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**GEOTEXTILE**

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INSTALLATION GUIDE

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TITAN ENVIRONMENTAL CONTAINMENT

TE  
NON WOVEN GEOTEXTILE



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#### Unloading & Storage:

- The geotextile shall be labeled, stored, and handled in accordance with ASTM D 4873, "Guide for Identification, Storage and Handling of Geotextiles".
- Geotextile rolls are to be unloaded under supervision of the geotextile installer using straps or other devices that will prevent damage to the geotextile material.
- The geotextile shall be kept dry and wrapped in a waterproof wrapping so that it is protected from UV light and the elements during shipping and storage. Torn wrapping shall be repaired as quickly as possible using an approved protective covering.
- Rolls should be stored on supports that will not damage the material. The material must be elevated at least 2 inches above the sub grade.
- If any material is found to be damaged during unloading, a notation should be made as to the roll number, location of damage and type. This information should be given to the Project Manager.



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#### Deployment:

- No material is to be deployed until the Project Inspector has inspected and approved installation of the geotextile.
- Material will not be deployed when moisture, high winds, or other adverse weather conditions are expected. This determination will be made by the Superintendent.
- Geotextile materials are to be deployed using methods that will not damage the material. The material will be visually inspected during deployment and any faulty or unsatisfactory areas will be marked for corrective action.
- If necessary, temporary sand bags may be used to prevent material uplift and movement from winds during geotextile installation. The number and location of sand bags will be determined by the Superintendent.
- All folds and excessive wrinkles are to be removed prior to sewing adjacent panels together.
- On slopes, the geotextile shall be anchored at the top and unrolled down the slope.

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#### Project Documentation:

- The Superintendent will maintain the following documentation on a daily basis;
  - Log of job activities, including number of personnel, weather conditions, and quantity of geotextile deployed.
  - Listing of material placed, including panel size and location, and a cross reference of panel numbers.



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- Listing of patches and repairs, including location and reason.
- Upon completion of the project, the following documentation is to be provided to the owner or inspector:
  - Copies of Items 1, 2, and 3 above.
  - Copies of Material Certifications from the Geotextile Manufacturer, if required by the project specifications.

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### Heat Seaming:

- On geotextiles seven (7) ounces per yard or heavier, fusion seaming with a heat gun may be used.
- The minimum overlap for this type of welding is four (4) inches.
- Prior to fusion seaming the geotextile together, the installer must demonstrate to the Field Engineer the ability to perform this type of installation.
- Care should be taken during installation to prevent damage to the geotextile:
  - Areas burned through by fusion welding shall be properly repaired.
  - Torn or punctured material shall be patched with sufficient overlap to prevent separation.

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### Machine Sewn Seaming:

- Sewing typically requires three people;
  - A machine operator
  - A person on front of the machine operator to aid in fabric throughout. This person holds the fabric edges evenly together and feeds the fabric into the sewing machine head or folder.
  - A person behind the machine should hold tension on the fabric so the machine operator has a taut and straight edge to sew across. All three men advance at the machine sewing speed.
- Fabric layers should be placed on the ground (preferably firm ground) so that the edges to be sewn are parallel and overlap a minimum of six inches and seamed together.
- Ensure that no soil materials are present within seams or overlaps.
- Use thread specifically adapted for this purpose and one the following types of sewing machines:
  - Single Thread, Chain Stitch
  - Union Special, American Newlong, or equal (Federal Class 101. Refer to the Federal Standard on stitches, seams and stitching).
- Thread should be of contrasting color to the fabric to facilitate seam inspection.
- Seams shall be sewn utilizing one or two rows of stitching. Each row shall consist of 4 to 7 stitches per inch for adequate strength.





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- Three types of seam can be used:
  - The Flat (Prayer) seam;
    - Stitching should be approximately 1.5 inches from the outside edge of the fabric (not in the selvage or at the selvage edge).
  - The "J" seam, and;
  - The Butterfly-folded seam.
    - *Both the "J" fold and Butterfly fold seams* require a fold of 1.25 inches to 2 inches from the fabric edge with the stitching approximately 1 inch from the folded edge.



- Care should be taken with to assure that the two fabric edges are even during seaming.
- Folders can be attached to the sewing machine to fold and guide the edges of the two fabric layers into the sewing head.
- The machine operator and assistant must inspect opposite sides of the seam for dropped or incorrect stitches.
  - If the machine misses a stitch or runs off the fabric, terminate the seam by cutting and tying the thread. Begin a new seam approximately one foot behind the broken seam.
  - Damaged areas of geotextile are to be patched with an additional layer of geotextile material. The patch is to overlap the damaged area by a minimum of six inches on each side and is to be heat bonded to the main layer of geotextile.

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### Thread Specification:

- Thread should be of contrasting color to the fabric to facilitate seam inspection.
- Threads used to sew geotextiles should be:
  - Polyester, Polypropylene, or Nylon
  - Bonded and Thermally Set
  - 1800 Denier Minimum
- Titan recommends the use of BT207 - nylon sewing thread which meets or exceeds all these criteria.
- Unless otherwise specified, the thread should be of contrasting color to the fabric to facilitate seam inspections.
- Thread weight is typically expressed as "denier" or "tex". Denier is the weight in grams of 9000 linear meters of thread. Tex is the weight in grams of one kilometer of thread.

$$\begin{aligned}2000 \text{ denier} &= .222 \text{ g/m} \\230 \text{ tex} &= .230 \text{ g/m}\end{aligned}$$

For example, one pound of 2000 denier thread contains approximately 6,700 feet (2045 m) of thread.



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#### Thread Consumption:

- Thread consumption is the length of thread required to sew a linear seam, i.e., seven feet of thread is required to sew one foot of seam. Thread consumption rates for the two-thread and single-thread machines are as follows:

<u>Machine</u>	<u>Length Ratio (Thread:Stitch)</u>
Two-Thread, Double-Locked Stitch	7:1
Single Thread, Chain Stitch	4:1

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#### Needles:

- Needle size is critical to the efficiency of the sewing operation. Needles should be compatible with machine and sewing thread. Needles are available through sewing machine manufacturer representatives.

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