

Filter Fence (De-watering)

DE-WATERING SEDIMENT CONTROL TECHNIQUE

Low Flow Rates	✓	Low Filtration	✓	Sandy Soils	✓
Medium Flow Rates		Medium Filtration		Clayey Soils	[1]
High Flow Rates		High Filtration		Polluted Soils	

[1] Capture rate of fine clay-sized particles may be poor, but can be improved through the use of high standard (thicker) filter cloth and/or incorporation of a *Grassed Filter Bed*.

Symbol FF



Photo 1 – Filter fabric



Photo 2 – Combined aggregate and filter fence sediment control system

Key Principles

1. The primary treatment mechanism is the *filtration* of coarse-grained particles, rather than gravity-induced settlement.
2. The fabric must consist of a non-woven or composite geotextile, **not** woven fabric.
3. Only suitable for use in the de-watering of stockpiles, or minor pumped flows.

Design Information

The fabric should ideally consist of the heaviest available filter cloth (e.g. 'bidim' A64 or the equivalent).

Maximum support post spacing of 1.5m, or 2.0m if a wire mesh support frame is used (not horizontal support wires). The fabric may also be supported by a continuous (i.e. closely butted) row of straw bales, anchored one stake per bale.

The lower 300mm of filter cloth must be buried in a 200mm (min) deep trench (backfilled and compacted, Figure 1), or a continuous 200mm high (min) sand or aggregate berm (Figure 2).

Design flow rate per meter length of fence can be analysed using the design guidelines presented for *Filter Ponds* (refer to separate fact sheet).

Maximum recommended design flow rate of 7 L/s/m².

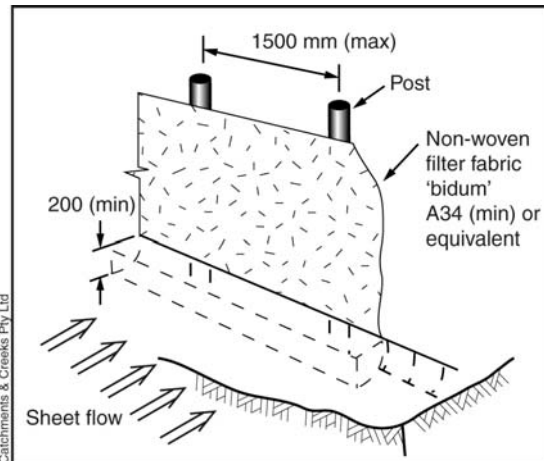


Figure 1 – Installation of filter fence without wire mesh backing

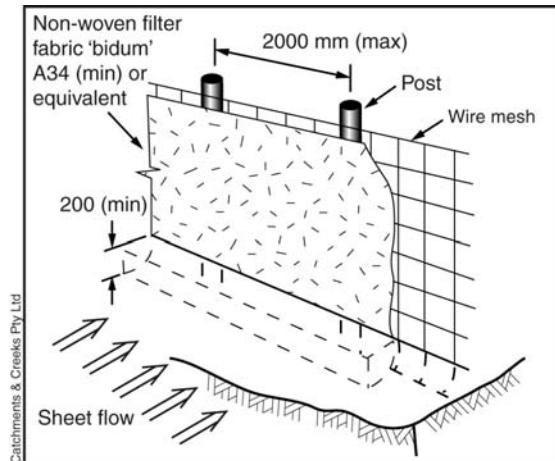


Figure 2 – Installation of filter fence with wire mesh backing

Description

A filter barrier, in the form of a non-woven fabric fence, placed down-slope of a stockpile of material being de-watered, or down-slope of a de-watering pump outlet.

A filter fence should **not** be confused with a *Sediment Fence*.

In its simplest form, a filter fence consists of heavy-duty, non-woven filter cloth staked at maximum 1.5m centres. Alternative design options include:

- filter cloth backed with wire mesh;
- filter cloth backed with straw bales;
- filter cloth wrapped around a 400mm high berm formed from compost.

Purpose

Used as a sediment control system during the de-watering of earth stockpiles or minor pumped discharges.

Limitations

Only suitable for very low flow rates.

Generally has very limited control over turbidity levels, unless incorporated with a suitable *Grassed Filter Bed* down-slope of the filter fence.

Advantages

Quick to install.

Can treat non-pressurised water, such as runoff from stockpiles.

Various design options exist for make-up of the filter fence that can improve the filtration process.

Disadvantages

The process will generally not remove turbidity (colour) from the passing water.

The sediment contained within de-watering operations may be too fine for the filter fence to be effective.

Special Requirements

The fabric should consist of a non-woven material suitable for the *filtration* of water.

If space is limited, then placing a row of straw bales between the stockpile and the filter fence can help to prevent direct contact between the stockpiled material and the filter fence.

Common Problems

Fabric not adequately buried.

Stockpiled material can shift (slump) causing damage to the filter fence.

Site Inspection

Check for signs of water bypassing the structure.

Check for material leaning against the fence.

Materials

- Geotextile fabric: non-woven filter cloth (minimum 'bidim' A34 or the equivalent). Wide strip tensile strength (AS3706.2) minimum 15kN/m in both directions. Pore size (EOS, O₉₅, AS 3706.7) less than 110µm. Mass per unit area (AS3706.1) minimum 200gsm.
- Support posts/stakes: 1500mm² (min) hardwood, 2500mm² (min) softwood, or 1.5kg/m (min) steel star pickets suitable for attaching fabric.
- Backing mesh: plastic or steel mesh with a maximum mesh opening of 200mm.

Installation

1. Refer to approved plans for location, and construction details. If there are questions or problems with the location or method of installation, contact the engineer or responsible on-site officer for assistance.
2. Install the filter fence in a manner that will minimise the risk of sediment-laden water flowing around the fence.
3. Unless otherwise directed by the responsible on-site officer, excavate a 200mm wide by 200mm deep trench along the proposed alignment of the filter fence, placing the excavated material up-slope of the fence.
4. If the filter fence is to be staked without a mesh backing, then secure the support posts into the ground at a spacing no greater than 1.5m.
5. If the filter fence is to be staked with a mesh backing, secure the support posts into the ground at a spacing no greater than 2.0m, then securely attach the backing mesh to the up-slope side of the support posts from a continuous length of mesh. Extend the mesh into the excavated trench.
6. If the filter fence is to be supported by straw bales, then after suitable anchoring the bottom 300mm of fabric, place a continuous row of straw bales immediately down-slope of the fabric and wrap the fabric over the top of the straw bales. Securely anchor the filter fence with a single stake driven through the fabric and centre of each bale.

7. Using a continuous length of non-woven geotextile, securely attach the fabric to the up-slope side of the support posts or backing mesh, with the fabric extended at least 200mm into the trench.
8. Backfill the trench and tamp the fill to firmly anchor the bottom of the fabric to prevent displacement of the fabric and to prevent the free movement of water under the fabric.

Maintenance

1. Inspect the filter fence regularly and at least daily during de-watering operations. Make repairs as needed to the fabric and support frame.
2. Inspect the fabric for obvious leaks resulting from holes, tears or joint failure in the fabric.
3. Check that water has not overtopped the fence at low points.
4. Repair any torn sections with a continuous piece of fabric placed inside the old fabric, extending at least from support post to support post.
5. Check for materials leaning up against the filter fence. Make repairs as needed to the fabric and support frame.

Removal

1. Remove all accumulated sediment and dispose of it in a suitable manner that will not cause an erosion or pollution hazard.
2. Remove all materials and repair damage to the ground surface as necessary.
3. Appropriately rehabilitate (e.g. revegetate) the ground as necessary to minimise the risk of an ongoing erosion hazard.