

Installation Guideline for TensorTech® TW1™ Wall System

This Installation Guideline provides a step-by-step guide intended for use by Contractors planning to construct an earth retaining structure using the TensorTech® TW1™ wall system.

Introduction

The TensorTech TW1 wall system has been developed to provide engineers, architects and builders with an attractive and economical retaining wall package. The system, comprising mortarless concrete facing blocks and Tensor geogrid reinforcement is one of a range of retaining wall options available from Tensor International.

There are several versions of the TensorTech TW1 wall system, utilizing different block geometry, which must be taken into consideration when setting the wall out.

TW1 Standard - The TensorTech TW1 Standard blocks have a block face setback that will result in a nominal wall face angle of 86.2° (1:15).

TW1 Link - The TensorTech TW1 Link blocks have a block face setback that will result in a nominal face angle of 89.2° (1:75). In addition, the TW1 Link blocks have a rebate in the side to accommodate a steel tie to facilitate connection of a façade.

Where applicable, the Contractor shall ensure that the installation fully complies with CDM Regulations 2015 and should refer to the Designer's Risk Assessment and COSHH statements.

Installation

1. Prepare the formation and cast an in-situ concrete levelling strip with typical dimensions of 450mm wide x 150mm high, or 600mm wide (or as specified), if an external architectural face is to be attached to the block facing.
2. Blocks are delivered to site on pallets with 40 number blocks per pallet. The nominal weight of each pallet is 1120 kgs. TW1 Base blocks with a flat underside are used for the initial course. A single course of TW1 Base block should be bedded on mortar to the correct line and level. Where TW1 Base blocks are not locally available TW1 Standard blocks can be used for the initial course by laying a thicker mortar bed to accommodate for the downstand.
3. Place a minimum 300mm width of approved drainage material (4-20mm size), or as specified in the contract documents, immediately behind the blocks in stages with each backfill layer. This drainage layer must be continuous vertically and horizontally behind the full wall face between blocks and backfill. The drainage layer will stop at a level 0.5m below the top of the wall.
4. Place and compact approved fill in accordance with the latest version of UK Manual of Contract Documents for Highway works (MCHW), Volume 1 specifications for Highway works (MCHW1) Series 600 for Earthworks, Highways, or as specified in the contract documents, up to the level of the first layer of geogrid. With the important restriction within 2m of the TW1 blocks to use only a vibrating plate compactor or vibrating roller with a mass per metre width less than 1300kg and a total mass less than 1000kg.
5. Cut the Tensor geogrid from the roll to the required design length as indicated on the Construction drawings. At the end to be connected to the blocks ensure that the row of ribs is trimmed back to a length of 50mm from the transverse bar (across the full width of the roll). Do not trim the ribs close to the transverse bar.
6. Remove all debris from the top of the units using a brush.
7. Place the prepared end of the geogrid over the rebate in the block and locate the moulded connectors around the transverse bar (Figure 1). Ensure that each aperture of

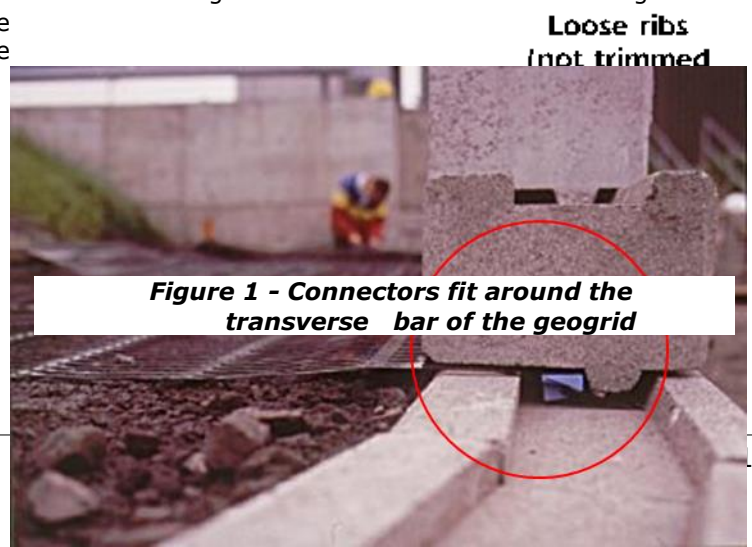


Figure 1 - Connectors fit around the transverse bar of the geogrid

the geogrid is covered by a connector. The connectors should be split where necessary to fit the geogrid rib spacing.

8. Position the assembly neatly into the rebate in the top of the blocks below with the trimmed ribs towards the face, ensuring that adjacent lengths of geogrid are abutted side-by-side at the wall face.
9. Repeat this procedure for the whole course ensuring that adjacent lengths of geogrid are abutted at the wall face not lapped.
10. Once again, ensuring all debris is brushed away, place the next course of blocks. Blocks should be placed stretcher bond and arranged so that the downstand is pushed up against the front of the rebate in the lower block.

Figure 2 - Connectors fit into the recess and are held in place by next block course.

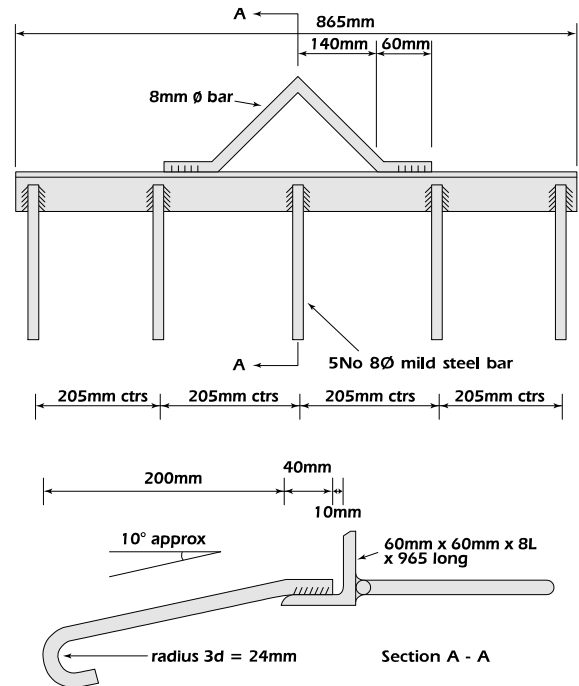


Figure 3 Tensioning Beam

11. Pull the free end of the geogrid so that the moulded geogrid connectors are firmly up against the rear of the rebate.
12. Place a minimum of three further courses of blocks ensuring they are pushed fully forward and are square with the previous course. Every course of blocks should be checked for horizontal and vertical alignment and the line and level of the wall overall checked every 3rd course. Any adjustment necessary may be made using ribs cut from the geogrid or approved shims, placed in between blocks. Insert the tensioning beam[1] through the apertures at the free end of the geogrid and apply a load sufficient to remove any slack. Leverage on a steel bar dug into the fill through the loop on the beam is usually sufficient.
13. Whilst maintaining tension, place a layer of fill on the geogrid which is sufficient to retain it in position when the load is released. Release the tension and remove the beam.
14. A 150mm thick cover of fill must be maintained between the geogrid and the tracks of any plant to avoid damage. Fill should be placed by plant such as an excavator with an opening bucket, which causes the fill to cascade onto the geogrid.
15. Plant used to place fill should be kept at least 2m away from the face.
16. If TW1 Link block is specified for an architectural masonry face to be attached, the approved stainless steel ties provided should be inserted into the slots of the TW1 Link blocks during the laying process (Figure 4). A rate of three ties to every square metre of face in a staggered pattern should be used.
17. Place and compact drainage material and fill in 150mm lifts, keeping blocks a minimum of three courses above the fill until the top of the structure is reached.
18. Compaction of fill shall be in accordance with the latest version of UK Manual of Contract Documents for Highway works (MCHW), Volume 1 specifications for Highway works (MCHW1) Series 600 for Earthworks, Highways, or as specified in the contract documents, up to the level of the next layer of geogrid. With the important restriction within 2m of the TW1 blocks to use only a vibrating plate compactor or vibrating roller with a mass per metre width less than 1300kg and a total mass less than 1000kg. Compaction should always commence nearest the face, working away toward the free end of the geogrid. Any lengths of geogrid fitted into the wall face above the level of fill should be temporarily folded over the top of the wall to provide a free working area.
19. Repeat steps 9-18 to construct the wall to the required height.
20. Any lengths of geogrid fitted into the wall face above the level of fill should be temporarily folded over the top of the wall to provide a free working area.
21. The drainage material should be excluded from behind the upper 0.5m of wall height.

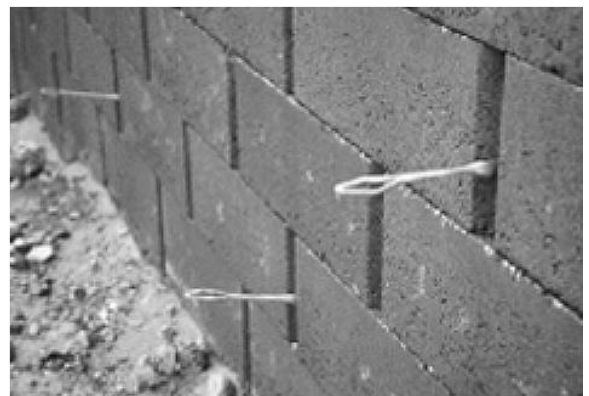


Figure 4 Ties in place for TW1 Link block

22. The top course of blocks should be bonded to the course below using a suitable external engineering adhesive. Extrude a line of adhesive either side of the rebate of the lower units and place the top course, pressing firmly to locate.
23. The TW1 Standard block is designed to allow construction of curved walls down to a minimum radius of 3m in plan. Preparation of the foundation strip and laying of the base units to the necessary alignment will be as in steps 1 & 2. Where a tight radius is required it may be necessary to reduce the width of the geogrid at the wall face by cutting on site, so as to ensure an efficient fit when the connector and geogrid are positioned in to the rebate.
24. To achieve good line and level, the coping units should be bedded on mortar. When alignment of the wall is curved or angled, the coping units require cutting on site to achieve best fit.
25. The Contractor is responsible for checking wall geometry during construction and taking necessary action to ensure that wall tolerance is met in accordance with Tensar International's recommendations.
26. The Contractor must fully assess the safety risk associated with working at height and where appropriate install any necessary temporary edge protection.



Figure 5 Geogrid overlaps on the inside of curved walls

Notes

1. Tensar Technical Note - TN/Uniaxial_Beam.

Refer to Tensar International if more specific advice is required.

This document was formerly published with the reference:CS_TW1

The information in this document supersedes any and all prior Installation Guideline for the products/system designated above and is supplied by Tensar International Limited without charge. Tensar International Limited excludes to the fullest extent lawfully permitted any and all liability whatsoever for any loss or damage howsoever arising out of the use of and reliance upon this information. It is your sole responsibility and you must assume all risk and liability for the final determination as to the suitability of any Tensar International Limited product and/or design for the use and in the manner contemplated by you in connection with a particular project.

Tensar, TensarTech and TriAx are registered trademarks

Copyright © Tensar International Limited 2020

Tensar International Limited

Tel: **+44 (0) 1254 262431**
 Fax: **+44 (0) 1254 266867**
 E-mail: **sales@tensar.co.uk**
www.tensar-
international.com

UK Head Office
Units 2 - 4 Cunningham
Court
Shadsworth Business Park
Blackburn
BB1 2QX
United Kingdom

