is a perforated, vapour-permeable dimpled sheet with a extremely high compressive strength (1,200 kPa), an excellent creep resistance guaranteeing a consistent long term drainage capacity and a construction height of approx. 13 mm.

A special mono-filament woven geotextile is bonded to each dimple as a filter layer. A vapour-permeable geotextile is glued to the back of the dimpled sheet as a separation and protection layer of the XPS insulation panels. The geotextiles are glued and not thermally bonded to the dimpled core to avoid damage to the mechanical and hydraulic properties of the geotextile and the drainage system. It also prevents the geotextile to be pushed in between the dimples obstructing the drainage capacity.



Composition Nophadrain Parking Deck System - Hgv - inverted roof

Application

The ND 600hdsv Drainage System is a component of the Nophadrain Parking Deck System – heavy goods vehicles that acts as a filter, drainage and protection layer on an inverted roof construction.

Properties

- Material dimpled sheet: recycled high impact polystyrene (HIPS)
- Material woven geotextile filter: polypropylene (PP)
- Material vapour-permeable geotextile: polypropylene (PP) and polyethylene (PE)
- Construction height: approx. 13 mm
- Compressive strength: approx. 1,200 kPa (deformation at 1 mPa = 9 %)
- Perforations/m²: approx. 1,540 / ø 6.3 mm
- Weight: approx. 1,476 g/m²
- Drainage capacity at i = 1 at 20 kPa: approx. 5.36 l/(s.m)
- Drainage capacity at fall ratio 2 % at 20 kPa: approx. 0.74 l/(s.m)
- Test: performance test at the Technical University Munich (D) - assessment of the performance and behaviour of a pavement structure under simulated traffic conditions.

Product	Dimensions (L x W)	Packaging
ND 600hdsv Drainage System	approx. 32 x 1.25 m	approx. 40 m², roll

NOPHADRAIN®
SMART GREEN ROOF SYSTEMS

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Data sheet	DoP600hdsv-005	ND 600hdsv	
Material Properties	**Standard**	**Unit**	**Performance**
Core	-	-	HIPS
Filter geotextile	-	-	PP-woven
Separation film	-	-	-
Separation geotextile	-	-	PP/PE
Mechanical Properties (mean values)			
Compressive strength	hEN ISO 25619-2	kPa	1,200
Compressive strength at 10 % deformation	hEN ISO 25619-2	kPa	1,000
Deformation at 1 mPa	hEN ISO 25619-2	%	9
Tensile strength [1] (MD/CMD) [2]	hEN ISO 10319	kN/m	44/52
CBR puncture resistance [1]	hEN ISO 12236	kN	4
Dynamic performation (cone drop)	hEN ISO 13433	mm	9
Resistance to weathering [3]	hEN ISO 12224	%	60/80
Physical Properties			
Construction height at 2 kPa	-	mm	13
Dimple height at 2 kPa	-	mm	12
Perforations per m²	-	-	1,540
Diameter perforations	-	mm	6.3
Water reservoir	-	l/m²	-
Material dimensions (L x W)	-	m	32 x 1.25
Mass per unit area	-	g	1,476
Surface area per roll	-	m²	40
Roll diameter	-	cm	75
Roll weight	-	kg	59
Hydraulic Properties (mean values)			
Opening size O_{90} [1]	hEN ISO 12956	µm	187
Water permeability H_{50} [1]	hEN ISO 11058	mm/s	44
Drainage Capacity (mean values)			
Vertical drainage / Wall - gradient i=1			
Surface load **Build-in-depth**			
20 kPa 2.0 m	hEN ISO 12958 [4]	l/(s.m)	5.36
30 kPa 3.0 m	hEN ISO 12958 [4]	l/(s.m)	5.26
50 kPa 5.0 m	hEN ISO 12958 [4]	l/(s.m)	4.97
100 kPa 10.0 m	hEN ISO 12958 [4]	l/(s.m)	4.47
200 kPa Exceptional	hEN ISO 12958 [4]	l/(s.m)	3.86
Horizontal drainage / Roof			
Fall = 0 % - Exceptional case			
≤ 2 kPa - extensive green roof	FH Karlsruhe (D) [5]	l/(s.m)	-
≤ 10 kPa - intensive green roof	FH Karlsruhe (D) [5]	l/(s.m)	-
Fall = 1 % - Exceptional case			
≤ 10 kPa - extensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.56
≤ 20 kPa - intensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.51
100 kPa - podium roof deck	hEN ISO 12958 [4]	l/(s.m)	0.39
200 kPa - parking roof deck	hEN ISO 12958 [4]	l/(s.m)	0.32
Fall = 1.5 %			
≤ 10 kPa - extensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.71
≤ 20 kPa - intensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.64
100 kPa - podium roof deck	hEN ISO 12958 [4]	l/(s.m)	0.49
200 kPa - parking roof deck	hEN ISO 12958 [4]	l/(s.m)	0.42
Fall = 2 %			
≤ 10 kPa - extensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.79
≤ 20 kPa - intensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.74
100 kPa - podium roof deck	hEN ISO 12958 [4]	l/(s.m)	0.57
200 kPa - parking roof deck	hEN ISO 12958 [4]	l/(s.m)	0.47
Fall = 2.5 %			
≤ 10 kPa - extensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.86
≤ 20 kPa - intensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.84
100 kPa - podium roof deck	hEN ISO 12958 [4]	l/(s.m)	0.62
200 kPa - parking roof deck	hEN ISO 12958 [4]	l/(s.m)	0.51
Fall = 3 %			
≤ 10 kPa - extensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.95
≤ 20 kPa - intensive green roof	hEN ISO 12958 [4]	l/(s.m)	0.94
100 kPa - podium roof deck	hEN ISO 12958 [4]	l/(s.m)	0.74
200 kPa - parking roof deck	hEN ISO 12958 [4]	l/(s.m)	0.57

[1] Performance expressed of the filter/geotextile only
[2] MD = Machine direction / CMD = Cross Machine Direction
[3] Material has to be completely covered within 14 days after installation
[4] hEN ISO 12958 tested hard/soft
[5] FH Karlsruhe (D) tested hard/hard

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