

INSTALLATION GUIDELINE

# MIRAGRID XT geogrid reinforced soil slopes



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# 1. INTRODUCTION

This document is prepared to help ensure that **MIRAGRID**® XT soil reinforcement, once installed, will perform its intended design function. To do so, the geosynthetic must be identified, handled, stored, and installed in such a way that its physical property values are not affected and that the design conditions are ultimately met as intended. This document contains information consistent with generally accepted practices of identifying, handling, storing, and installing geosynthetic materials. Failure to follow these guidelines may result in the unnecessary failure of the geosynthetic in a properly designed application.

# 2. MATERIAL IDENTIFICATION, STORAGE AND HANDLING

The geosynthetic will be rolled on cores having strength sufficient to avoid collapse or damage from normal use. Each roll will be wrapped with plastic covering to protect the geosynthetic from damage during shipping and handling, and will be identified with a durable gummed label, or the equivalent, clearly readable on the outside of the wrapping for the roll. The label will show the manufacturer's name, the style number, and the roll number.

While unloading or transferring the geosynthetic from one location to another, prevent damage to the wrapping, core, label, or the geosynthetic itself. If the geosynthetic is to be stored for an extended period of time, the geosynthetic should be located and placed in a manner that ensures the integrity of the wrapping, core, and label as well as the physical properties of the geosynthetic. This can be accomplished by elevating the geosynthetic off the ground and ensuring that it is adequately covered and protected from ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, fire or flames including welding sparks, temperatures in excess of 60 C (140 F), and human or animal destruction.

# 3. FOUNDATION SOIL/SUBGRADE PREPARATION

The foundation soil/subgrade should be excavated to the lines and grades as shown on the construction drawings or as directed by the engineer. Over-excavated areas should be filled with compacted backfill material. The foundation soil/subgrade should be proof rolled prior to backfill and geosynthetic placement. This exercise should be performed prior to each subsequent geosynthetic layer installed. The soil fill shall be compacted to 95% of optimum dry density per AASHTO T99. It is recommended that cohesive soils be compacted in 6 in to 8 in (15 cm to 20 cm) compacted lifts and granular soil in 9 in to 12 in (23 cm to 30 cm) compacted lifts.

# 4. GEOSYNTHETIC INSTALLATION

Prepare the surface on which the geosynthetic reinforcement is to be placed to prevent damage to the geosynthetic. The subgrade should be cleared of all obstacles and proof rolled. The surface should be smooth and level such that any shallow depressions or humps do not exceed 6 in (15 cm) in depth and height. This exercise should be performed prior to each subsequent geosynthetic layer installed.

Before unrolling the geosynthetic, verify the roll identification, length, installation orientation and the installation location with the construction drawings. While unrolling the geosynthetic, inspect it for damage or defects. Damage caused during storage, handling, or installation shall be addressed as directed by the engineer.

The geosynthetic should be laid at the proper elevation and orientation on the construction drawings, or as directed by the engineer. Correct orientation of the geosynthetic is of extreme importance and shall be verified by the contractor. The primary geogrid reinforcement tensile strength direction is placed perpendicular to the slope face and the geogrid type and tensile strength direction are marked on the selvage edge. The geosynthetic shall be cut to length as shown on the construction drawings using a razor knife, scissors, sharp knife, or equivalent.



After the geosynthetic has been laid in place, it should be tensioned by hand until taut, free of wrinkles and lying flat. Adjacent geosynthetic panels should have no gaps for 100 percent coverage. Geosynthetic panels may be secured in-place with staples, pins, sand bags, or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the engineer.

**MIRAGRID XT** should be installed as one continuous panel with the primary strength direction extending from the face of the slope to the minimum required embedment length, perpendicular to the slope face. **MIRAGRID XT** may not be spliced in the primary strength direction through overlap, sewing or mechanical connection.

Place only that amount of geogrid required for immediately pending work to prevent undue damage. After a layer of geogrid has been placed, the succeeding layer of soil shall be placed and compacted to specified density. After the soil layer has been placed, the next geosynthetic layer shall be installed. This process shall be repeated for each subsequent layer of geosynthetic and soil.

## 5. REINFORCED SOIL SLOPES (RSS) WITH WELDED WIRE MESH FACING

### A. Placement of welded wire mesh forms

Place the wire baskets adjacent to one another at the elevation shown on the plans. Wire ties or hog rings may be used to keep wire baskets aligned. It is recommended to overlap adjacent baskets laterally in each lift by a single welded wire mesh aperture, typically 4 in (10 cm) or as specified. Basket joints should be placed in a running bond and vertical joints offset a minimum of 2 ft (61 cm).

### B. Geogrid reinforcement placement

The **MIRAGRID XT** geogrid reinforcement leading edge shall be placed up to the front of the welded wire mesh form and tensioned by hand until taut, free of wrinkles and lying flat. The geosynthetic reinforcement and **MIRAGRID Miramesh GR** may need to be cut (perpendicular to the wall face) to place the support struts. **MIRAGRID XT** geogrid reinforcement panels may be secured in-place with staples, pins, sand bags, or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the engineer.

The geosynthetic may not be overlapped or connected mechanically to form splices in the primary strength direction. Single panel lengths are required in the primary strength direction. Therefore the geosynthetic should be installed in one continuous piece with the primary strength direction extending the full length of the reinforced area. No overlapping is required between adjacent rolls unless specified by the engineer.



### C. **MIRAGRID Miramesh GR/TR** placement

Install **MIRAGRID Miramesh® GR** parallel to the wall/slope face, or as directed by the project engineer. Place the **MIRAGRID Miramesh GR** against the inside front face of welded wire mesh form. Minimum embedment is based on project design plans and basket vertical offset. When placing the **MIRAGRID Miramesh GR**, drape the geotextile over the wire face, allowing for the required wrap embedment. Install the reinforcing struts at a minimum of 24 in (61 cm) on center (typical).

## 6. REINFORCED SOIL SLOPES (RSS) WITH GEOSYNTHETIC WRAP FACE



### A. MIRAGRID Miramesh GR/TR placement

Install **MIRAGRID** Miramesh GR parallel to the wall/slope face, or as directed by the project engineer. Place the **MIRAGRID** Miramesh GR against the inside front face of welded wire mesh form. Minimum embedment is based on project design plans and basket vertical offset. When placing the **MIRAGRID** Miramesh GR, drape the geotextile over the wire face, allowing for the required wrap embedment. Install the reinforcing struts at a minimum of 24 in (61 cm) on center (typical).

### B. Turf reinforcement mat installation

The turf reinforcement mat (TRM) facing option **PROPEX** Pyramat® laydown process starts with the downstream/downwind end of the site. To ensure proper pinning of the overlapped areas the proceeding roll width must be laid out before the current roll width can be pinned with exception to the final roll width. For straight sections of a slope, **PROPEX** Pyramat panel lengths should be long enough to construct the anchor trenches and covering the surface of the soil reinforced slope. Ensure that **PROPEX** Pyramat has intimate contact with the ground and all irregular surfaces beneath it are removed. Secure **PROPEX** Pyramat panels in place using pins across the slope surface according to the project's engineered design. For additional details on **PROPEX** Pyramat installation, please see the [Installation Guide PROPEX Pyramat for slopes](#).



## 7. TEMPORARY REINFORCED SOIL SLOPES (RSS) WITH NONWOVEN WRAP FACE



### A. Geogrid reinforcement placement

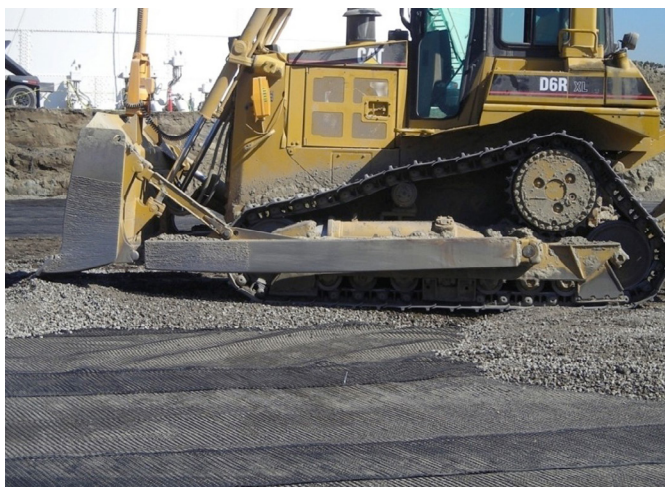
To achieve compaction of the backfill to the face, a temporary wooden form should be used. Place the **MIRAGRID XT** geogrid reinforcement against the wooden temporary form. Drape the **MIRAGRID XT** over the temporary form, allowing for the required wrap embedment. Minimum wrap embedment of the geogrid top wrap of each layer, per FHWA is a minimum of 3 ft (1 m). The geogrid shall be placed up to the front of the temporary form and tensioned by hand until taut, free of wrinkles and lying flat. **MIRAGRID XT** geogrid reinforcement panels may be secured in-place with staples, pins, sand bags, or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the engineer.

The geogrid may not be overlapped or connected mechanically to form splices in the primary strength direction. Single panel lengths are required in the primary strength direction. Therefore the geogrid should be installed in one continuous piece with the primary strength direction extending the full length of the reinforced area. No overlapping is required between adjacent rolls unless specified by the engineer.

### **B. Nonwoven MIRAFAI N-Series or woven MIRAFAI HP-Series placement reinforcement mat installation**

Install **MIRAFAI N-Series** or **MIRAFAI HP-Series** parallel to the wall/slope face, or as directed by the project engineer. Place the **MIRAFAI N-Series** inside the **MIRAGRID XT** and against the inside of the wooden temporary form. Minimum embedment on the top and bottom of each geogrid lift is 12 in (30 cm). When placing the **MIRAFAI N-Series** or **MIRAFAI HP-Series**, drape the geotextile over the form, allowing for the required wrap embedment. Once both the **MIRAGRID XT** and geotextile face wrap are placed, backfill placement for the lift can proceed.

## **8. BACKFILL PLACEMENT**



Backfill within 3 ft (1 m) of the wall/slope face will typically be compacted with hand equipment. Density shall be measured every soil lift or as otherwise directed by the engineer. Backfill shall be graded away from the slope crest and rolled at the end of each work day to prevent ponding of water on the surface of the reinforced soil mass. The site shall be maintained to prevent the flow of water from overtopping the slope crest during construction and after the completion of the slope.

Most rubber-tired vehicles can be driven at slow speeds, less than 10 mph (6 km/h) and in straight paths over the exposed geosynthetic without causing damage to the geosynthetic. Sudden braking and sharp turning should be avoided. Tracked construction equipment should not

be operated directly upon the geosynthetic. A minimum fill soil thickness of 6 in (15 cm) is required prior to operation of tracked vehicles over the geosynthetic. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geosynthetic.

## **9. DRAINAGE**

Groundwater infiltration of surface runoff can cause saturation of the reinforced soil fill that will significantly reduce soil strength and reduce a retaining wall/steepened slope's factor of safety. If the wall was not designed with the extra reinforcement to handle these reduced strengths, then a drainage system should be provided to prevent the fill from becoming saturated.

### **About Solmax**

Solmax is a world leader in sustainable construction solutions, for civil and environmental infrastructure. Its pioneering products separate, contain, filter, drain and reinforce essential applications in a more sustainable way – making the world a better place.

The company was founded in 1981, and has grown through the acquisition of GSE, TenCate Geosynthetics and Propex. It is now the largest geosynthetics company in the world, empowered by more than 2,000 talented people. Solmax is headquartered in the province of Quebec, Canada, with subsidiaries and operations across the globe.

### **Uncompromised quality**

Our products are manufactured to strict international quality standards. All our products are tested and verified at our dedicated and comprehensive laboratories which maintain numerous accreditations. We offer our partners a wide scope of testing according to published standards to ensure products delivered to sites meet specified quality requirements.

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