



BASELOK™

BY INDUSTRIAL FABRICS, INC.

GEOGRID

BASE REINFORCEMENT



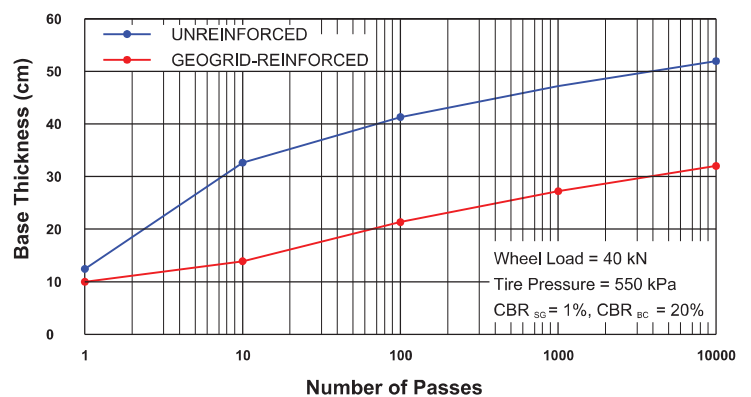
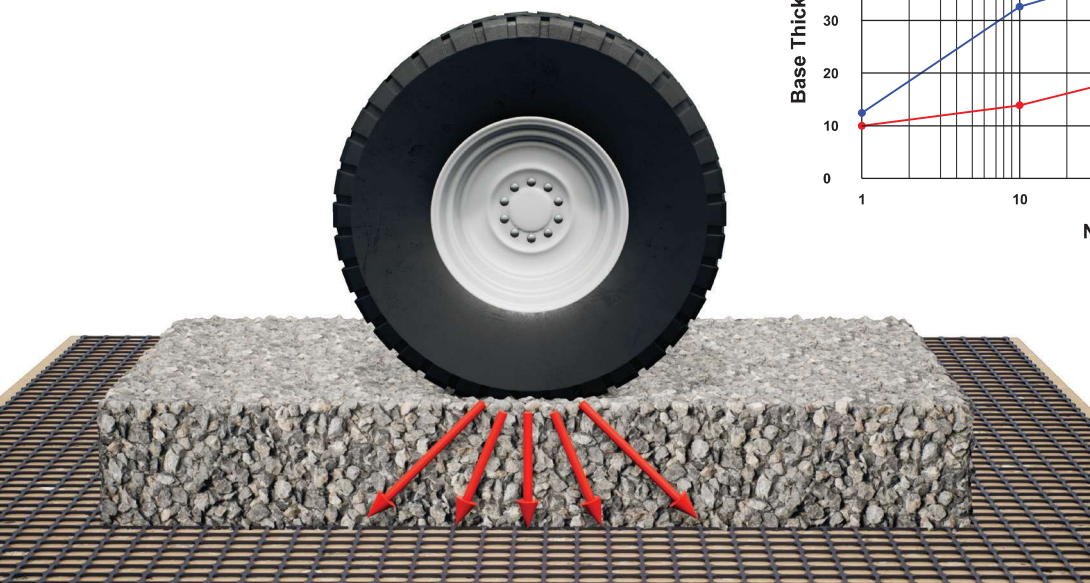
BASELOK™ BASE REINFORCEMENT

Biaxial (BX) GeoGrids have been used successfully in the civil construction industry for over 40 years.

BaseLok™ GeoGrids are manufactured from an extruded polypropylene sheet that is punched and drawn. The result is an open aperture polypropylene grid structure that resists high, short term dynamic loads such as vehicular wheel loads.

Unconfined aggregate has the tendency to move under load and when force is applied. When a BaseLok™ GeoGrid is installed beneath an aggregate layer, the aggregate interlocks with the GeoGrid, increasing the stiffness of the section. This increased stiffness means less required aggregate, reduced rutting, improved performance, and ultimately cost savings to the contractor and owner.

BETTER LOAD DISTRIBUTION



BASELOK™ BASE REINFORCEMENT

The environmentally friendly polypropylene design of BaseLok™ GeoGrid is an optimal solution for a variety of base stabilization projects. By enhancing the structural stiffness of the subgrade beneath your paved or unpaved project zone with BaseLok™ GeoGrid, you minimize opportunities for washouts, subgrade failures, potholes, and reflective cracking in base stabilization applications, such as:

Paved

- Roadways
- Runways
- Parking lots
- Airports
- Intermodal facilities

Unpaved

- Haul roads
- Storage yards
- Staging areas
- Working surfaces
- Wind & Solar Farms

Base Reduction - Reducing the amount of material and labor required to construct the appropriate subgrade, cutting both cost and time. Save on aggregate thickness for your next project.

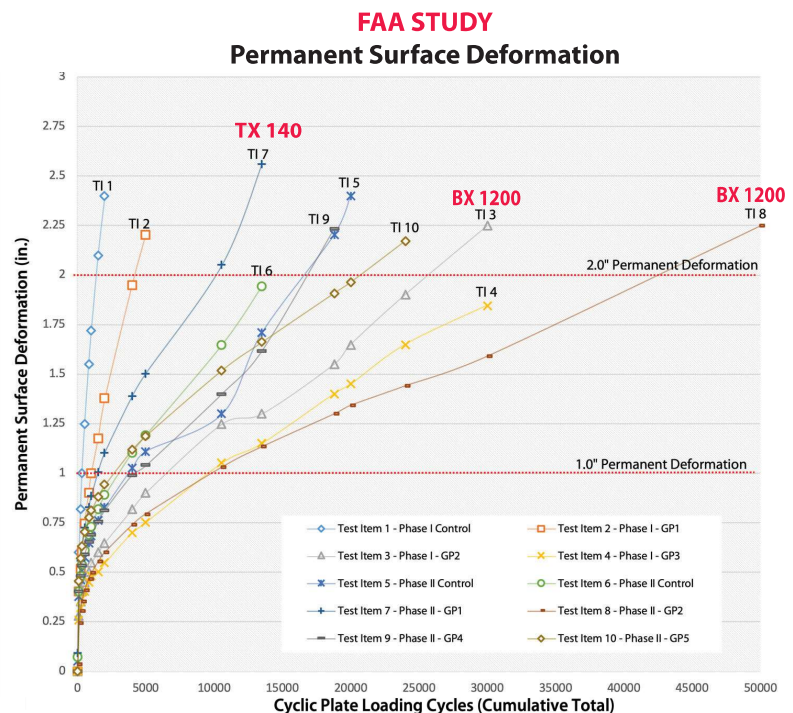
THE PROOF IS IN THE TESTING

When designing with GeoGrids, strength is key. As there are many varieties and types of grids on the market, it has been proven that adding in a GeoGrid layer will add performance to a section. The stiffer and stronger the grid, the more performance and value added; specifically in weak and soft soils. As a load is applied, Baselok™ GeoGrids must perform under the heavy load and spread the tension across the weak subgrade. This is why Baselok™ has designed grids that ensure to be stiff enough to bridge over the weak soils without failure. Other manufacturers pride themselves on reducing the plastic for a higher cost product, yet lose the ability to be stiff enough under the toughest conditions.

Biaxial GeoGrids have stood the test of time and design. A recent FAA report, "Using geosynthetics in flexible airport pavements" confirms that reducing the plastic in products does not encourage performance. **BX 1200 performed 5-6x better than the competing triaxial geogrid at half the cost.** Additional tests show that the aperture stability modulus, based on the Giroud Han Method, may not be the key material property to geogrid benefits. Junction stiffness and tensile strength prove to be major factors in resisting the lateral loads under certain conditions as proven by the "Montana State Study: Geosynthetic subgrade stabilization – Field testing and design method calibration, Cuehlo and Perkins."

Geogrid Design can be analyzed using the following methods:

- Giroud Han Design
- Bearing Capacity Method
- AASHTO 93 Design Method
- PCase Method





Base Reinforcement



APPLICATIONS

- > Roads & Highways (DOT)
- > Petrochemical
- > Oil & Gas
- > Rail
- > Airports
- > Port & Intermodal Facilities
- > Wind & Solar Farms
- > Waste Management
- > Electrical Distribution
- > Government Infrastructure
- > Mining
- > Federal EPA Hazmat Sites
- > Coastal / Waterways





Railway

BASELOK™ RAILWAY SOLUTIONS

Maintenance and Heavy Duty Railways

Biaxial GeoGrids have been successfully deployed in railway reinforcement projects since the 1980s. With enhanced aggregate confinement and optimized stabilizing qualities, BaseLok™ GeoGrid is a proven solution for your next railway project.

When using BaseLok™ GeoGrid Solutions for your ballast or sub-ballast railway project, you can expect:

- **Lower construction time**
- **Lower upfront costs**
- **Increase in railway service life**
- **Eliminate speed restrictions on historically less sections of railway**
- **Minimize later creep and ballast settlement**
- **Enhanced roadbed drainage**

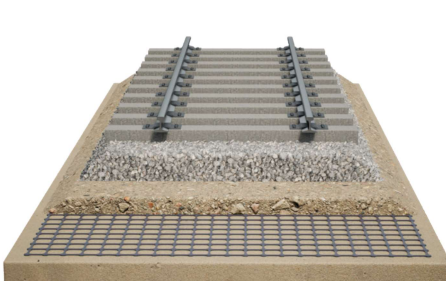


Tested and Proven

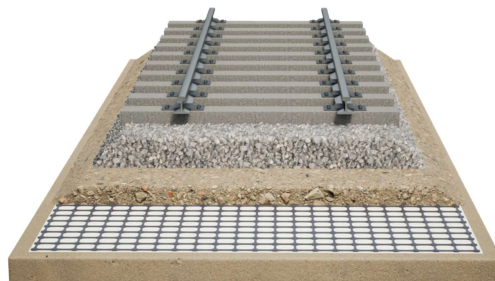
AREMA - The American Railway Engineering and Maintenance of Way Association is the nation's premier source for industry practices pertaining to railway systems, and they strongly advocate for the use of GeoGrid track bed stabilization applications. The optimization qualities of GeoGrid have proven to stabilize various subgrades in multiple lab and field tests.

Building Better Railways

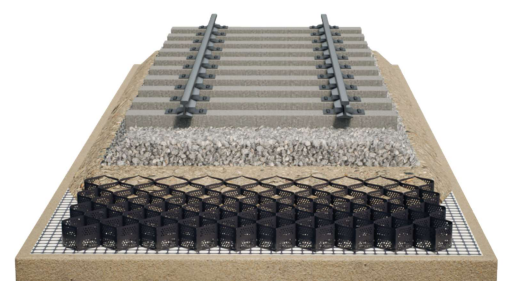
BaseLok™ solutions use a biaxial design to encourage mechanical interlocking on the subgrade surface. Unbound aggregate is prone to lateral movement and can lead to ballast and sub-ballast settlement and can present substantial hazards to a railway. BaseLok's™ ability to confine aggregate within its apertures promotes longevity and stability for your railway structure.



BaseLok™ GeoGrid



BaseLok™ FabGrid®



BaseLok™ GeoCell w/ FabGrid®

Engineering Assistance

Snowshoe Effect: A geogrid reinforced aggregate section spreads construction loads over soft soils

CBR Installation Guidelines Table

Subgrade Strength	Clear All Vegetation?	BX Overlap ¹	Ties? ²	Direct Traffic ³	Geotextile ⁴
$\text{CBR} \leq 1$	N	3 ft	Recommended	N	Check Piping Ratio
$1 \leq \text{CBR} \leq 2$	If possible	2 - 3 ft	N	N	Check Piping Ratio
$2 \geq \text{CBR} \leq 3$	Y	1 - 2 ft	N	N	Check Piping Ratio
$3 \leq \text{CBR}$	Y	1 ft	N	Y	N

NOTES:

1. General Geogrid Overlap Rule: Overlap = 3 ft for $\text{CBR} \leq 1$; Overlap = 1 ft. for $\text{CBR} \geq 3$; interpolate between.
2. Ties are typically 8" cable ties. The ties help keep the geogrid from separating during aggregate placement and spreading.
3. Direct Traffic pertains only to conventional rubber-tired equipment.
4. Analysis Req'd = Geotextile required only if filtration criteria not met by aggregate fill.

Each project will vary in loads, soils and environmental conditions. The Baselok™ engineering team is ready to assist and recommend the exact need for each project with our full line of geosynthetic products from GeoGrids to GeoCells.

Contact our team today to complete a site visit and field testing or to just discuss your project needs.

WWW.BASELOK.COM



> PRE-CONSTRUCTION LOGISTICS

Ordering

To place an order, contact your BaseLok™ representative and provide any information pertinent to the project. BaseLok™ has a knowledgeable sales team and professional engineers on staff who can assist with your order and also help anticipate any potential issues that could arise during installation. At this time, it is also advisable to schedule a pre-construction meeting or possible jobsite visit with your BaseLok™ representative or engineer.

Delivery

Upon delivery, verify that the proper GeoGrid product has been delivered. Each GeoGrid roll shipped will be individually labeled or tagged with the manufacturer's name, product identification, and roll number. Inspect the delivered products to verify that they are free of flaws and that no damage occurred during delivery.

Storage

GeoGrid should be stored at temperatures above -20°F (-29°C). GeoGrid should only be handled/installed at temperatures above 14°F (-10°C). Contact BaseLok™ if your project limitations require installation or storage of GeoGrid beyond these recommendations.

> SURFACE AND SITE PREPARATION

If possible, the site should be cleared of all debris, stumps, plant growth, topsoils, stones, and other deleterious materials.

In some instances where very low CBR subgrades ($\text{CBR} < 0.5$) are present, it may be beneficial to leave some vegetation, topsoils, and fine root mats in place. Where moderate CBR subgrades ($\text{CBR} > 2$) are present, a light proof roll is recommended to locate unstable areas. This is why GeoGrids are used.

The proper equipment should be used to smooth and compact the subgrade to the specified requirements. Check with the engineer for subgrade compaction requirements.

> LAYOUT, OVERLAP, AND PLACEMENT

The layout of the GeoGrid rolls should be predetermined before you begin placement of the rolls. GeoGrid rolls are commonly rolled parallel with the roadway system. However, where conditions include very soft subgrades ($\text{CBR} < 0.5$), and/or where lateral spreading and separation of overlaps is a concern, it may be beneficial to lay out GeoGrid rolls perpendicular to the road. Consult with your engineer and GeoGrid representative to determine the best GeoGrid layout for your project.

For proper installation, the rolls should be overlapped side-to-side and end-to-end. The overlapping should be in the same direction as the aggregate placement. The recommended overlap varies from 1 foot to 3 feet based on subgrade strength. Recommendations for general overlaps can be found on top of page six. However, your engineer should be consulted to determine the proper overlap to be used.

Installation



To accommodate curved sections in your layout plan, GeoGrid should be cut and overlapped. Cutting of GeoGrid may be done with sharp shears and other handheld cutting devices. It is mandatory that the proper safety equipment be used while cutting and installing GeoGrid. The GeoGrid may also be cut to accommodate other immovable protrusions such as manhole covers.

Once layout and overlap requirements have been determined, you can prepare to roll out your GeoGrid. The GeoGrid should begin to be rolled out from an area easily accessible to construction equipment while complying with the layout plan. For very soft subgrades, the layout should begin on firm soils on the perimeter of the project. This will act as an anchor point from which you can roll GeoGrid onto softer sections. Frequently check to make sure your alignment is being maintained throughout your GeoGrid installation process.

At the time of installation, GeoGrid shall be rejected if defects, rips, or flaws are present, or if deterioration or damage occurred during manufacturing, transportation, or storage.

> TENSIONING AND ANCHORING

While unrolling GeoGrid, maintain alignment and pull taut to remove slack and wrinkles. Do not roll out too much GeoGrid at once. Start with about 40 feet and continue unrolling as aggregate is spread. Be sure to anchor the beginning of each roll at the center and corners before fully unrolling the material. To hold GeoGrid in place prior to aggregate placement, soil, rocks, or other weights may be used to hold the GeoGrid edges and overlaps in place. Small shovel piles of aggregate are commonly used along overlaps, edges, and corners. If allowed, anchor pins or sod staples may also be used.

> AGGREGATE PLACEMENT

The aggregate is placed and spread over GeoGrid using normal construction methods and equipment. The aggregate is normally back dumped. After the aggregate is back dumped, it is then spread out over the GeoGrid. Tracked bulldozers are commonly used for spreading of the aggregate. For soft subgrade conditions ($\text{CBR} < 1.5$), low ground pressure models are recommended.

Unless relatively competent subgrades ($\text{CBR} > 4$) exist, trucks and other construction vehicles should not be driven directly over GeoGrid. Where competent subgrades ($\text{CBR} > 4$) do exist, standard rubber-tired vehicles may drive over GeoGrid at very slow speeds of less than 5 mph. A test section should be evaluated to determine the possible damage from direct vehicle contact. If acceptable, aggregate may be dumped as the vehicle advances. Sudden starts, stops, and turns should be avoided when operating equipment directly over GeoGrid. Tracked construction equipment should not be operated directly on the GeoGrid. The turning or pivoting of tracked equipment over installed aggregate should be kept to a minimum to prevent tracks from displacing the aggregate and damaging the GeoGrid.



Installation

For softer subgrades (CBR < 4), aggregate should be dumped on previously placed material and then pushed onto the GeoGrid. For very soft subgrades (CBR < 0.5), consult with your engineer and GeoGrid representative to determine the best method of aggregate placement.

Lift thicknesses are generally not less than 6 inches. The initial lift may be as thick as necessary to prevent rutting or failure of the subgrade soils. During spreading, the bulldozer blade should raise gradually as each lift is spread over the GeoGrid. Take caution not to catch the bulldozer blade or any other equipment on the GeoGrid.

The shoving action from bulldozers or other aggregate spreading equipment may cause waves in the GeoGrid layout ahead of the fill. This can be minimized by unrolling the GeoGrid a little at a time. Once sufficient aggregate is in place on the GeoGrid, unroll the next section.

> COMPACTION

Compaction requirements should be obtained from the project specifications. Unless very soft soils are present, standard compaction methods can be used. Vibratory compaction should be avoided or minimized over GeoGrid. Rutting or pumping of the subgrade experienced during compaction should be immediately addressed. Consult with the engineer to determine corrective actions required such as additional aggregate to strengthen the section.

In extremely wet conditions, it may be necessary to cease operations to allow pore pressures to dissipate from the subgrade and reduce moisture content. Weak areas found during final compaction commonly indicate inadequate aggregate thicknesses at those locations. Consult the engineer to determine a plan for these areas.

> REPAIRS

If GeoGrid is damaged during or after installation, it can be repaired by patching the area. To repair the damaged GeoGrid section, first excavate the fill from the damaged area extending 3 feet in all directions of the damage. Place a GeoGrid patch over the damage, extending at least 3 feet in all directions, and replace the excavated material and re-compact.

> SITE SUPPORT - BASELOK.COM

GeoGrid Roll Characteristics

BaseLok™ GeoGrid Roll Characteristics						
Type	Roll Width*		Roll Length		Roll Area	
	(m)	(ft)	(m)	(ft)	(m ²)	(yd ²)
BX 1515	4	13.1	100	328	400	477
BX 1100	4	13.1	75	246	300	358
BX 2020	4	13.1	75	246	300	358
BX 1200	4	13.1	50	164	200	239
BX 1500	4	13.1	50	164	200	239
BX 3030	4	13.1	50	164	200	239
BX 3030L	4	13.1	50	164	200	239

* Custom Rolls: 16' width available upon request.





GeoGrid Selection Guide

Product Properties ¹	Test Method	Units		BX1515	BX1100	BX2020	BX1200	BX1500	BX3030	BX3030L
Aperture Dimensions ²		in (mm)	MD	1.4 (36)	1 (25)	1.4 (36)	1 (25)	1 (25)	1.3 (33)	2.2 (57)
			XD	1.4 (36)	1.3 (33)	1.4 (36)	1.3 (33)	1.2 (30.5)	1.3 (33)	2.2 (57)
Minimum Rib Thickness ²		in (mm)	MD	0.04 (1)	0.03 (0.8)	0.06 (1.5)	0.05 (1.3)	0.07 (1.8)	0.09 (2.3)	0.09 (2.3)
			XD	0.03 (0.8)	0.03 (0.8)	0.04 (1)	0.05 (1.3)	0.07 (1.8)	0.06 (1.5)	0.06 (1.5)
Tensile Strength at 2% Strain	ASTM D6637	lb/ft (kN/m)	MD	380 (5.5)	280 (4.1)	480 (7)	410 (6)	580 (8.5)	822 (12)	822 (12)
			XD	380 (5.5)	450 (6.6)	480 (7)	620 (9)	690 (10)	822 (12)	822 (12)
Tensile Strength at 5% Strain	ASTM D6637	lb/ft (kN/m)	MD	750 (11)	580 (8.5)	960 (14)	810 (11.8)	1,200 (17.5)	1,507 (22)	1,507 (22)
			XD	750 (11)	920 (13.4)	960 (14)	1,340 (19.6)	1,370 (20)	1,507 (22)	1,507 (22)
Ultimate Tensile Strength	ASTM D6637	lb/ft (kN/m)	MD	1,030 (15)	850 (12.4)	1,370 (20)	1,310 (19.2)	1,850 (27)	2,055 (30)	2,055 (30)
			XD	1,030 (15)	1,300 (19)	1,370 (20)	1,970 (28.8)	2,055 (30)	2,055 (30)	2,055 (30)
Roll Size Standard*		ft (m)		13.1 x 328 (4 x 100)	13.1 x 246 (4 x 75)	13.1 x 246 (4 x 75)	13.1 x 164 (4 x 50)	13.1 x 164 (4 x 50)	13.1 x 164 (4 x 50)	13.1 x 164 (4 x 50)
Roll Size Special Order		ft (m)		12.9, 16 x 328 (3.93, 4.88 x 100)	12.9, 16 x 246 (3.93, 4.88 x 75)	12.9, 16 x 246 (3.93, 4.88 x 75)	12.9, 16 x 164 (3.93, 4.88 x 50)	12.9, 16 x 164 (3.93, 4.88 x 50)	12.9, 16 x 164 (3.93, 4.88 x 50)	12.9, 16 x 164 (3.93, 4.88 x 50)

Structural Integrity									
Junction Efficiency	ASTM D7737	%	93	93	95	93	93	95	95
Flexural Stiffness	ASTM D7748	mg-cm	325,000	250,000	800,000	750,000	2,000,000	3,000,000	3,000,000
Aperture Stability	ASTM 7864	m-N/deg	0.38	0.32	0.5	0.65	0.75	0.9	0.9

Durability									
Resistance to Installation Damage	ASTM D5818	%SC / %SW / %GP	95 / 93 / 90	95 / 93 / 90	95 / 93 / 90	95 / 93 / 90	95 / 93 / 90	95 / 93 / 90	GP 75%
Resistance to Long Term Degradation	EPA 9090	%	100	100	100	100	100	100	100
Resistance to UV Degradation	ASTM D4355	%	100	100	100	100	100	100	100

Dimensions & Delivery

The BaseLok™ biaxial geogrid shall be delivered to the job site in roll form with each roll individually identified. Roll sizes depend on availability at time of order.

Notes

- Unless indicated otherwise, values shown are minimum average roll values determined in accordance with ASTM D4759-02. Brief descriptions of test procedures are given in the following notes.
- Nominal dimensions.
- BaseLok offers several additional products not shown on the above selection chart. Please contact your BaseLok representative to find out about our additional products.

BASELOK™
by Industrial Fabrics, Inc.

GEOGRID

Corporate

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USA

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Customer should verify with the product manufacturer that customer has the most current **BASELOK™ GEOGRID** specifications for the product ordered or purchased. The **BASELOK™ GEOGRID** system can be used in the application described in our literature and on our website, provided proper installation and engineering principles are followed. Professional engineering should be consulted before installation of **BASELOK™ GEOGRID** units to assure appropriate design and use. ALL EXPRESSED OR IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. **BASELOK™** is a trademark of Industrial Fabrics, Inc.