

Secugrid® & Combigrid®

Base Reinforcement Applications

NAUE GmbH & Co. KG



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The following installation recommendation contains general installation guidelines. It is presented as a general format, not as a direct substitute for a project specific specification. In the event of a conflict, the requirement of the project specification will supersede these recommendations. This recommendation does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this guideline to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. The information contained herein has been compiled by NAUE GmbH & Co. KG, Germany, and is, to the best of our knowledge, true and accurate. There is no implied or expressed warranty. Final determination of suitability for use contemplated is the sole responsibility of the user. This information is subject to change without notice.

1. Scope

This installation guide is valid for all Secugrid®/Combigrid® geogrids (in the further installation guide referred to as Secugrid®) used in base reinforcement applications. It details the receipt, storage and handling, installation of geogrid and fill placement.

2. Applications

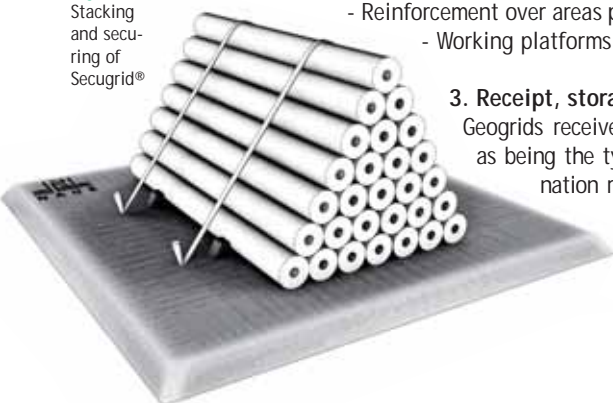
This guide is appropriate for geogrid installation in base reinforcement applications, to include, but not limited to:

- Unpaved roads and/or roads subsequently paved
- Parking areas, unpaved and/or subsequently paved
 - Area stabilization for storage and multidirectional traffic areas
 - Reinforcement over areas prone to subsidence
 - Working platforms applications

3. Receipt, storage and handling

Geogrids received shall be verified as being the type, grade or designation required for the project, as defined by the project documents. Material shall be clearly marked,

Fig. 1
Stacking and securing of Secugrid®



and in good condition before acceptance by the installation contractor. Secugrid® and Combigrid® geogrids are wrapped with a protection sheet to avoid effects to the roll due to shipment, water, sunlight or contaminants while being stored, transported or handled. Geogrids are transported and stored in rolls, and may be stacked on top of each other, but no more than seven rolls in height.

It must be ensured that rolls cannot move at any time once stacked and stored. If rolls are used for lifting purposes the pole length for 4.75m (15.58ft) wide Secugrid®/Combigrid® rolls should be 3.60m (≥11.8ft) to avoid bending of the roll during the lifting process. If stored on the ground, a tarpaulin shall be laid first to protect rolls from collecting dirt from site. If unwrapped geogrid is exposed to the elements for more than 30 days, a tarpaulin for protection must cover material stored onsite. Geogrids may be installed either manually or by use of mechanized equipment.

Edges of the geogrid rolls can be sharp, so gloves may be used during hand carrying and placement to prevent injury. Mechanized equipment may be used providing the said installation equipment does not damage the geogrid during this process.

4. Secugrid® installation

Ground surface shall be prepared prior to placement, providing a level and uniform ground surface, with appropriate clearing and grubbing performed to accomplish this. Additional preparation, as outlined in the project documents may be required. Geogrid shall be placed in the location and orientation specified in the project plans and specifications. Geogrid shall be laid flat and smooth directly on the prepared subgrade. All wrinkles and folds shall be removed.

When required, geogrid may be pretensioned to eliminate slack. Additional piles of aggregate or pinning of Secugrid® to the subgrade may be suitable to hold Secugrid® in place during the aggregate filling process. Should wind lift be a concern, then sufficient measures should be taken and be requested from the responsible specifying or site engineer.

Adjacent Secugrid® geogrids shall be overlapped, or joined as specified in the project plans. Overlaps shall be in the direction as shown on the plans. If not specified the overlap requirements can be used as listed in the following table 1 (for road construction applications). Other applications such as reinforce-

ment applications such as reinforcement of embankments, slopes, etc. shall be as specified in the project plans. Overlaps shall be in the direction as shown on the plans. If not specified the overlap requirements can be used as listed in the following table 1 (for road construction applications). Other applications such as reinforcement of embankments, slopes, etc. shall be as specified in the project plans.

Fig. 2
Installation and overlap



ment for working platforms, slope reinforcement, areas prone to subsidence, etc. might require other dimensioned overlap lengths.

Tab. 1 General Secugrid® overlap recommendation
Soft subgrade installations may require a greater overlap, or joining of adjacent rolls using cable ties or other suitable device to maintain the geogrid location and orientation during fill placement. Consult project plans and specifications for more instructions in this regard.

Soil Type	CBR [%]	E_{V2} [MN/m ²]	Overlap
Firm	> 3	$E_{V2} > 15\text{MN/m}^2$	300mm (12in.)
Soft	1 - 3	$5\text{MN/m}^2 \leq E_{V2} \leq 15\text{MN/m}^2$	300mm – 900mm (12 - 30in.)
Very Soft	< 1	$E_{V2} < 5\text{MN/m}^2$	900mm (30in.)

5. Cutting

If cutting of material is required this may be done with sharp shears, knife-like tools, handheld power saws, angle grinders or other suitable tools. As during the entire handling process, appropriate safety and health practices need to be followed

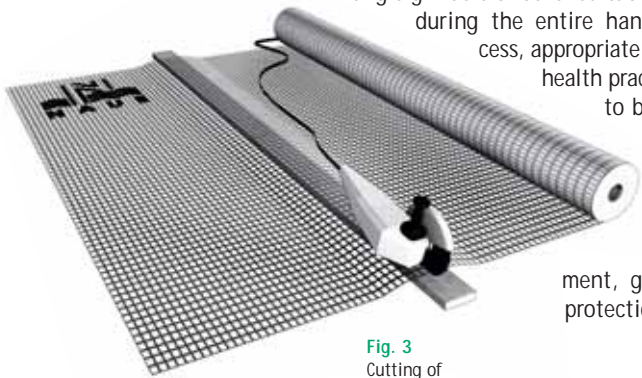


Fig. 3 Cutting of Secugrid®

(i.e. use of appropriate safety equipment, gloves, eye protection, etc.).

6. Repair

If Secugrid® geogrids are damaged during the installation process or afterwards, damaged areas may be repaired by laying a patch of Secugrid® of the same type over the damaged area. To allow a perfect interlocking of the aggregate,

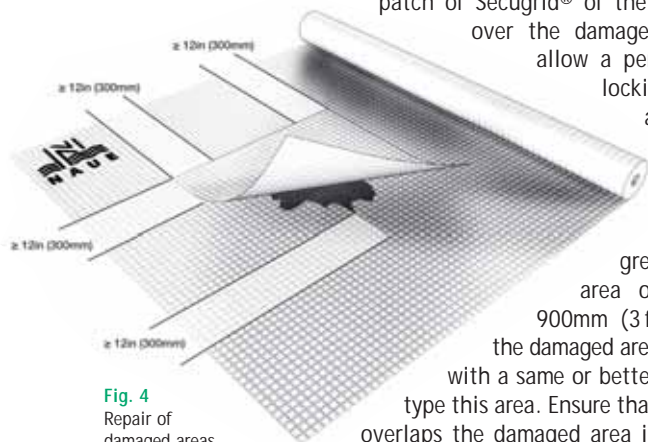


Fig. 4 Repair of damaged areas

remove the already placed aggregate in an area of at least 900mm (3ft) around the damaged area and patch with a same or better Secugrid® type this area. Ensure that this patch overlaps the damaged area in all directions with a minimum of 300mm (12 inches) as well as requirements from section 4, especially in table 1.

7. Fill placement and compaction control

Prior to fill placement the geogrid shall be inspected by the certified inspector, to make sure it is placed in the proper location, and has not been damaged during this installation. Damaged geogrid, as determined by the engineer shall be repaired immediately, either by replacement or by patching to suitably cover the damaged area. For additional requirements it is recommended to consult the responsible project engineer.



Fig. 5 Soil placement

Typically construction vehicles are not allowed to traffic directly on the geogrid. The subbase or base course shall be placed so a minimum of 200mm (8 inches) is in place before trafficking may occur. Any ruts occurring during fill placement shall be immediately filled in.

Typically granular fill is used for base reinforcement applications. In all cases fill used shall be as required in the specifications, and shall be placed and compacted accordingly. Otherwise, the recommended granular fill for paved roads should be well graded crushed aggregate to achieve positive mechanical interlocking and low moisture susceptibility.

Size	% Passing
1 ½ inch	100
¾ inch	50-100
sieve # 4	25-50
sieve # 40	10-20
sieve # 100	5-15
sieve # 200	< 10

Size	% Passing
45 mm	90-100
31.5 mm	70-90
16 mm	50-70
5 mm	30-50
2 mm	20-40
0.4 mm	5-25
0.63 mm	< 5

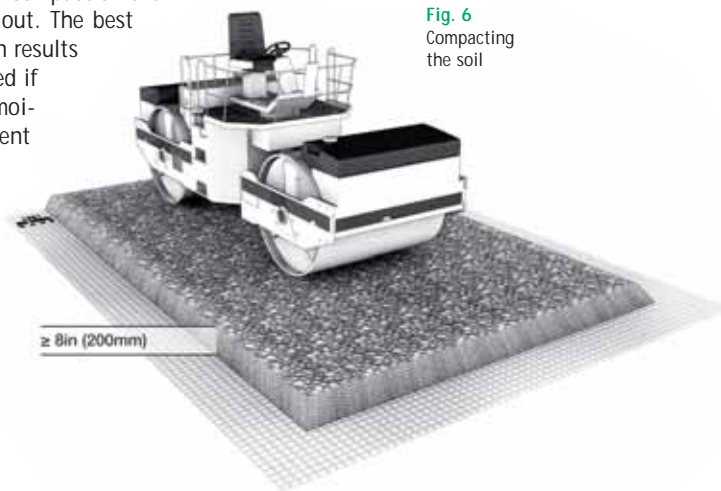
Tab. 2 Preferred fill gradation if not specified

If not specified the typical granular fill requirements can be used as listed in the following table 2.

Well graded granular fill material up to a grain sizes of 63mm (2.5 inch) are acceptable to be installed without further verification. Materials with a larger grain size require further investigation, especially in regards of installation resistance.

8. Compaction

Compaction shall be carried out according to the minimum standards set forth by appropriate local guidelines or as described in the project specifications. If not otherwise described compaction of the installed aggregate over the geogrid should be carried out to the prescribed density (generally 98% Proctor). Use light equipment only for compacting the first course on very soft subgrade (CBR < 1%). In these cases initial static followed by dynamic compaction shall be carried out. The best compaction results are achieved if the fill moisture content is close to optimum.



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