

SUGGESTED SITE SUBGRADE & BASIC OPERATIONAL & MAINTENANCE GUIDELINES for GEOMEMBRANE LINED FACILITIES

Please Note: This information is provided as a generic aid only to the design Engineer when incorporating Geomembrane linings into project works. It is given without prejudice, guarantee nor liability and is based on years of practical experience, extracts from the SANS 1200 D series (D, DA, DB and DE) for earthworks and the SANS 10409:2005 for Geomembrane Liners. The Engineer will at all times have responsibility for the final design.

EARTHWORKS

- The Civil Contractor shall be responsible for preparing and maintaining the subgrade in a condition suitable for installation of the liner unless specifically agreed otherwise.
- Surfaces to be lined shall be smooth and free of debris, roots and angular or sharp particles that might prove detrimental to the performance of the liner system. The Maximum size of particles shall typically not exceed 3mm.
- The sub-grade shall be well compacted, dry and stable for the life of structure in accordance with design specifications. The site should be constructed with either a suitable sub surface drainage system and/or gas removal system to prevent build up of pressures from below the liner.
- If the in-situ soil is unsuitable, a sand or fine gravel layer of thickness at least 2.5X the largest dimension of the largest particle size in the in-situ soil (or 50mm whichever is the greater) or a geotextile non woven protector sufficient to meet the above requirements should be used.
- The sub-grade shall be finished to the class of planar flatness as specified by the Engineer and shall have no sudden sharp or abrupt changes in grade. The maximum deviation under a 3m straight edge should typically be less than 50 mm and no abrupt changes greater than 5mm shall be tolerated.
- The Civil Contractor shall protect the sub-grade from desiccation, flooding and freezing. Sub-grade found to have unacceptable desiccation cracks or which exhibit excessive swelling, heaving or other movements shall be replaced or reworked by the Civil Contractor and made good.
- Special attention should be given to the angle between the inside anchor trench face and the adjacent horizontal surface. This can be a location for high stress concentrations and should be radiused as appropriate.

SURFACE ACCEPTANCE

Engineered Linings shall provide the Client/Site Manager with a written acceptance of the surface prior to commencing installation. Subsequent repairs to the sub-grade and the surface shall remain the responsibility of the Civil Contractor.

ANCHOR TRENCHES

Anchor trenches, as designed by the engineer, should be provided around the perimeter of the lined area. These must be excavated, backfilled and compacted normally in layers by the civil contractor.

CONCRETE WORKS, STRUCTURES & PENETRATIONS

- Structures shall be constructed being mindful of the need to connect flexible liner systems **and related fixing points**. They should be sufficiently strong, durable and smooth and surfaces should be straight and flat to accommodate any drilling and use of any steel anchors. Consideration must be made to the shutter nibs and corners and should be ground smooth as required. The use of a geotextile to protect the liner is also a consideration.
- The structure should be equipped where necessary with a concrete corbel / lip located around the structure in the plane to be occupied by the liner and should have radiused / chamfered corners. At the immediate transition zone between the structure and surrounding earthworks, this should be free of any steps and should be well compacted or **be constructed in such a manner so as to avoid differential settlement**.
- Any structures which will be required to penetrate or support the liner system shall be carefully considered. (eg. Pipes, overflows, footings, sumps, manholes, etc). These should be fitted with appropriate connections as suggested by the Lining Installer.

MAINTENANCE & SAFETY

- The Lining is **slippery** when wet and extreme care has to be taken by all parties during installation, and especially operation. Cat ladders, knotted ropes and life jacket should be considered around lined water structures. We recommend that **fencing** be erected to safeguard people and animals from falling in.
- Regular cutting back of grassed areas adjacent to the lined structure should be done to limit the effects of fire damage.

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