GuangDong HLS Engineering Materials Co., Ltd



SOFT FOUNDATION
Prefabricated Vertical Drain

Materials Provider for Soil Improvement



Guangdong HLS Engineering Materials Co., Ltd. is a professional manufacturer of engineering materials for soft soil foundation treatment industry, focus on soft soil treatment product production manufacture. Wick Drain and the horizontal drainage drain, we have strong production capacity, and daily production of wick drain reach 0.5 million meters. , horizontal drainage drain reach 0.1 million meters, vacuum pre-loadig horizontal drainage pipe 0.1 million meters.

The production of HLS wick drain is strictly in accordance with the Ministry of Communications industry standard *JT/T 521 -2004 highway engineering geosynthetics, JTS206-1-2009 water transportation engineering' and 'American standard ASTM test method[1] . The product quality is stable and has won many honor certificates. HLS NS vacuum pre-loading system obtained the authorization of the utility model patent of the * State Intellectual Property Office[1] . The company implemented a modern management system and successfully passed the ISO9001: 2000 quality management system certification.

High quality with economic cost and stable production capacity are the way to win in the market competition. HLS soft foundation engineering materials have been widely used in major domestic key projects and applied in the Pearl River Delta, Hong Kong, Macau and Southeast Asia.

HLS basic and sincere attitude, humbly soliciting opinions and suggestions from all walks of life, in line with the development of the industry market, constantly optimized applicable wick drain products, such as: High-Performance Wick Drain, One-piece Wick Drain, Measurable Wick Drain and High Discharge Capacity wick drain, Strong Drainage Wick Drain to meet customers' needs in different construction conditions.

◎ASTM Vertical Wick Drain

♦ ASTM Vertical Wick Drain is for soft ground improvement made from PP or PE mixture filter board and non-woven fabrics (High Performance Filter Jacket). It can be produced in accordance with the client project requirement.

ASTM Standard Vertical Wick Drain is popular applied in many countries. Especially South East Asian, South & North America market，and the popular specification will be as below.

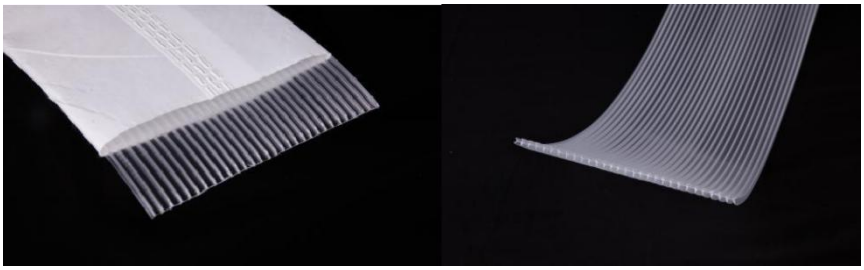
♦ Performance

Trapezoidal Tear Strength (Index>100N)

High Discharge Capacity

High Grab Tear Strength


Raw Material




PVD Core Strip

SPECIFICATION

Item	Property	Unit	Test Method	Values
Composition Drain	Width	mm		≥ 100
	Thickness	mm		≥4
	Tensile strength of Drain	kN	ASTM D 4595	>1.5kN@10%strain
	Elongation at break	Kg/10cm		≥2%
	Elongation at 1.0 kN	Kg/10cm		≤10%
	Discharge Capacity i=1.0 @200kpa	m3/year	ASTM D 4716	≥2800
	Discharge Capacity i=0.5 @150kpa	m3/year	ASTM D 4716	≥2000
Filter Jacket	Wide width tensile strength	kN/m	ASTM D 4595	>2.5
	Trapezoidal tear strength	N	ASTM D 4533	>120
	Grab strength	N	ASTM D 4632	> 500
	Puncture resistance	N	ASTM D 4833	> 190
	Burst strength	kN/m2	ASTM D 3786	> 1149
	Permeability at 100m head	m/s	ASTM D 4491	> 28 $\times 10^{-2}$
	Permittivity	s	ASTM D 4491	> 0.8
	Apparent opening size O95	um	ASTM D 4751	<75

PET Fabric Vertical Wick Drain

♦PET Fabric Vertical Wick Drain is for soft ground improvement made from PP or PP, PE mixture filter board and non-woven fabrics (Normal Filter Jacket). It can be produced in accordance with the client project requirement.

PET Fabric Vertical Wick Drain is popular applied in Asian and specified project.

♦ Performance

Trapezoidal Tear Strength (Index<100N)

Normal Discharge Capacity

Normal Grab Tear Strength



SPECIFICATION

Item	Property		Unit	Type				Remark
				SPB-A	SPB-B	SPB-C	SPB-D	
Composite Drain	Setion Size	Width	mm	100±2	100±2	100±2	100±2	
		Thick	mm	≥3.5	≥4.0	≥4.5	≥5.5	
	Vertical Flow Capacity		cm^3/s	≥15	≥25	≥40	≥60	Side pressure 350kPa
	Compound Tensile Strength		kN/10cm	＞1.0	＞1.3	＞1.5	＞1.5	Tension is kN/10cm
	Elongation Percentage		%	＜10	＜10	＜10	＜10	Tension is kN/10cm
Filter Jacket	Penetration Coefficient		cm/s	≥$5x10^{-4}$	≥$5x10^{-4}$	≥$5x10^{-4}$	≥$5x10^{-4}$	Sinking into water for 24h
	Equivalent Aperture		μ/m	＜75	＜75	＜75	＜75	Aperture Φ98
	Tensile Strength	Vertical dry Condition	N/cm	≥15	≥25	≥30	≥35	10% of extension rate
		Horizon Wet Condition	N/cm	≥10	≥20	≥25	≥30	15% of extension rate
Core	Structure			Core section is like a harmonica shape				
	Raw Material			Polypropylene、Polyethylene				
	Antibacterial Property			No Breeding				
Packing	Length per roll		m	200±2				
	Qty per 40′ container		m	130000m, 120000m, 110000m, 100000m				
	Outer Diameter		m	1.20				
	Inner diameter		m	0.16				

ENISO Vertical Wick Drain



♦ ENISO Standard Vertical Wick Drain mainly applied in Middle East, European Country,Western Asia. Which is for the soft ground improvement made from a mechanically strong PP or PP, PE mixture filter board and non-woven fabric (High Performance Filter Jacket).

It can be produced in accordance with the client project requirement.

♦ Performance

High Water Permeability

High Discharge Capacity

High Tensile Strength

SPECIFICATION

	Item	Unit	Standard	Value
Filter	Tensile strength	kN/m	BS EN ISO 10319:2015	≥2.6
	Elongation at 1.0kN/m	%	BS EN ISO 10319:2015	< 1.5
	Water Permeability V_{20}	mm/s	BS EN ISO 11058:2019	≥40
	Permittivity	s^{-1}	/	/
	Apparent Opening SizeO_{90}	um	GB/T 14799-2005	≤ 79
Core	Core Weight	g	/	>63
	Core Width	mm	/	> 98
	Core Height	mm	/	> 2.4
Composite Drain	Weight	g	/	>82
	Tensile Strength	kN	BS EN ISO 10319-2015	>2.6
	Discharge Capacity	m^3/year	BS EN ISO 18325-2015	>3000

High Trapezoidal Tear Strength Vertical Wick Drain

♦ We are the First Enterprise can reach the Vertical Trapezoidal Tear Strength > 300N of the index of the Non-woven filter (Designed Filter Jacket) in China.

And this kind of product is designed for Mexico Airport Runway Project and passed the TUV independent laboratory test.

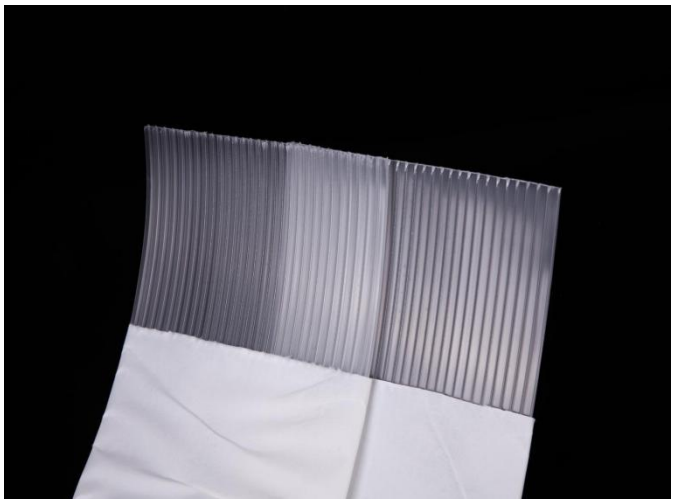
With the Trapezoidal Tear Strength upraise, which dose not affect the Water Permeability.

♦ Performance

Trapezoidal Tear Strength (Index>300N)

High Water Permeability

High Grab Tear Strength.



SPECIFICATION

Property	Item	Unit	Test Method	Value
Overall Drain （Core+Filter）	Width	mm	----------	>105
	Thickness	mm	ASTMD 5199	≥3.0
	Tensile Strength	kN/full width	ASTMD 4595	≥2.0
Filter Jacket	Trapezoidal Tear Strength	N	ASTMD 4533	≥300
	Grab Strength	N	ASTMD 4632	>600
	Apparent Opening Size(AOS)	um	ASTMD 4751	≤210(#70 sieve)
	Permeability	m/s	ASTM D 4491	$> 1.0 \times 10^{-4}$
	Pemittivity	S^{-1}	ASTM D 4491	> 0.7

◎Bio-Degradable Vertical Wick Drain

♦ With the environment developing, worldwide governments are strive for ecology friendly development. In respond to the call, HLS design the Bio-Degradable Wick Drain for meeting the worldwide demand.



Mainly Composition of Bio-Degradable Vertical Wick Drain

a. Poly Butylene Succinate

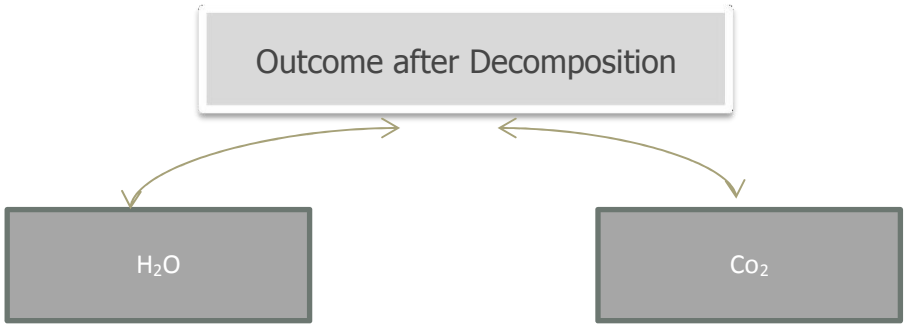
b. Poly Lactic Acid

♦ Significance between Non-degradable wick drain & Bio-Degradable Wick Drain

Non-degradable wick drain：Slow biodegradable, residual material will pollute the soil.

Bio-Degradable Wick Drain：Perfectly degraded 100% after ground improvement.

Outcome of the Bio-Degradable Wick Drain after Ground Improvement：



SPECIFICATION

Property		Unit	Test Method	Result
Overall Drain （Core+Filter）	Weight	g/m	ISO 9864	≥70
	Thickness	mm	ASTMD 5199	≥3.0
	Width	mm	ASTMD 3774	100±5
	Tensile Strength	kN/full width	ASTMD 4595	≥2.0
	Discharge Capacity （300kPa， i=0.5）	cm^3/s	ASTMD 4716	≥60
Filter	Coefficient of permeability	m/s	ASTMD 4491	$\geq 1\times10^{-4}$
	Tensile Strength	N/m	ASTMD 4595	≥2000
	Apparent Opening Size O_{95}	%	ASTMD 4751	≤75

◎Vertical Wick Drain & Data Logger Device



Traditional Vertical Wick Drain Qty Measuring
Traditional Vertical Wick Drain liner meter Measuring used to apply the Copper Wire inside the Vertical Wick Drain. Refer to the Picture as below.

Vertical Wick Drain + Data Logger Device
In case of the mistaken and complicated measuring on the Vertical Wick Drain quantity. We design a data logger for meeting the owner demand and replace the traditional Wire Copper Vertical Wick Drain.

Item	Data Logger Application Presentation	Wire Copper Application
Description	Install and connect the Excavator 1.Quantity record & depth 2.Location/Direction 3.Successful Piling record4. Failed piling record 4.Downward insertion force pressure 5.Oil pressure of Excavator6. Printed the record at site	1.To left the wire copper inside the Vertical Wick Drain 2. Use the Wire Copper to measure the depth by electrical sounding device.
Difference	Easy to record the whole data throughout the project.	Increase the work，time，cost. And it is easy to make mistake during record.



HLS
ENGINEERING

Tel : 0086-20-61918015

Fax : 0086-20-61918016

Email: inquiry@hls-eng.com

Website: www.hlsengineering.com

Add : No. 506, Building 1, Panshan Chaoneng Pioneer Park, No. 900,

North Panyu Avenue, Panyu District, Guangzhou, Guangdong, China.

GuangDong HLS Engineering Materials Co., Ltd