



SandMat

INSTALLATION GUIDE

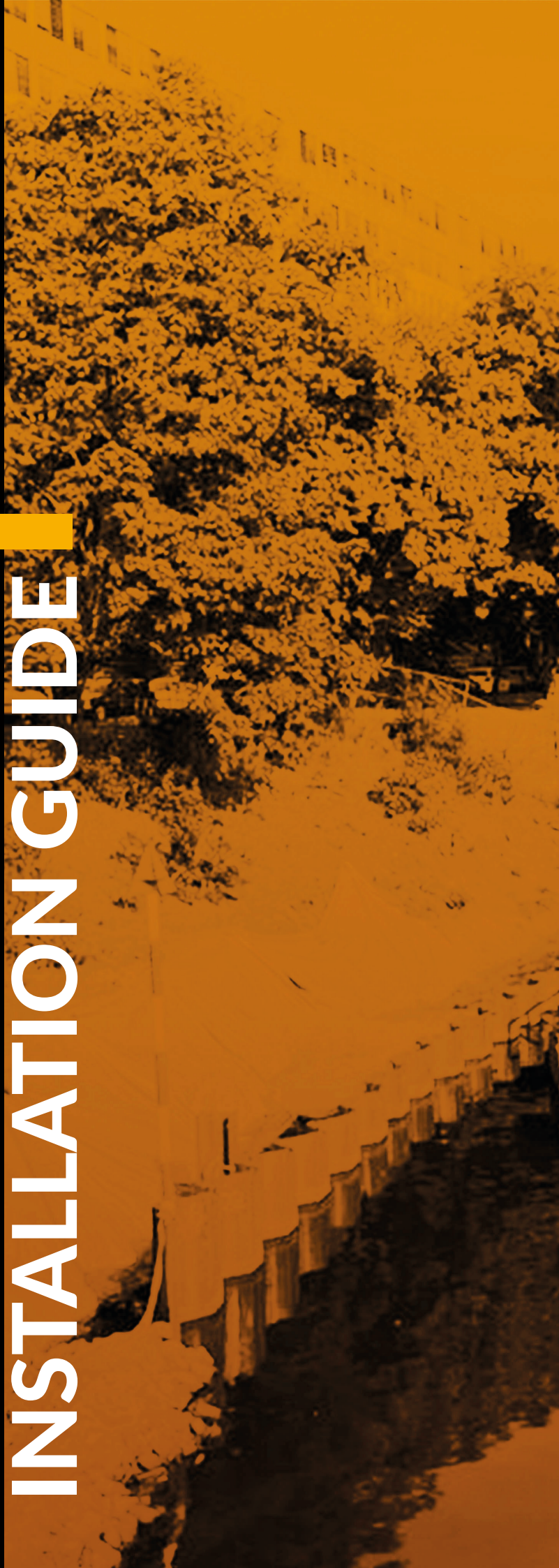


TABLE OF CONTENTS

Table of Contents

1. Scope	3
2. About Eurobent	5
3. Environmental impact	7
4. Supply, Packaging and Labelling	9
5. Unloading, Storage and Transportation	11
6. After delivery inspection	14
7. Equipment recommended on site	16
8. Personal protective equipment	18
9. Qualification for installer	20
10. Weather conditions for installation	22
11. Subgrade preparation	24
12. Installation	26
12.1. Installation	28
12.2. SandMat placement	28
12.3. Joining panels	34
13. Inspection	30
14. Damage repair	32
15. Terms & Conditions	34

SCOPE

01

1. SCOPE

The following installation recommendations are general guidelines for SandMat installation. They are provided as a general statement and are not a direct substitute for specifications for the project. In the event of a discrepancy, the project specification will override these recommendations.

These installation guidelines are not intended to establish a specific procedure for all climatic, geographic, hydraulic, or topographic conditions that may exist at a particular installation site. Appropriate installation procedures for unusual site conditions should be modified as necessary to maintain the integrity of the SandMat and adjacent site. The information contained in this document has been prepared by Eurobent Sp. z o.o. and is, to the best of our knowledge, true and accurate.



The manual is based on experience and standards:

- ASTM D5888 (Standard Guide For Storage and Handling of GCLs),
- ASTM D 6102 (Standard Guide For Installation of GCLs),
- ASTM D 5889 (Standard Practise for Quality Control of GCLs),
- ASTM D 6072 (Standard Guide for Obtaining Samples of GCLs),

which should be considered as supplementary to the manual.

The user of these guidelines should establish appropriate safety and health practices and determine the applicability of legal restrictions prior to use.

Final determination of suitability for the intended application rests solely with the user, who is responsible for proper installation of the SandMat. This information is subject to change without notice.

Eurobent does not warrant or assume responsibility for the results obtained from these installation guidelines or for the proper application of SandMat in any project, as it is the designer's responsibility to determine what material is appropriate for a particular project.

These instructions should be read in relations to the contract specifications and drawings. They are intended to provide guidance in normal installation situations and are provided on the request. If you have questions about the design, unusual installation problems, or any concerns, contact your designer or Eurobent for further advice. In all situations, the installer is responsible for the installation.

ABOUT EUROBENT

02

2. ABOUT EUROBENT

Eurobent Sp. z o.o. is a Polish company from Lower Silesia.

Eurobent entered the geosynthetics production market in 2008. The company is a team of young, dynamically developing people. Thanks to the high standards of its products and the professional service Eurobent has earned the trust and respect of some of the largest GTP consumers in the European market and beyond. At the same time, thanks to many years of experience in the field of geosynthetics production, the company has been able to develop invaluable knowledge in the production of GTP, which has enabled them to become an innovative and acknowledged competitor on the international market.

A company is built by talented people committed to provide the best service and products available on the international market.

Eurobent's laboratory technicians constantly undertake numerous tests on our products to ensure that their high standards are constantly maintained.



Eurobent is committed to constantly review the service we provide. The company aims to provide the highest quality product and also ensure that it would be manufactured, stored and transported in the way to minimize the negative impact on the environment. The customers can be sure that they purchase an eco-friendly product from a company that is committed to environmental protection.

One of Eurobent's main products is SandMat which consists of a non-woven geotextile or PP composite layers and a quartz sand embedded inside. It can be used successfully in scour protection, filtration and drainage.

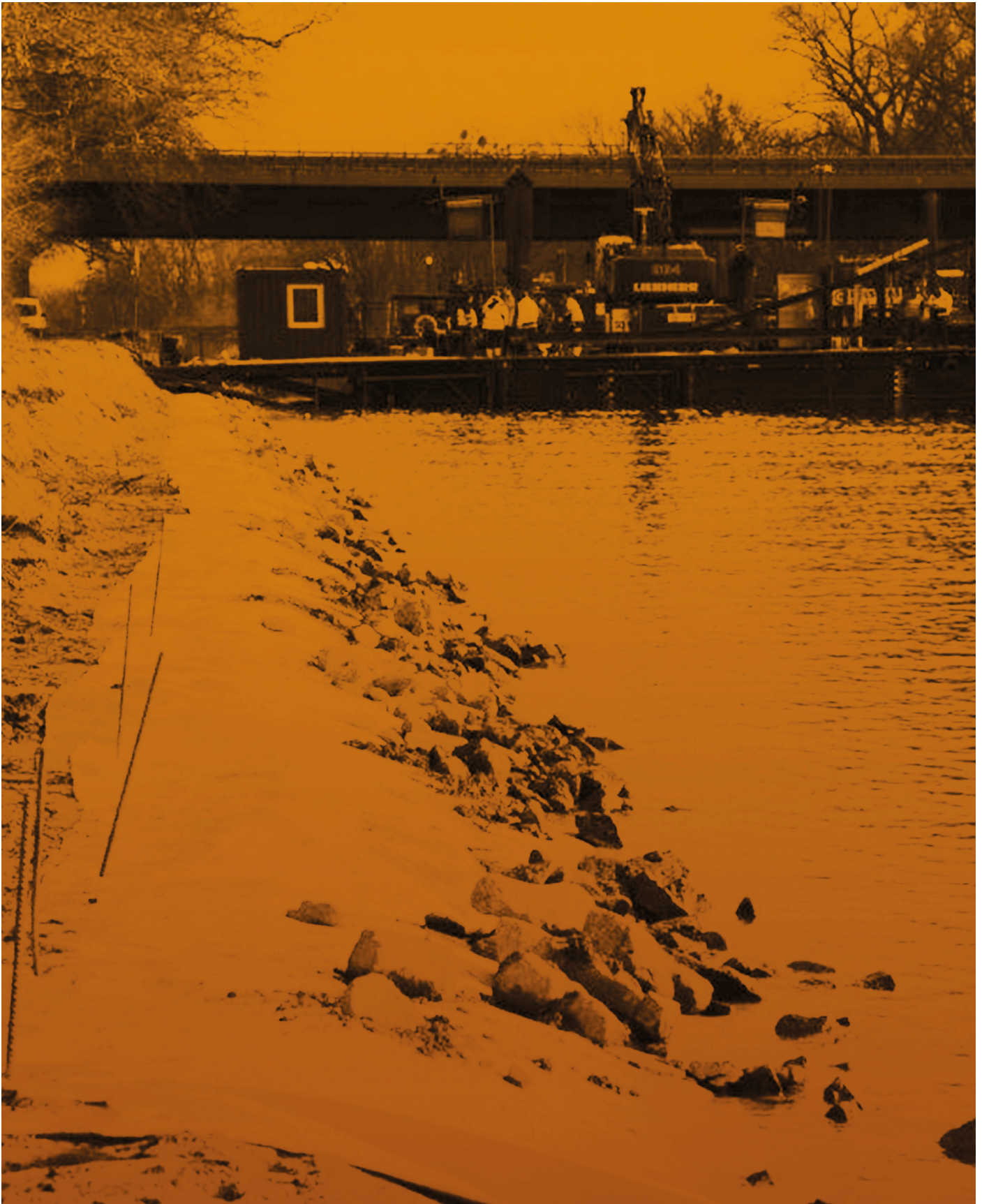


ENVIRONMENTAL IMPACT

03

3. ENVIRONMENTAL IMPACT

All materials used for the production of SandMat do not contain any hazardous or toxic substances and do not affect the environment in any way. No harmful substances are released to the SandMat in case of fire hazard.



ENVIRONMENTAL IMPACT

**SUPPLY,
PACKAGING
AND LABELLING**

04

4. SUPPLY, PACKAGING AND LABELLING

SandMat is labelled according to EN ISO 10320 for easy identification after unloading and during installation. Each roll shall be marked with the following information:

1. Manufacturer's name
2. Product identification
3. Roll number

SandMat is usually provided in rolls with a width of 5,1 m and a length of 40 m. Rolls can be also offered in other dimensions, depending on customer needs. Average roll diameter is approx. 60-70 cm, and the weight is approximately 1000 kg. SandMat rolls are wound on PVC cores with an inner diameter of 10 cm. Every roll is packed in a plastic, UV resistant sleeve. All rolls are marked with a label containing the information about dimensions, lot and a unique, traceable roll number.



Each roll is equipped with a set of two lifting straps. It is recommended to put a steel core inside the roll while unloading material from the truck to prevent bending of the roll.

While storing SandMat rolls do not place them directly on the ground but on pallets or similar constructions underneath. Rolls should not be stacked in more than 4 rolls high.

SandMat rolls should not be directly exposed to the bad weather conditions during the storage. All rolls shall be covered with a plastic sheet or a tarpaulin. Do not remove the plastic sleeves prior to installation.



SUPPLY & PACKAGING & LABELLING

UNLOADING, STORAGE AND TRANSPORTATION

05

5. UNLOADING, STORAGE AND TRANSPORTATION

Unloading

The party directly responsible for unloading the rolls should refer to this manual prior to arrival of the material in order to make sure they have proper unloading equipment and know the procedure. The unloading and on-site handling should be appropriately supervised. During the unloading procedure all material lot and roll numbers should be recorded and compared to the packing list. In addition, each roll of SandMat should also be visually inspected to determine if there is no perforation in the packaging or other visual material damage.

Accumulation of some moisture within roll packaging is normal and does not affect the product quality.

The exact nature and extent of the damage should also be indicated on the CMR/Bill of Lading along with the specific lot and roll numbers of the damaged materials. Photos of the damaged goods on the truck are required.

Unloading the truck at the construction site is carried out either by forklifts, wheel loaders, excavators or by means of built-in truck cranes.

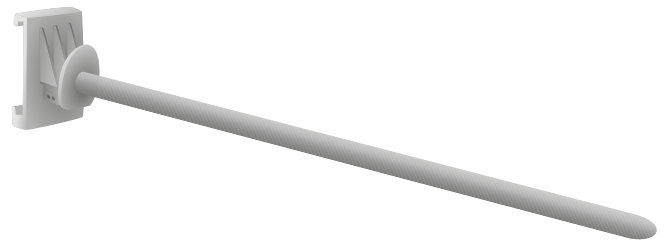
A suitable crossbeam can be used also for the unloading. The crossbeam pipe (with a maximum diameter of 8 cm) is thrust through the core of the rolls and attached at the ends with chains, belts or ropes to the crossbeam. The unloading is carried out upwards.



If there is no crossbeam available, at least 2 belts are wound around the rolls. The unloading is carried out smoothly upwards or laterally via e.g. crane.

Another unloading option is a forklift, to which a stable mandrel is attached. The truck is unloaded from the back in this manner. Under no circumstances should the rolls be dragged from the truck since the geosynthetic clay liner may be damaged significantly.

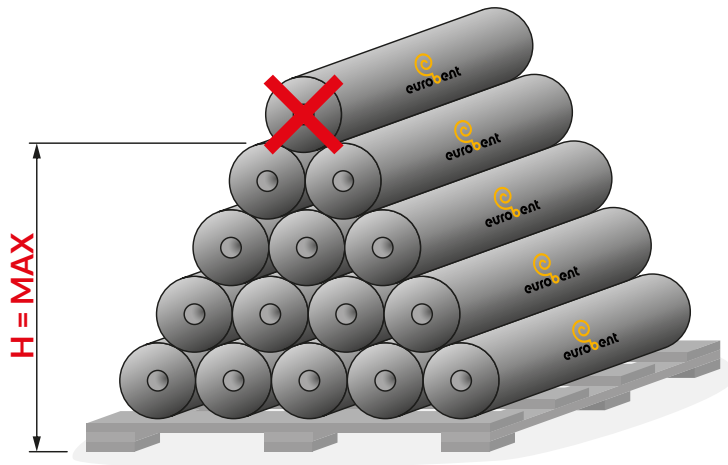
SandMat may also be delivered in shipping containers. In these cases, different unloading equipment and techniques must be employed. Because of limited access to the SandMat rolls, it is usually necessary to utilize an extendable-boom forklift with a pole carpet (stinger) attachment.



The rolls are removed by inserting the stinger through the roll cores and lifting/pulling the rolls from the container. To each container we add several loading straps - thanks to that rolls can be tied up - it makes it easier to remove the rolls from the container.

Storage

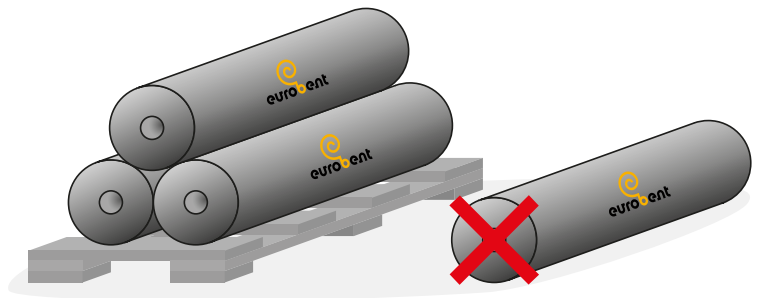
SandMat may be stored at a project site indefinitely, provided that proper storage procedures are followed.



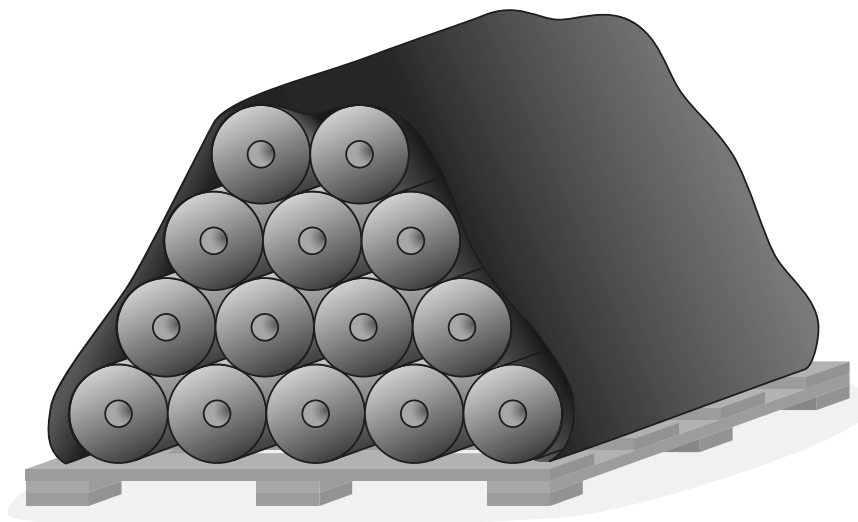
Firstly, a dedicated storage area should be identified. This area should be leveled, dry, well drained, and located away from high-traffic areas of the job site.

In the warehouse and on site, bentonite mats should be placed on underlying material (wooden beams, pallets, plastic profiles etc.) to avoid unnecessary material wetting by rain during storage.

Rolls should not be stacked in more than 4 rolls high. Long-term storage of material in a warehouse or on a construction site requires periodic inspection of the condition of the packaging. The polyethylene sleeves of SandMat rolls should be examined for any obvious rips or tears. Sleeve damage should be repaired immediately with adhesive tape or additional plastic sheeting. At this point it is also recommended to examine the labels - if they were displaced in transit, they should be taped to the roll.



SandMat should not be directly exposed to the elements during the storage. Cover all rolls with a plastic sheet or a tarpaulin. Do not remove the plastic sleeves prior to installation.



NOTE:

The temperature of the surrounding environment has no degrading effect on the quality of SandMat mats even when stored for long periods.

AFTER DELIVERY INSPECTION

06

6. AFTER DELIVERY INSPECTION

1. Each roll shall be visually inspected when unloaded to determine if any packaging or material has been damaged during transit.
2. Repairs to damaged SandMat shall be performed in accordance with installation manual:
 - a. Rolls with visible damage shall be marked and set aside for closer examination during deployment.
 - b. Minor rips or tears in the plastic packaging shall be repaired with moisture resistant gluing tape prior to being placed in storage to prevent moisture damage.
 - c. SandMat rolls delivered to the project site shall be only those indicated on SandMat manufacturing internal test reports.
 - d. In the case of SandMat, the presence of flowing water in the package requires the removal of water from the roll package. Free flowing water in the packaging of unreinforced SandMat is not a reason to reject the roll.

Preserve integrity and readability of roll labels.



AFTER DELIVERY INSPECTION

**EQUIPMENT
RECOMMENDED
ON SITE**

07

7. EQUIPMENT RECOMMENDED ON SITE

The QCA inspector shall verify that proper handling equipment exists which does not pose any danger to installation personnel or risk of damage or deformation to the liner material itself. Suitable handling equipment is described below:

1. Spreader Bar Assembly – A spreader bar assembly shall include both a core pipe or bar and a spreader bar beam. The core pipe shall be used to uniformly support the roll when inserted through the SandMat core while the spreader bar beam will prevent chains or straps from chafing the roll edges;
2. Stinger – A stinger is a rigid pipe or rod with one end directly connected to a forklift or other handling equipment. If a stinger is used, it should be fully inserted to its full length into the roll to prevent excessive bending of the roll when lifted;
3. Straps – A properly structured and supported pole or “carpet puller” can be used to unload SandMat Rolls onsite. As an alternative, straps with appropriate lifting capacity, located across the roll, can be used as one of the methods of lifting and unloading SandMat rolls;
4. Excavator (tracked or wheeled) or front-end loader. Equipment should be suitable for the anticipated load;
5. Carpet knife or safety knife;
6. Felt pens or other pens to write on geotextiles;
7. Measuring tape;
8. Broom.



PERSONAL PROTECTIVE EQUIPMENT

08

8. PERSONAL PROTECTIVE EQUIPMENT

Respiratory, eye, hand and body protection may be recommended when working with SandMat. Safety is key, so taking the necessary safety precautions is a must:



Safety Eye protection



Dust mask



Safety Hazard Clothing



Glove



PERSONAL PROTECTIVE EQUIPMENT

QUALIFICATION FOR INSTALLER

09

9. QUALIFICATION FOR INSTALLER

Recommendations:

The installation team must be familiar with SandMat installation guidelines and be trained in installation of it.

Installer shall have experience installing SandMat on at least 5 projects and have installed a minimum of 100 thousand m² of SandMat materials.

The manual is based on experience and standards:

- The suitability of the materials used as documented by certificates and statements from authorized testing institutes.
- Documentation of the specific attestations or delivery notes of the materials used at the construction site involved.
- Self control during the execution in relation to the manufacturer's manual:
 - visual inspection of the underlayment before the actual installation,
 - visual inspection of the overlaps and the entire lined surface,
 - visual inspection of workmanship details.



WEATHER CONDITIONS FOR INSTALLATION

10

10. WEATHER CONDITIONS FOR INSTALLATION

SandMat does not require special weather conditions during its deployment.



WEATHER CONDITIONS FOR INSTALLATION

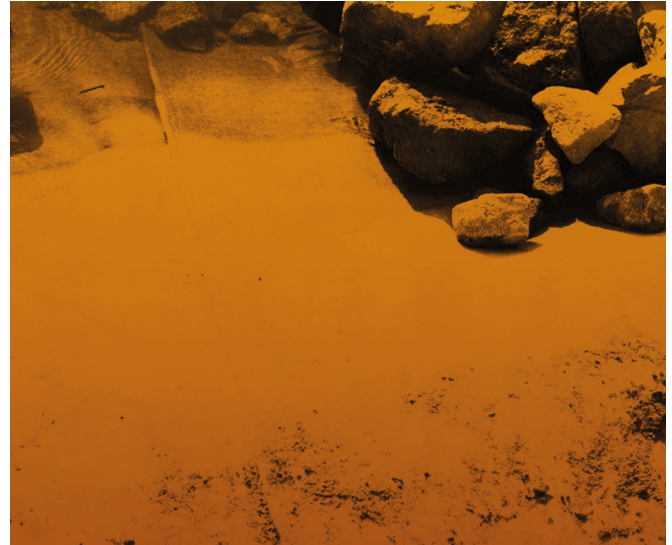
SUBGRADE PREPARATION

11

11. SUBGRADE PREPARATION

Surface, on which you plan to install the SandMat must be free of sharp rocks, organic matter and other objects larger than 50 mm. The subgrade should be compacted at least 90% of its proctor density. While compacting with a smooth-wheeled or rubber-tired roller, try to keep the surface free of water. SandMat may be installed on a frozen subgrade, however only if the subgrade soil in the unfrozen state meets the requirements listed above.

When installing SandMat over a soil subgrade, the finished surface should be smooth without any abrupt elevation changes, voids, cracks or ice. In addition it should be firm and unyielding, and compacted to a degree so that deployment or other construction equipment does not leave tracks or ruts greater than 25 mm in depth.



Notwithstanding the above requirements, the subgrade surface must also be prepared in strict accordance with the project drawings and specifications, and the engineer's approval of the subgrade must be obtained prior to material deployment.



SUBGRADE PREPARATION

INSTALLATION

12

12. INSTALLATION

12.1. Installation

SandMat should be placed on the prepared subgrade without wrinkles or folds. Place the SandMat on the ground at the installation site. Unroll the SandMat roll like a carpet.

For easier handling and positioning of SandMat it is recommended to provide a lifting device which allows to lift the rolls with a bulldozer or front end loader. The iron pipe may serve as a device for unloading as well as for installation of the liner.

On slopes the orientation of panels shall be parallel to the slope. The panels should be secured in an anchor trench at the top of the slope. The requirement as well as dimensioning should be based on a stability calculation.

SandMat is often used as part of a scour protection along river embankments and riverbeds and at the bottom of canals that are previously filled with water. Underwater installation requires a bigger overlapping section up to 1,0 m. Orientation of underwater overlapping has to take the streaming direction into consideration. Installation starts always downstream. The following rolls are installed in upstream direction to avoid streaming caused lifting forces underneath the overlapping area and to create an overlapping structure comparable to roof tiles. The unrolling process is performed by using a steel beam pushed through the core of the roll connected by chains to a suitable lifting machine. To ensure a proper overlapping underwater it is recommended to assist and control the unrolling process by divers.

An effective measurement to reduce overlapping is to connect neighbored roll edges by seams. The sewing process can not be performed under water. Consequently the product has to be layed out on a barge, or other vessel with a large enough deck. The SandMat can already be overlapped on the deck of the barge using seams, which will be described in the next subsection of the document.

To ensure proper functioning of the SandMat at the bottom of the channel, it must be protected from disorderly washout by water movement. The easiest way is to cover it with stones, which is possible due to the high puncture resistance of the liner.



If SandMat is not installed underwater, it must be covered with a layer of soil within up to 14 days of installation to maintain the 50-year product warranty.

12.2. SandMat placement

SandMat shall be placed in a way that longitudinal joints are parallel to the slope direction. Transversal joints should also be located a minimum of 1 m from the toe and crest of any slopes steeper than 4H:1V. End seams on slopes should be used only if the liner is not expected to be in tension and interface friction testing confirms this.

SandMat surface should be smooth, without any folds, especially at the exposed edges.

12.3. Joining panels

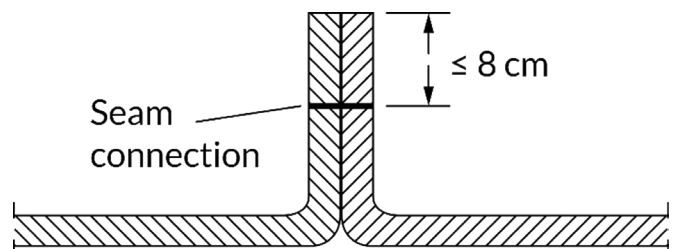
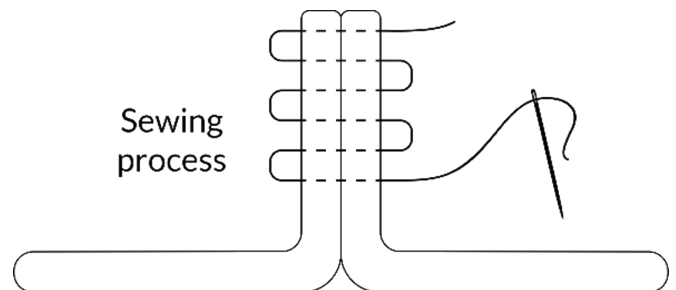
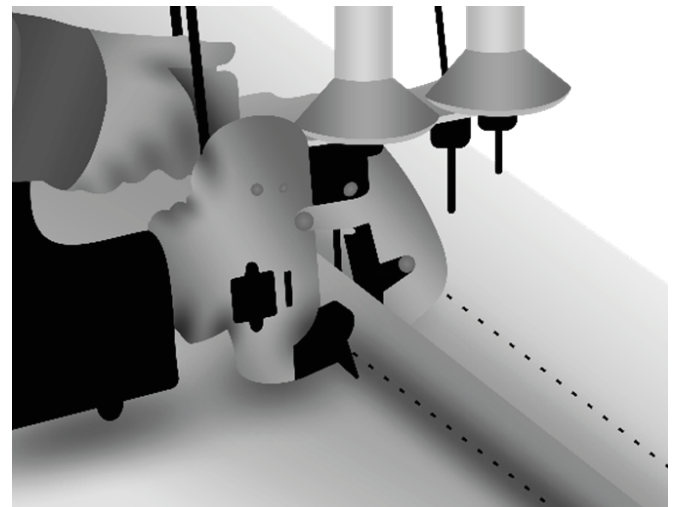
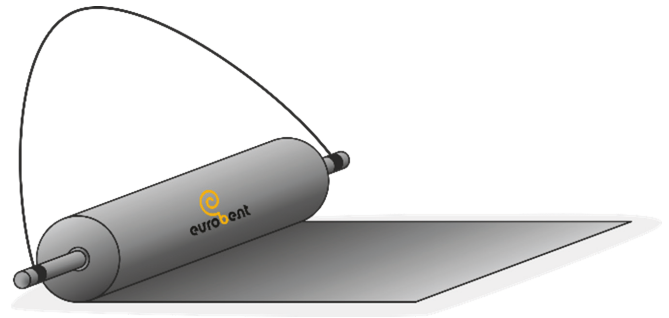
Each panel is marked with two lines, the first located 15 cm from the edge, and the second one is 7 cm farther. This helps in the parallel arrangement of the panels in relation to each other.

The size of the overlap depends on the shape of the underground and design requirements.

The longitudinal edges of SandMat are free of sand, which ensure proper sewing of panels. In order to properly connect the two SandMat panels, they should be placed in such a way that they overlap along the sides. SandMat edges should then be folded up one to the other so that the overlapping section form a single upstanding line. The sewing process will connect the edges of two rolls along the folded overlapping section that is free of sand filling material to protect the sewing needle from damages. It is recommended to use suitable sack sewing machines as sewing device, e.g. Union Special Type 2200 GA or comparable and proper yarn with high tensile strength that provide - once transformed into a seam - stronger resistance than the sandmat during a pull apart test.

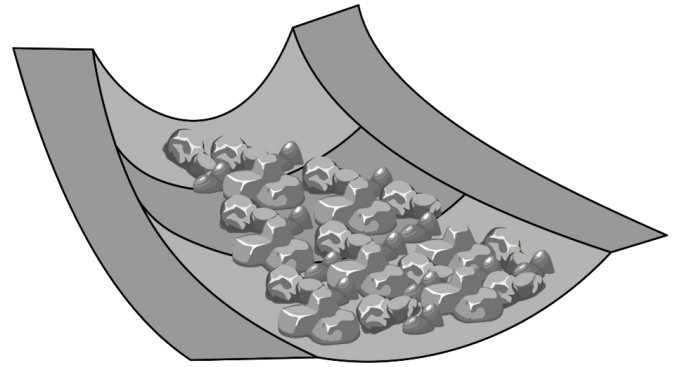
Sewing minimizes overlaps, saving a large part of the material.

The minimum distance between the edge of the product and the seam shall not be less than 8-10 cm. The given variation is due to the hand sewing process that - in opposite to industrial sewing - does not allow precise straight sewing lines. This requirement leads to a total loss by overlapping between two neighbored rolls of 16-20 cm. Compared to standard overlapping underwater of up to 1,0 m. the sewing process provide a saving of 80% overlapping losses.



The above described sewing process provide a safe and approved connection between the rolls achieving the same tensile properties as the product itself. As temporary connection between two rolls at dry installation conditions without further movement of the product, the geotextile surface inside the overlapping area can melted by using a a hot air gun such as e.g. Leister Triac or comparable and pressed together. This hot air connection is comparably weak.

Moreover, thanks to high puncture resistance, SandMat shall be covered with Riprap, which fixes the mat to the subsoil and prevents the panels from moving relative to each other.



INSTALLATION

INSPECTION

13

13. INSPECTION

After placement and seams, an authorized person should perform a thorough visual inspection of the SandMat rolls and seams. This should be done as soon as possible after placement is complete.

The inspection should include overlaps, alignment, penetrations, joints, detection of any defects including installation damage. Detected mis-installed areas should be marked, repaired, and repairs should be inspected and approved by the project engineer or authorized person.

The inspection/repair process should be carried out in a systematic manner as soon as possible to ensure that no defective area is left unrepaired.



INSPECTION

DAMAGE REPAIR

14

14. DAMAGE REPAIR

If there is a tear in the mat, remove the sand from the edges and sew the mats together as described in Joining Panels section (page 28).

In case of a tear in the form of a hole in the SandMat, which cannot simply be sewn up, a patch should be cut from another SandMat panel and placed in the defect area. The fixing of the patch should be done in the manner of overlapping joints.



DAMAGE REPAIR

TERMS & CONDITIONS

15

15. TERMS & CONDITIONS

The engineering design for a specific site should be done after the site survey has provided all the necessary information.

The evaluation of appropriate safety factors for each specific project must always remain the responsibility of the design engineer.

This manual contains two forms that are helpful for daily installation reports and for SandMat inspections, both on the day of delivery and after installation.

Forms 1 & 2 are attached to the manual.





Installation form	
Project Name/Number	
Installation date	
Weather conditions	
Numbers of installed rolls	

Information about conditions of storage in a yard and on-site.	
Rolls labeled	Yes <input type="checkbox"/> No <input type="checkbox"/>
Packaging damage	Yes <input type="checkbox"/> No <input type="checkbox"/>
Rolls damage	Yes <input type="checkbox"/> No <input type="checkbox"/>
SandMat surface acceptable	Yes <input type="checkbox"/> No <input type="checkbox"/>
All seams visually inspected	Yes <input type="checkbox"/> No <input type="checkbox"/>
All detail work inspected	Yes <input type="checkbox"/> No <input type="checkbox"/>

*If there are defects or deficiencies that need to be noted, use the Remarks section.

.....
Date and signature of the person reporting the installation



Remarks

Empty rectangular box for entering remarks.

.....
Date and signature of the person reporting the installation



eurobent

KEEP ROLLING

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