



GRS Muralex®

System Description

GEOSYNTIA



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GRS Muralex®



GRS Muralex® – GRS system with natural stone facing

Summary

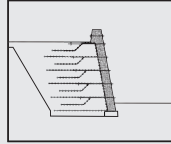
GRS Muralex® is a system solution for the installation of geosynthetic reinforced retaining structures. The GRS Muralex® system comprises earthworks reinforced by Fortrac® geogrid layers (as the structural element) and an attached front facing made from corrosion-protected steel mesh filled with stones.

The system is used to build steep, geogrid-reinforced retaining structures for applications such as bridge abutments, retaining walls, noise barriers and road or railway embankments. Wide-ranging options in terms of batter, contouring and slope face design ensure that GRS Muralex® retaining walls blend perfectly with their setting. The flexible geogrids and standardized system components facilitate the use of standard earth-moving plant for soil placement and boost the efficiency of site operations. This translates into substantial cost savings compared to conventional construction methods.



KEY DATA

- Bridge abutment with GRS Muralex® system, Avenue 2 tunnel, Maastricht
- Fortrac® T used as system reinforcement
- Built in 2012

**GRS Muralex®**

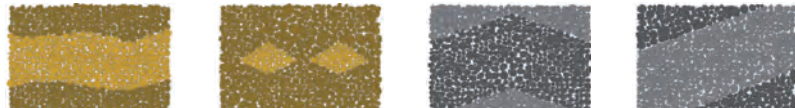
The structure normally has a front batter between 70° and 90°. The front facing is formed by a large-format, spot-welded steel mesh hung at a predetermined distance in front of the wrap-around wall. The gap between mesh and wall is filled with coarse ballast or rubble. The spot-welded mesh and stone filling lend the structure a gabion-like appearance.

The special front facing offers protection against fire, vandalism, UV radiation and external mechanical action. Unlike other construction types, the GRS Muralex® system gives designers the option of incorporating the facing either during or after installation of the reinforced retaining structure. This also makes the system suitable for land susceptible to settlement as the steel mesh assembly can be fixed after any settlement of the GRS has occurred. The system is thus inherently free from restraint and deformation stresses.

Moreover, having no structural function, the steel mesh face assembly can be easily replaced should it ever suffer damage through impact or any other unforeseen action.

Wall face

Different stone types and arrangements can be selected to meet the aesthetic requirements of the architect.

**System components****For wrap-around wall:**

- Fortrac® geogrids as reinforcing elements, with tensile strengths and embedment lengths as required by structural calculation
- Separating nonwoven fabric to prevent erosion and washing-out of soil
- Preformed steel mesh angles as lost formwork (Model II)

For front facing:

- Corrosion-protected steel mesh
- Corrosion-protected clasps to join together front mesh units
- Corrosion-protected steel ties with anchor plate (one-piece or two-piece tie rods, depending on formwork concept)
- Corrosion-protected brackets for connection of front mesh to steel ties, plus screws and washers
- Adequately compression- and frost-resistant stone filling (not included in package), suitable for mesh size of front facing

HUESKER will be pleased to provide you with expert advice on the choice of system components, the requirements placed on the fill material/soil and a suitable stone filling.



Installation of system components



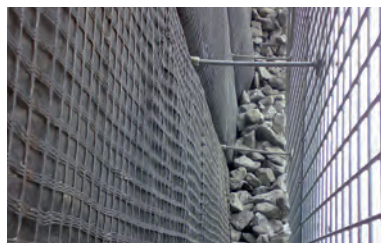
Model I

Large-area formwork with two-piece tie rod

The formwork is erected on a subgrade of adequate bearing capacity along the line of the future wall. Fortrac® geogrids are then incorporated layer by layer using the wrap-around method in the lengths required by the structural calculation. The fill material specified by the structural design is placed and compacted in accordance with good practice. Existing site material or regionally sourced soils can often be used.

After each layer, the tie rods are positioned according to the specified grid such that the socket is flush with the formwork. After removal of the formwork panels, the steel ties incorporated in the soil are extended by screwing threaded rods into the sockets (two-piece tie). The front mesh is then assembled, aligned and structurally connected to the tie rods using brackets. The front mesh units are joined together by clasps. Assembly of the front mesh and filling with stones should be carried out step by step using temporary bracing.

Two-piece tie rod ▼





Model II

Ancillary/lost formwork with one-piece tie rod

In contrast to the large-area formwork, this model – like the GRS Fortrac® Natur S system – generally employs preformed steel mesh angles as lost formwork. This, in turn, allows the incorporation of one-piece tie rods, thus eliminating the need for additional sockets and connection rods. Here, the tie rods are installed so as to project beyond the installed GRS by the depth of the planned front facing. The connection between the steel ties and front mesh units as well as between the individual mesh units are as for Model I.





Technical service

HUESKER's engineers will be glad to assist you with the structural calculation and the sizing of specific GRS structures. They will provide comprehensive advice from preliminary design to on-site installation.

HUESKER liaises closely with clients and designers so as to ensure that all relevant factors are taken into account. Specialist designers can also be involved for the preparation of detailed structural design and production information.





Benefits at a glance

The GRS Muralex® retaining wall system offers numerous advantages over standard solutions:

- Economic and eco-efficient construction, e.g. through use of locally sourced materials (soil, stone)
- Protection against fire, vandalism, UV radiation and external mechanical action (e.g. impact/accidents)
- Easily replaceable exterior (e.g. after impact)
- High-quality earthwork structure due to functional separation of GRS and front facing
- Freedom from restraint and deformation due to phased installation of GRS and front facing
- Logistical flexibility during construction phase due to phased installation
- No elaborate foundations needed
- Optional use of machinery for stone filling
- No extra costs for maintenance and care
- Wide-ranging design options

Apart from offering advice on products and applications, HUESKER Synthetic can also supply customized specification texts for tendering purposes. Upon request, we shall also be glad to provide you with further information, data sheets, certificates and test reports on the retaining wall system.

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HUESKER Synthetic GmbH

Fabrikstrasse 13-15
48712 Gescher, Germany
Phone: +49 (0) 25 42 / 7 01-0
Fax: +49 (0) 25 42 / 7 01-499
E-mail: info@HUESKER.de
Internet: www.HUESKER.com

Further
Information:



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