

713 – Dewatering

713.01 Filter Bags (Pump Discharge Filter Bags)

Definition:

A **pump discharge filter bag** is geotextile bag through which sediment-laden water is pumped to minimize the discharge of sediment from dewatering of wet excavations or other ponded areas on construction sites.



Exhibit 713.01-A. Filter bags installed on a level aggregate pad with a stabilized discharge or outflow path to the receiving stream.

Source: IDEM

Purpose:

To minimize the discharge of sediment from pump induced dewatering activities by filtering sediment-laden pump discharges from wet excavations or ponded areas encountered in construction activities. Filter bags may be used in combination with flocculants refer to Flocculants – Polymers (714.05) and manufacture’s requirements.

Note: This measure is not intended to treat or remove contaminates other than sediment. Dewatering of contaminated ground water will require additional control measures/treatments that will require appropriate permitting to discharge.

Specifications:

Implementation Criteria:

When implementing pump filter bags locate bags where the discharge outflows will not impact construction activities, cause erosion, have increased sediment load, and/or overwhelm site sediment control (refer to Water Pumping (713.02) practice for additional practice information regarding water pumping activities).

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Size/Capacity:

- The necessary dimensions of a filter bag are dependent on the pumping rate (pump size). If the filter bag is too small increases the potential of bursting (bag failure), seam ripping and/or hose detachment resulting in sediment discharge.
- When dewatering excavations with high clay content soil materials larger filter bags will likely be required due to the rapid clogging potential of the geotextile filter bag.
- Follow manufactures recommendations/requirements when sizing bags based upon pump size and soil conditions.

Location:

- Locate filter bags where outflows can easily drain away. Avoid concave locations.
- Filter bags must be placed on nearly level to slightly sloping surface (less than 5% slope) to prevent bag rolling. Aggregate pads can be implemented to level slopes of 5% or greater but yet less than 10%.
- Preferred locations for filter bags are areas of undisturbed stable densely grass vegetated areas where bag out flows can be further filtered by the surrounding vegetation and away from water resources.
- Filter bags can be located on flat bed trailers or truck beds (without rough edges) for ease of removal and disposal.
- Implement secondary containment Rock Berm (709.06) down slope of bags when near sensitive water resources such as streams and wetland areas or when near adjacent properties.
- Filter bags are to be located for ease of access for monitoring, maintenance and filter bag removal (filter bags become very heavy once they become filled with sediment).
- Filter bags shall be protected from objects or items that could puncture or tear the filter bag when stored and during dewatering operations.
- Do not locate filter bags in water resources, wetlands, stream channels, or in concentrated flows or pipe outlet flow paths.

Materials:

- Filter bags made of nonwoven polyethylene geotextile meeting the minimum requirements of Exhibit 713.01-B.
- Geotextile filter bag seams must be durable and adequately burst resistant. These seams maybe double stitched with high strength thread.
- Steel hose clamps or equivalent to tightly attach pump hose to the filter bag (Exhibit 713.01-C).
- Elevated drainage pad (optional): Aggregate INDOT CA No. 8 (Refer to Appendix D), wood mulch/tree grinding, straw bales, wood pallet (free of protruding nails or other sharp objects or broken wood slats).
- Secondary containment berm (optional): refer to Rock Berm (709.06)
- Outflow pathway stabilization materials: dependent upon design, site conditions and pumping requirements.

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The table below provides the minimum properties for filter bag geotextile.

Geotextile Filter Bag Minimum Properties		
Property	Test Method	Value
Mass Per Unit Area	ASTM D-5261	8 oz/yd ²
Grab Tensile Strength	ASTM D-4632	180 lbs
Grab Elongation	ASTM D-4632	50%
Trapezoid Tear Strength	ASTM D-4533	80 lbs
CBR Puncture Strength	ASTM D-6241	475 lbs
Water Flow Rate	ASTM D-4491	70 gal/min/ft ²
Apparent Opening Size	ASTM D-4751	80 U.S. Sieve
UV Resistance (500 hrs)	ASTM D-4355	70%

Exhibit 713.01-B.

Installation:

- (1) Ensure to remove all sharp objects, sticks and debris etc. from filter bag location.
- (2) Install a level elevated drainage pad for best outflow results. Extend pad at least 1 foot beyond the footprint of the filter bag. A variety of options to elevate the filter bag to promote/facilitate more efficient outflows from the filter bag from the bottom side. Option 1. Aggregate pad INDOT CA No. 8 a minimum of 6 inches thick. Option 2. Wood mulch/tree grindings a minimum of 6 inches thick. Option 3. Strawbale pad of bales. Option 4. Wood pallets.
- (3) To correct excessive slopes, install a level aggregate pad of INDOT CA No. 8 gravel a minimum of 6 inches thick and sufficient to create a level pad.
- (4) Install if necessary, a stabilize outflow pathway to receiving water resources or unstable receiving sloping areas. Filter bag outflows should not cause erosion along the pathway to the discharge point (such as the receiving conveyance or water resource). Install outlet and outflow pathway protection or energy dissipation measures appropriate for the flows/pumping rate and duration of pumping activities such as the following (refer to Water Pumping 713.02):
 - a. Riprap outlet protection Energy Dissipater (Outlet Protection) (705.01) (refer to Exhibit 713.01-D).
 - b. Plastic sheeting (refer to Exhibit 713.02-B).
 - c. Riprap-Lined Channel (704.02)
- (5) Where needed or in close proximity to water resources or adjacent properties install a secondary containment Rock Berm (709.06) on the downslope sides and tie into higher ground or for level or

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less sloping locations encircle the outflow pad with a rock berm or like the Gravel Donut Drop Inlet Protection (706.02) (Chapter 7, page 149).

- (6) Connect the pump hose to the filter bag using a tight connection such as with a steel hose band clamp over the rigid hose connector area to form a watertight connection. (refer to (refer to Exhibit 713.01-C). Do not clamp or tie around flexible hose areas since a tight connection cannot be achieved. To obtain a tight leak free filter bag connection do not connect more than one pump hose to a bag.
- (7) Wherever possible implement measures to minimize sediment entry to pump intake area by implementing floating inlets (refer to Water Pumping 713.02) or use a sump pit for dewatering (refer to Exhibit 713.02-I).

Note: When continuous pumping is required during sub-freezing conditions special provisions are needed to reduce bag freezing and rupture potential.

Disposal:

- Allow bag to dewater prior to attempting to moving, disconnecting pump hose or opening bag.
- Where site characteristics allow, the bag may be left in place and cut open and the contents spread out and stabilized. Remove all visible fabric.
- Do not empty bags or leave contents where runoff can carry sediment into wetland, waterways or conveyances.
- Bags and contents can be buried or taken to areas allowing clean fill (when pumping from uncontaminated sites).
- When using in combination with flocculants or polymers dispose bag and contents according to manufacturer's requirements and refer to Flocculants – Polymers (714.05).

Maintenance:

- Monitor the outflow to nearby water resources, off-site properties and receiving conveyances such as storm sewer inlets and swales for excessive sedimentation. Cease pumping when impacts are identified and evaluate for improvements.
- Filter bags require frequent monitoring. At a minimum, inspect at the beginning of pumping operations and at a minimum of once every hour thereafter until the cessation of pumping of sediment-laden water.
- Cease pumping when bag can no longer pass water at a reasonable rate and threatens to rupture and replace with a new filter bag.
- When secondary containments are used and begin to exhibit sediment deposits then cease pumping and implement a new filter bag.
- Monitor hose-bag connection and ensure a watertight connection with no leakage.
- Monitor bag for holes, rips or tears. Immediately cease pumping when holes, rips or tears are identified and replace filter bag prior to resumption of pumping of sediment-laden water.
- Store replacement bags in a protected location to prevent exposure to sunlight, punctures, abrasion, rips and tears.
- Do not use damaged, punctured or torn bags.
- Maintain positive drainage away from filter bags for efficient operation.
- If erosion from filter bag outflow is identified, cease pumping and stabilize outflow pathway prior to the resumption of pumping activities.

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- For continuous pumping activities have on-site or ready access to additional filter bags in the event of bag failure or bag is full.

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Exhibit 713.01-C. Pump hoses must be securely attached to filter bags to prevent leakage and disconnection. The pump hose has been securely clamped with a steel hose clamp over the rigid hose connector end.

Source: IDEM



Exhibit 713.01-D. Filter bag outflow to the stream has been stabilized with riprap protected stream bank. Stream pump around discharge piping is in the foreground within the stream channel with a stabilized discharge pad.

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Source: IDEM



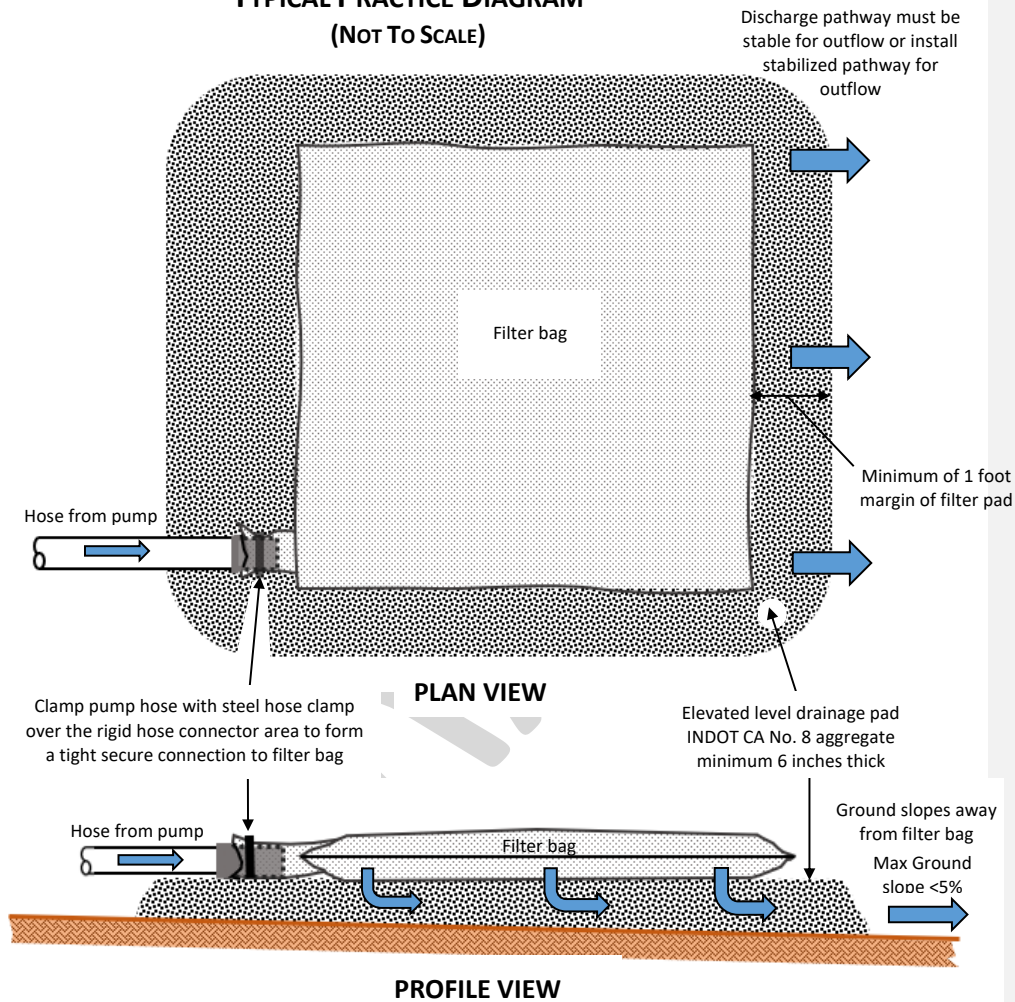
Exhibit 713.01-E. Pump hose has not been securely attached to the filter bag and unsatisfactory unfiltered leakage is occurring. Bag needs to be replaced due to a puncture or tear is leaking unfiltered discharge. Bag has been well located in a slightly sloping stable well vegetated area.

Source: IDEM

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Exhibit 713.01-F

FILTER BAGS (PUMP DISCHARGE FILTER BAGS) TYPICAL PRACTICE DIAGRAM (NOT TO SCALE)



NOTES:

- Optional: Elevated drainage pad materials: INDOT CA No. 8 aggregate, wood mulch, strawbales, or wood pallets (all free of sharp objects).
- The illustrations in this exhibit are not intended to serve as construction drawings. The diagrams/drawings are to be used to communicate the concepts for implementation of this control measure.

Source: IDEM File