



SPECIFICATION FOR THE SUPPLY & INSTALLATION OF GROUT FILLED EROSION CONTROL MATTRESSES

1. EXTENT OF WORK

The work to be executed under this specification includes the supply of all materials, equipment and labour necessary for the complete installation of Foreshore Protection's 'Grout Matt' erosion control system.

2. DEFINITION

Foreshore Protection's 'Grout Matt' erosion control mattresses are hereafter termed 'the mattress'.

3. QUALIFICATION OF TENDERS

Installation of the mattress shall only be undertaken by specialist installers. Tenderers shall have a minimum of 5 years proven experience in installation of mattresses and shall furnish records of past experience in this field.

Tenders submitted by Tenderers who have no or insufficient previous experience will not be accepted.

4. SITE PREPARATION

Prior to placement of mattress, the area to be protected shall be prepared so as to be normally stable in the absence of surface erosive forces.

All surfaces shall be cleared of vegetation and any stumps removed to 0.5m below the surface. The surfaces shall be trimmed so as to be free of any irregularities that may detract from the final appearance of the mattress.

Any introduced material shall be subject to the superintendent's approval and shall be compacted to 95% of standard compaction with optimum moisture content depending on soil types and conditions.

All trenches shall be excavated to the dimensions specified prior to installation of the mattress.

The final preparation is to be to the satisfaction and approval of the superintendent prior to installation of the mattresses.

5. MATTRESS PROPERTIES

The mattress must be manufactured from a double layer of open selvage fabric joined in a mat configuration with multiple panels.

The fabric shall be woven from very high strength multifilament polyester.

The mattress must be capable of withstanding inflation pressures of 1.0MPa without rupture of the fabric or bursting of seams.

The weave must allow sufficient water to be forced out of the grout through the mattress to reduce the water/cement ratio from 0.9 to approximately 0.5 during pressurisation.

5.1. Filter Point Mattress

Filter Point Mattress shall consist of double layer fabric woven in such a manner as to provide Filter Points at regular spacings. The Filter Points spacing and subsequent thickness of the inflated mattress shall be as follows:

Filter Point Spacing	Nom. Inflated Thickness
125mm	80mm
200mm	120mm
240mm	140mm

Filter Points shall conform so as to ensure the release of hydrostatic pressure from pore water build up while retaining all fines behind the mattress.

Filter Points constructed of rivets, grummets or metal rings are not acceptable. Under no circumstances should the warp or weft strands be broken at the Filter Points. The design of the Filter Point shall ensure consistent and satisfactory performance during inflation.

5.2. Uniform Cross Section Mattress

Uniform Cross Section mattress shall consist of double layer fabric joined together by diagonal restraining ties. These restraining ties shall be designed so as to allow the mattress to inflate to a uniform thickness.

The ties shall have sufficient strength to withstand inflation pressures of 1.0MPa.

The nominal thickness of Uniform Cross Section mattress shall be 100mm, 150mm or 200 mm unless otherwise specified. It is understood that the finished thickness may be 10 % less than nominated, due to ground conditions and angles particular to each project.

5.3. Growth Matt

Growth Matt consists of a tubular grid structure which is injected with grout. The tubular grids have 310mm centres with a nominal thickness of 75mm and 115mm at the intersection. The resulting grid squares in between the grout injected tubes shall

consist of unwoven fibres with an effective area of 250mm square. These grids allow vegetation to establish while the unwoven fibres retain the soil.

6. COLLAPSIBLE BLOCK MATTRESS

Collapsible Block Mattress shall consist of rectangular blocks cast in place in a staggered joint pattern and has the option of being linked together by cables which are inserted between the two layers of fabric prior to grout injection. The fabric shall be woven together in such a manner as to provide articulation- type joints surrounding the blocks. The thickness and dimensions of each block can be adjusted for design purposes, however typical thickness are 100 mm, 200 mm, or 300 mm.

7. TAILORING

The mattress shall be tailored to fit over the area specified with due allowance being made for change in shape upon inflation.

Individual mill panels shall be stitched together such that the two layers of fabric are separately joined edge to edge to create a continuous concrete mattress. All seams shall be properly sewn and shall be capable of withstanding a grout pressure of at least 1.0MPa.

Butt joints or lapped joints shall not be allowed.

8. GROUT

The mattress shall be pumped full with grout consisting of a mixture of portland cement, fine aggregate and water conforming to the following properties.

- Minimum cement content of 400kg/m³
- Minimum 28 day strength of 20MPa

The contractor shall submit the proposed mix design to the superintendent for approval at least 1 week prior to installation.

8.1 Cement

Unless noted to the contrary, all cement shall be Type A portland cement conforming to recommended standards.

8.2 Fly Ash

As an aid to pumpability the substitution of pozzolanic quality fly ash may be permitted.

8.3 Water

Water shall be clean and fresh and free from deleterious substances. Water that is not potable shall not be used.

9. GROUT SAMPLING

A test sample of fabric approximately 0.5m x 1.0m is to be inflated with grout. Pressure should be held until the sample is properly inflated and the water/cement ratio has reduced sufficiently to be representative of normal pumping procedures. The fabric is then cut open and the grout removed and tested in accordance with recommended standards.

10. INSTALLATION AND INFLATION

The mattress shall be tailored to the installation to allow the full, hard inflation of the fabric and ensure an even, smooth, uncramped distribution across the entire work site and into the anchor trenches.

Areas of tension within the fabric which preclude full inflation shall be removed prior to inflation. Crimping, folds and overlaps shall be removed prior to inflation.

When the mattress is to be installed around piles, pipes, headwalls, headstocks, retaining walls, etc, the fabric shall be tailored so that the inflated mattress will close very tightly onto the object and afford a seal against the penetration of sediment or water.

The fabric shall then be injected with the concrete slurry through various injection ports in a pattern determined by the specialist installer. The pattern of pumping shall be designed to avoid cramping or other deformities of the filled mattress and special care shall be taken to observe that such defects do not arise during injection operations.

The slurry shall be injected at a sufficient pressure to fully inflate the mattress to a hard packed state with mattress thickness at the ridges conforming to the specification.

Flattened or under inflated sections shall not be allowed.

Care shall be exercised not to walk on or otherwise load up any inflated section of the mattress within the first hour after completion of inflation.

On completion of the installation and inflation, all edges of the mattress shall be dressed up to the adjoining surfaces by concrete grouting, backfilling, etc as detailed on the drawings or as otherwise directed by the superintendent.