PET (Polyester) Filament Spunbond Needle Punched Nonwoven Geotextile

PET filament spunbond needle punched nonwoven geotextile (long filament geotextile) is made by forming a network of polyester filaments and solidifying them, with fibers arranged in a three dimensional structure. In addition to having good mechanical properties, it also has good vertical and horizontal drainage performance, elongation performance, permeability and filtration performance, as well as high acid and alkali resistance, aging resistance and other good chemical properties.

The specifications of polyester filament nonwoven geotextile can be selected from 80-800g/m^2, abbreviated as “PET filament nonwoven geotextile”. In addition to having good mechanical properties, PET filament nonwoven geotextile also has good longitudinal and transverse drainage performance, good elongation performance, and high chemical stability properties such as biological and aging resistance. It is mainly used for road reinforcement and crack repair to protect soil from loss; Used for filter layer for tailings dam body; Used as an isolation layer between road, airport, railway masonry and foundation; Used for drainage of dam body and concrete lake surface; Used for drainage and other purposes in tunnel lining engineering.

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Polyester filament spunbond needle punched nonwoven geotextile is prescribed by the state, a kind of new construction material that used for civil engineering. Its relative product is short fiber geotextile fabric, but the tensile strength of the filament is higher than that of the short fiber.

Surface softness, multi gap, good friction coefficient and can increase the adhesion ability of soil particles and other particles. It can also prevent the loss of fine particles. It is a kind of widely used synthetic material.

PET Filament Spunbond Needle Punched Nonwoven Geotextile Features:

- Permeability and planar drainage: PET filament nonwoven geotextile is thick and formed, with good planar drainage and vertical permeability, and can still maintain this performance after many years.
- Creep resistance: PET filament nonwoven geotextile has better creep resistance than other geotextiles, therefore it has good long term performance. It can withstand the erosion of common chemical substances in soil and the corrosion of gasoline, diesel, etc.
- Ductility: PET filament nonwoven geotextile has good elongation under certain stress, allowing it to adapt to uneven and irregular base surfaces.
- UV resistance: PET filament nonwoven geotextile has extremely high UV resistance and high temperature resistance. The filament geotextile can withstand high temperatures up to 230 ℃ and still maintain its structural integrity and original physical properties at high temperatures.

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Geotextile Products: POLYESTER FILAMENT SPUNBOND NEEDLE PUNCHED NONWOVEN GEOTEXTILES

APPLICATION

Polyester filament non-woven geotextile has good mechanical function, good water permeability, corrosion resistance, aging resistance, isolation, reverse filtration, drainage, protection, stability, reinforcement and other functions, can adapt to uneven base course, can resist external force of construction, creep is small, and can still maintain its original function under long-term load, mainly used for seepage prevention, reinforcement, protective embankment, water retaining treatment, landfill reverse filtration, drainage, asphalt pavement reconstruction and other projects.

SPECIFICATIONS OF PET FILAMENT SPUNBOND NEEDLE PUNCHED NONWOVEN GEOTEXTILE

TECHNICAL STANDARD FOR PET FILAMENT SPUNBOND NEEDLE PUNCHED NONWOVEN GEOTEXTILE GB T17639-2008

Item	Index								
Nominal breaking strength	4.5	7.5	10	15	20	25	30	40	50
Longitudinal and transverse rupture strength, kN/m ≥	4.5	7.5	10.0	15.0	20.0	25.0	30.0	40.0	50.0
Standard strength corresponds to elongation,%	40~80								
CBR burst strength /kN≥	0.8	1.6	1.9	2.9	3.9	5.3	6.4	7.9	8.5
Longitudinal to tear strength /kN ≥	0.14	0.21	0.28	0.42	0.56	0.7	0.82	1.1	1.25
Equivalent aperture O_{90} /mm	0.05~0.20								
Thickness /mm ≥	0.8	1.2	1.6	2.2	2.8	3.4	4.2	5.5	6.8
Width deviation, %	-0.5								
Deviation of mass per unit area, %	-5								

TECHNICAL STANDARD FOR PET FILAMENT SPUNBOND NEEDLE PUNCHED NONWOVEN GEOTEXTILE ASTM STANDARD

Index Properties	Test Method	Unit	Values								
			150	200	250	300	350	400	450	500	600
Color			White or Black								
Ultimate Tensile Strength, MD	ASTM D4595	kN/m	11	14	17	19	24	27	30	37	41
Ultimate Tensile Strength, TD	ASTM D4595	kN/m	10	12	15	17	21	25	28	34	38
Tensile Elongation	ASTM D4595	%	45	50	50	50	60	60	60	60	60
Grab Tensile Strength, MD	ASTM D4632	N	600	850	1000	1250	1450	1700	1900	2100	2500
Grab Tensile Strength, TD	ASTM D4632	N	550	700	900	1100	1250	1450	1600	1800	2150
Grab Elongation	ASTM D4632	%	45	50	50	50	60	60	60	60	60
Trapezoid Tear Strength, MD	ASTM D4533	N	300	350	430	490	540	630	710	770	920
Trapezoid Tear Strength, TD	ASTM D4533	N	270	330	400	450	510	610	690	750	900
CBR Puncture Strength	ASTM D6241	N	1800	2300	2700	3200	3600	4400	4800	5800	6900
Apparent Opening Size O_{90}	ASTM D4751	mm	0.11	0.11	0.10	0.09	0.09	0.08	0.08	0.08	0.08
Water Flow Q_{100}	ASTM D4491	L/m²/s	235	220	200	185	165	125	110	90	80
U.V. Resistance	ASTM D4355	% @ 500h	70	70	70	70	70	70	70	70	70

Geotextile Products: POLYESTER FILAMENT SPUNBOND NEEDLE PUNCHED NONWOVEN GEOTEXTILES

PROJECTS CASE OF THE PET (POLYESTER) FILAMENT SPUNBOND NEEDLE PUNCHED NONWOVEN GEOTEXTILE

[Road Construction in Espain]

[Landfill in Brazil]

GEOTEXTILE CONSTRUCTION

The roller laying method is carried out manually, and the first step is to ensure the smoothness of the cloth surface, leaving a certain gap during construction to allow for external deformation of the material. At the same time, it should be noted that after installation, certain protective measures should be taken to prevent dust, soil and other substances from entering the geotextile layer. If there is a needle leakage, the needle leakage area must be re stitched and reinforced. If the laying project is carried out on a slope, the high end of the actual slope should be fixed during the laying process. After the fixation is completed, long silk geotextile should be rolled down along the slope and laid. After rolling, the cloth surface should be in a taut state. If the laying surface is flat, sand bags need to be used for fixation during the laying process. After a section of the geotextile is laid, the sand bags cannot be removed until the upper layer of material is laid.

COMPARISON BETWEEN PP GEOTEXTILE AND PET GEOTEXTILE

- The special structure of polypropylene gives it excellent acid and alkali resistance, especially its alkali resistance is superior to polyester. When used in underground engineering with strong soil acidity and alkalinity for protection, reinforcement, waterproofing, and seepage prevention, its effect is better than polyester.
- The surface friction coefficient of polypropylene fibers is small, the friction between fibers is small, and the wear resistance is good. The anti vibration friction performance is much better than that of polyester.
- Polypropylene has good hydrophobicity and does not absorb water, making it superior to polyester in water supply and drainage engineering applications.
- Polypropylene fiber needle punched geotextile has higher strength than polyester needle punched geotextile with the same weight, and the longitudinal and transverse strengths are equal.

APPLICATION SCENARIOS

- PET filament spunbond needle punched nonwoven geotextile can be used as a filter layer around drainage pipes;
- PET filament spunbond needle punched nonwoven geotextile can be used for vertical or horizontal drainage inside earth dams;
- PET filament spunbond needle punched nonwoven geotextile can be used to strengthen weak foundations in projects such as highways, railways, embankments, airports, and ports.

Filament geotextile has good mechanical function, good water permeability, corrosion resistance, aging resistance, isolation, anti filtration, drainage, protection, stability, reinforcement and other functions, can adapt to uneven base course, can resist external force damage, creep is small, and can still maintain its original function under long-term load. Even when exposed to an environment of nearly 20 ℃ for a short period of time, its performance remains almost unchanged. Through extensive experiments and practice, it has been proven that long filament geotextiles have long-term corrosion resistance to various natural soils, moisture, and microorganisms.

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