Spartan Road Grid™ 10C

FIBERGLASS GEOGRID COMPOSITE SYSTEM

Spartan Road Grid™ 10C composite system is a bi-axial geogrid bonded to a needle punched non-woven geotextile. It is specifically designed for asphalt reinforcement with an additional moisture proofing benefit. Its composite characteristic provides a continuous non-deforming water-resistant barrier. Spartan Road Grid™ 10C is polymer coated which ensures proper adhesion to the asphalt layers over the tack coat surface, and further optimizes the chemical compatibility between the fiberglass reinforcement and the pavement overlay to create a solid bond of the asphalt layers over the tack coat surface. This bond ensures that the reinforcing grid is in a position to effectively accept and distribute tensile stresses.

This system offers excellent heat resistance, minimal shrinkage at high temperatures, high chemical, physical and biological durability along with optimal elastic modulus and aperture size. It is biologically unaffected by soil micro-organisms, inert to all chemicals normally found in the soil, and formulated to resist ultraviolet degradation.

Tested Property	Test Method	Unit English (Metric)	Value English (Metric)	
			MD	XD
Ultimate Tensile Strength [1]	ASTM D 6637	lb/inch (kN/m)	571 (100.0)	571 (100.0)
Tensile Strength at 2% Strain [1]	ASTM D 6637	lb/inch(kN/m)	456 (80.0)	456 (80.0)
Secant Stiffness EA at 2% Strain	ASTM D 6637	lb/inch (kN/m)	22,847 (4,000.0)	22,847 (4,000.0)
Coating			Polymeric	
Elongation at Break [2]	ASTM D-6637	%	<3	<3
Optimum Elasticity Modulus [2]		psi (mPA)	10.6 x 10^6 (73,000)	
Melting Point Coating	ASTM D 276	Degrees C	> 752 (>400)	
Melting Point Glass	ASTM D 338	Degrees C	> 820	
Asphalt Retention	ASTM D 6140	gal/yd^2 (l/m^2)	0.3 (1.35)	
Aperture Size	Nominal	inch (mm)	0.5 (12.7)	0.5 (12.7)
Mass/Unit Area [2]	ASTM D 5261	oz/yd^2 (g/m^2)	16.9 (570)	
TYPICAL ROLL DIMENIONS				
Roll Width [3][4]	Minimum	ft (m)	5.0 (1.5) or 7.38 (2.25)	
Roll Length [3][4]	Minimum	ft (m)	246.06 (75)	

Notes:
1. MARV – Minimum Average Roll Values
2. Mean
3. Minimum
4. Typical. Standard roll dimensions are shown. The products can be fabricated to custom lengths and widths to meet customer needs

☎ (905) 386-1744

Spartan Road Grid™ 10
BIAXIAL FIBERGLASS GEOGRID

ONTARIOAGRA PIPING & SUPPLIES INC.

Spartan Road Grid™ 10 is a biaxial fiberglass geogrid and is specifically designed for asphalt reinforcement. Its optimal apertures allow asphalt particles to penetrate through the grid to achieve high interlock and effective bonding of the two asphalt lifts. Spartan Road Grid™ 10 is also polymer coated which ensures proper adhesion to the asphalt layers over the tack coat surface
and further optimizes the chemical compatibility between the fiberglass reinforcement and the pavement overlay to create a solid bond of the asphalt layers over the tack coat surface. This bond ensures that the reinforcing grid can effectively accept and distribute tensile stresses.

It's self-adhesive and offers excellent heat resistance; minimal shrinkage at high temperatures; high chemical, physical and biological durability along with optimal elastic modulus and aperture size. It is biologically unaffected by soil micro-organisms, inert to all chemicals normally found in the soil, and formulated to resist ultraviolet degredation.

Tested Property	Test Method	Unit English	Value English (Metric)	
			MD	XD
Ultimate Tensile Strength	ASTM D 6337	lb/inch (kN/m)	571 (100.0)	571 (100.0)
Tensile Strength at 2% Strain [1]	ASTM D 6637	lb/inch (kN/m)	456 (80.0)	456 (80.0)
Secant Stiffness EA at 2% Strain [1]	ASTM D 6637	lb/inch (kN/m)	22,847 (4,000.0)	22,847 (4,000.0)
Shrinkage Properties	Internal Test Method	%	Less than 0.5% at 200˚C after 15 minutes	
Strain at Ultimate [2]	ASTM D 6637	%	<3	<3
Grid Material			Fiberglass Grid	
Coating			Polymeric with pressure sensitive self-adhesive backing	
Optimum Elasticity Modulus [2]		psi (mPA)	10.6×10^6 (73,000)	
Melting Point Coating	ASTM D 276	˚F (˚C)	>752 (>400)	
Melting Point Glass	ASTM C 338	˚F (˚C)	>1,508 (>820)	
Aperture Size (center to center of strand)	Nominal	inch (mm)	0.5 (12.7)	0.5 (12.7)
Mass/Unit Area [2]	ASTM D 5261	oz/yd² (g/m²)	12.5 (420)	
STANDARD ROLL DIMENSIONS				
Roll Width [3][4]	Minimum	ft (m)	5.0 (1.5) or 7.38 (2.25)	
Roll Length [3][4]	Minimum	ft (m)	328.08 (100.0) or 246.06 (75)	

Notes:
1. MARV – Minimum Average Roll Values
2. Mean
3. Minimum
4. Typical. Standard roll dimensions are shown. The products can be fabricated to custom lengths and widths to meet customer needs

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Spartan Road Grid™ 11

BI-AXIAL FIBERGLASS GEOGRID

Spartan Road Grid™ 11 fiberglass geogrid is specifically designed for asphalt reinforcement. Its optimal apertures allow asphalt particles to penetrate through the grid to achieve high interlock and effective bonding of the two asphalt lifts. Spartan Road Grid™ 11 is also polymer coated which ensures proper adhesion to the asphalt layers over the tack coat surface and further optimizes the chemical compatibility between the fiberglass reinforcement and the pavement overlay to create a solid bond of the asphalt layers over the tack coat surface. This bond ensures that the reinforcing grid is in a position to effectively accept and distribute tensile stresses.

It is self-adhesive and offers excellent heat resistance; minimal shrinkage at high temperatures; high chemical, physical and biological durability along with optimal elastic modulus and aperture size. It is biologically unaffected by soil micro-organisms, inert to all chemicals normally found in the soil, and formulated to resist ultraviolet degradation.

Tested Property	Test Method	Unit English	Value English (Metric)	
			MD	**XD**
Ultimate Tensile Strength	ASTM D 6337	lb/inch (kN/m)	571 (100.0)	571 (100.0)
Tensile Strength at 2% Strain [1]	ASTM D 6637	lb/ft (kN/m)	456 (80.0)	456 (80.0)
Secant Stiffness EA at 2% Strain [1]	ASTM D 6637	lb/inch (kN/m)	22,847 (4,000.0)	22,847 (4,000.0)
Shrinkage Properties	Internal Test Method	%	Less than 0.5% at 200˚C after 15 minutes	
Strain at Ultimate [2]	ASTM D 6637	%	<3	<3
Grid Material			Fiberglass Grid	
Coating			Polymeric with pressure sensitive self-adhesive backing	
Optimum Elasticity Modulus [2]		psi (mPA)	10.6×10^6 (73,000)	
Melting Point Coating	ASTM D 276	˚F (˚C)	>752 (>400)	
Melting Point Glass	ASTM C 338	˚F (˚C)	>1,508 (>820)	
Aperture Size (centre to centre of strand)	Nominal	inch (mm)	1.0 (25.4)	1.0 (25.4)
Mass/Unit Area [2]	ASTM D 5261	oz/yd^2 (g/m^2)	12.5 (420)	
STANDARD ROLL DIMENSIONS				
Roll Width [3][4]	Minimum	ft (m)	5.0 (1.5) or 7.38 (2.25)	
Roll Length [3][4]	Minimum	ft (m)	328.08 (100.0) or 246.06 (75)	

Notes:
1. MARV – Minimum Average Roll Values
2. Mean
3. Minimum
4. Typical. Standard roll dimensions are shown. The products can be fabricated to custom lengths and widths to meet customer needs

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Spartan Road Grid™ 20
BIAXIAL FIBERGLASS GEOGRID

ONTARIOAGRA PIPING & SUPPLIES INC.

Spartan Road Grid™ 20 is a biaxial fiberglass geogrid and is specifically designed for asphalt reinforcement. Its optimal apertures allow asphalt particles to penetrate through the grid to achieve high interlock and effective bonding of the two asphalt lifts.

Spartan Road Grid™ 20 is also polymer coated which ensures proper adhesion to the asphalt layers over the tack coat surface and further optimizes the chemical compatibility between the fiberglass reinforcement and the pavement overlay to create a solid bond of the asphalt layers over the tack coat surface. This bond ensures that the reinforcing grid can effectively accept and distribute tensile stresses.

It is self-adhesive and offers excellent heat resistance; minimal shrinkage at high temperatures; high chemical, physical and biological durability along with optimal elastic modules and aperture size. It is biologically unaffected by soil micro-organisms, inert to all chemicals normally found in the soil, and formulated to resist ultraviolet degredation.

Tested Property	Test Method	Unit English	Value English (Metric)	
			MD	XD
Ultimate Tensile Strength [1]	ASTM D-6637	lb/inch (kN/m)	571 (100.0)	1,142 (200.0)
Tensile Strength at 2% strain [1]	ASTM D-6637	lb/inch (kN/m)	457 (80.0)	914 (160.0)
Secant Stiffness EA at 2% strain [1]	ASTM D-6637	lb/inch (kN/m)	22,847(4,000.0)	45,694 (8000.0)
Shrinkage Properties	Internal Test Method	%	Less than 0.5% at 200°C after 15 minutes	
Strain at Ultimate [2]	ASTM D-6637	%	<3	<3
Grid Material			Fiberglass Grid	
Coating			Polymeric with pressure sensitive self-adhesive backing	
Optimum Elasticity Modulus [2]		psi (mPA)	10.6×10^6 (73,000)	
Melting Point Coating	ASTM D-276	°f (°C)	>752 (>400)	
Melting Point Glass	ASTM C-338	°f (°C)	>1508 (>820)	
Aperture Size (center to center of strand)	Nominal	inch (mm)	0.5(12.7)	0.5 (12.7)
Mass/Unit Area [2]	ASTM D5261	oz/y^2 (g/m^2)	18.0 (610)	
TYPICAL ROLL DIMENSIONS				
Roll Length [3][4]	Minimum	ft (m)	246 (75)	
Roll Width [3][4]	Minimum	ft (m)	5.0 (1.5) or 7.3 (2.25)	

Notes:
1. MARV – Minimum Average Roll Values
2. Mean
3. Minimum
4. Typical. Standard roll dimensions are shown. The products can be fabricated to custom lengths and widths to meet customer needs

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Spartan Road Grid™ 11EPM
BI-AXIAL FIBERGLASS GEOGRID

ONTARIOAGRA PIPING & SUPPLIES INC.

Spartan Road Grid™ 11EPM fiberglass geogrid is specifically designed for asphalt reinforcement. These grids are polymer-coated and bonded to an engineered polymeric membrane (EPM) on one side. The EPM is designed to facilitate a stronger adhesion to the asphalt layers when the grid is placed over a light tack-coated surface. Spartan Road Grid™ 11EPM is placed with the EPM side always on the top. The polymer coating further optimizes the chemical compatibility between the fiberglass and the pavement overlay. The bonding ensures that the reinforcing grid can accept the tensile stresses and distribute them. The selection of this material is based upon excellent heat resistance, minimal shrinkage at high temperatures, high chemical, and physical durability along with optimal elastic modules and aperture size. Spartan Road Grid™ 10EPM are biologically unaffected by soil micro-organisms and are inert to all chemicals normally found in the soil against ultraviolet degradation.

Tested Property	Test Method	Unit English	Value English (Metric)	
			MD	XD
Ultimate Tensile Strength [1]	ASTM D-6637	lbs/ft (kN/m)	571 (100.0)	571 (100.0)
Tensile Strength at 2% Strain [1]	ASTM D-6637	lbs/ft (kN/m)	456(80.0)	456 (80.0)
Secant Stiffness EA at 2% Strain [1]	ASTM D-6637	lb/inch (kN/m)	22,847 (4000.0)	22,847 (4000.0)
Shrinkage Properties	Internal Test Method	%	Less than 0.5% at 200°C after 15 minutes	
Strain at Ultimate [2]	ASTM D-6637	%	<3	<3
Grid Material			Fiberglass grid with polymeric coating having 'EPM' bonded on the top and pressure sensitive self - adhesive on the bottom	
Adhesive Backing			Pressure Sensitive	
Optimum Elasticity Modulus [2]		psi (mPA)	10.6×10^6 (73,000)	
Melting Point Coating	ASTM D-276	°f (°C)	>752 (>400)	
Melting Point Glass	ASTM C-338	°f (°C)	>1508 (>820)	
EPM Melting Point	ASTM D-276	°f (°C)	>255 (>124)	
Aperture Size (center to center of strand)	Nominal	inch (mm)	1.0 (25.4)	1.0 (25.4)
Mass/Unit Area [2]	ASTM D5261	oz/y^2 (g/m^2)	12.9 (432)	
TYPICAL ROLL DIMENSIONS				
Roll Width [3][4]	Minimum	ft (m)	5.0 (1.5) or 7.38 (2.25)	
Roll Length [3][4]	Minimum	ft (m)	328.08 (100.0) or 246.06 (75)	

Notes:
1. MARV – Minimum Average Roll Values
2. Mean
3. Minimum
4. Typical. Standard roll dimensions are shown. The products can be fabricated to custom lengths and widths to meet customer needs

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Titan Earth Grid ™20

BI-AXIAL POLYPROPYLENE GEOGRID

Titan Earth Grid® 20 is a bi-axial polypropylene (PP) geogrid. It is manufactured using a punching and drawing process whereby the polypropylene sheet is stretched in two directions, machine (longitudinal) and cross-machine (transverse). The result is a monolithic and isotropic geogrid with thick and wide ribs, and thick integral nodes. The ribs have a high degree of molecular orientation continuing in part through the mass of the integral node. Engineered to be mechanically and chemically stable in aggressive soil environments, the Earth Grid™ geometry allows for strong mechanical interlock with soil particles and features high tensile stiffness at low strains to resist construction damage, environmental exposure and formulated to resist UV degradation. It is also not susceptible to hydrolysis, environmental stress cracking and micro-organism attack.

TESTED PROPERTY	TEST METHOD	UNIT ENGLISH (METRIC)	VALUE ENGLISH (METRIC)	
			MD	XD
Ultimate Tensile Strength(1)	ASTM D 6637	lbs/ft (kN/m)	1,371 (20.0)	1,371 (20.0)
Tensile Strength at 2% Strain(1)	ASTM D 6637	lbs/ft (kN/m)	548 (8.0)	548 (8.0)
Tensile Strength at 5% Strain(1)	ASTM D 6637	lbs/ft (kN/m)	960 (14.0)	960 (14.0)
Minimum Carbon Black Content	ASTM D 4218	%	2	
Junction Strength(1)(3)	GRI-GG2 ASTM D 7737	lbs/ft (kN/m)	1,302 (19.0)	1,302 (19.0)
Flexural Rigidity(1)	ASTM D 7748	mg-cm	750,000	
Aperture Stability(2)(4)	US. COE	m-N/deg	0.50	
Resistance to UV degradation @ 500 hours(2)	ASTM D 4355	%	100	
Minimum Rib Thickness	Callipered	inch (mm)	0.06 (1.4)	0.04 (1.0)
Aperture Size(2)(5)	Nominal	inch (mm)	1.38 (35.0)	1.38 (35.0)
TYPICAL ROLL DIMENSIONS				
Roll Width		ft (m)	12.95 (3.95)	
Roll Length(6)		ft (m)	164.04 (50.0)	

NOTES:
(1) Minimum Average Roll Values (MARV) – Calculated as (mean minus 2x standard deviation) – ASTM-D4759-02.
(2) Average.
(3) Junction efficiency is defined as junction strength divided by multi-rib strength.
(4) Resistance to in plane rotational movement measure at an applied moment = 2m-N (20kg-cm) in accordance with US Army Corps of Engineers methodology for the measurement of torsional rigidity.
(5) Aperture tolerance: within ± 10% coefficient of variance.
(6) Custom Length orders can be accommodated.

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Titan Earth Grid ™ 30

BI-AXIAL POLYPROPYLENE GEOGRID

Titan Earth GridTM 30 is a bi-axial polypropylene (PP) geogrid. It is manufactured using a punching and drawing process whereby the polypropylene sheet is stretched in two directions, machine (longitudinal) and cross-machine (transverse). The result is a monolithic and isotropic geogrid with thick and wide ribs, thick integral nodes, and uniform square apertures. The ribs have a high degree of molecular orientation continuing in part through the mass of the integral node. Engineered to be mechanically and chemically stable in aggressive soil environments, the Earth GridTM geometry allows for strong mechanical interlock with soil particles and features high tensile stiffness at low strains to resist construction damage, environmental exposure and formulated to resist UV degradation. It is also not susceptible to hydrolysis, environmental stress cracking and micro -organism attack.

TESTED PROPERTY	TEST METHOD	UNIT ENGLISH (METRIC)	VALUE ENGLISH (METRIC)	
			MD	XD
Minimum Carbon Black Content	ASTM D 4218	%	2	
Ultimate Tensile Strength (1)	ASTM D 6637	lbs/ft (kN/m)	2,056 (30.0)	2,056 (30.0)
Tensile Strength at 2% Strain (1)	ASTM D 6637	lbs/ft (kN/m)	822 (12.0)	822 (12.0)
Tensile Strength at 5% Strain (1)	ASTM D 6637	lbs/ft (kN/m)	1,508 (22.0)	1,508 (22.0)
Junction Strength (1) (3)	GRI-GG2 ASTM D 7737	lbs/ft (kN/m)	1,953 (28.5)	1,953 (28.5)
Flexural Rigidity (1)	ASTM D 7748	mg-cm	2,000,000	
Aperture Stability (2) (4)	US. COE	m-N/deg	0.75	
Minimum Rib Thickness	Callipered	inch (mm)	0.09 (2.3)	0.06 (1.5)
Aperture Size (2) (5)	Nominal	inch (mm)	1.50 (38)	1.50 (38)
TYPICAL ROLL DIMENSIONS				
Roll Width	Minimum	ft (m)	12.95 (3.95)	
Roll Length [6]	Minimum	ft (m)	164.04 (50)	

NOTES:

(1) Minimum Average Roll Values (MARV) – Calculated as (mean minus 2x standard deviation) – ASTM-D4759-02.
(2) Average.
(3) Junction efficiency is defined as junction strength divided by multi-rib strength.
(4) Resistance to in plane rotational movement measure at an applied moment = 2m-N (20kg-cm) in accordance with US Army Corps of Engineers methodology for the measurement of torsional rigidity.
(5) Aperture tolerance: within ± 10% coefficient of variance.
(6) Custom Length orders can be accommodated.

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