Filter Point
Filter Band™
Uniform Section
Enviromat™
Articulating Block
Hydrocast™ Armor Units

HYDROTEx™
Fabric-formed Concrete Erosion Control and Armoring Systems

Product Guide
Filter Point (FP) Linings

Filter Point Linings, with filtering points (drains) provide erosion resistant, permeable concrete linings for ditches, channels, canals, streams, rivers, ponds, lakes, reservoirs, marinas, and port and harbor areas. Filter Point Linings have a cobbled surface and a relatively high coefficient of hydraulic friction in order to achieve lower flow velocities and to reduce wave run-up. The filter points provide for the relief of hydrostatic uplift pressures, increasing the system's stability.

Filter Point Linings were the first style of fabric form for concrete. In 1965, a Dutch patent was issued for “fabric-formed slope paving.” The form suggested by this patent was later refined to create the first “filter point” lining.

As the use of this technology has spread worldwide, a variety of other forms have been developed to meet specific job requirements.

Filter Band™ (FB) Linings

Filter Band Linings are similar to Filter Point Linings, providing an effective and highly permeable concrete lining that resists erosive forces.

Filter Band differs from Filter Point in that the form creates interconnected, tubular concrete elements that are separated by large, interwoven filter bands. The filter bands provide for greater reduction of uplift pressures than filter points. Also, the biaxial alignment of the tubular elements creates two directionally-determined coefficients of hydraulic friction. As a result, Filter Band achieves a greater reduction of flow velocity or wave energy than Filter Point.

Filter Band concrete linings are specified in situations similar to those for which Filter Point might be specified, but which also require greater relief of uplift pressures, higher reduction of flow velocities, or greater reduction of wave run-up.

The Advantages of Hydrotex Linings, Mats, and Armor Units

Stability:

Hydrotex Fabric Forms, manufactured by Synthetex LLC, have been used in millions of square feet of installations worldwide, some in the most severe conditions. In the process they have established a new benchmark in erosion protection by outperforming traditional concrete slope paving, gabions, precast concrete blocks, and rip rap.

Thousands of installations and extensive flume testing have proven that Hydrotex fabric-formed concrete erosion protection systems outperform all alternatives. Hydrotex Linings and Mats, with permissible shear stress in excess of 60 lbs/ft² (2.87 kN/m²), provide the high degree of stability needed to resist the stresses associated with high velocity flows. Hydrotex fabric-formed concrete has greater hydraulic efficiency than rip rap, gabions, precast concrete blocks, and conventional concrete slope paving because of several factors. It can mitigate uplift forces due to outflow and excess pore water pressure, reduce hydraulic uplift by slowing channel velocities, and conform to soil contours to reduce the potential for scour.

Reduced Uplift Pressures:

Many styles of Hydrotex Linings and Mats can accommodate severe uplift pressures. These uplift pressures often cause the failure of conventional concrete slope paving. Unlike traditional methods, fabric forms can be manufactured with built-in filter drains that reduce the mean phreatic level and pore pressures within the underlying soil.

Management of Hydraulic Flow:

Many Hydrotex Fabric Forms construct concrete linings and mats with deeply patterned surfaces. These patterns create a high coefficient of hydraulic friction. The result is reduced...
Uniform Section (US) Linings

Uniform Section Linings are similar to traditional concrete slope paving. They create a solid, high quality concrete lining with a relatively low coefficient of hydraulic friction and a uniform cross section. Uniform Section Linings are used to reduce the infiltration of aggressive waste and chemical fluids into or out of open channels and basins. They are also used to reduce exfiltration in arid regions where open channels and basins require watertight linings.

Uniform Section Linings are resistant to most leachates and chemicals. They protect geosynthetic liners from mechanical damage, exposure to UV light, and freeze-thaw cycles and also serve as a ballast layer. These self-supporting, high strength linings permit construction on steep side slopes and replace the use of clay or sand as liner protection. Concrete filling of the forms can be performed with a minimum of traffic on the liner, and the tensile strength and abrasion resistance of the fabric protect the liner from the pumped concrete.

Enviromat™ (EL and EB) Linings

Enviromat Linings are installed to provide protection against periodic high flows. After installation, vegetation can be planted within the open structure of the lining. Enviromat Linings are used in drainage ditches and on the upper slopes of channels, canals, lakes, reservoirs, rivers, and other water courses as well as for embankments subject to heavy run-off.

Enviromat Linings are comprised of concrete-filled elements and unfilled areas that allow for the establishment of vegetation. Once the concrete sets, the unfilled areas are opened by cutting the fabric and are then planted or filled with topsoil and seeded. Within a growing season a vegetated cover will normally extend over the lining, resulting in an erosion control system with the hydraulic, ecological, and aesthetic features desired. EL Linings have a greater open area than EB, so a vegetated cover will be established more rapidly. However, EB Linings are designed to articulate and are more tolerant of uneven settlement after installation.

Ease of Installation:

Hydrotex Fabric Forms are delivered to the job site ready-to-fill and require no additional forming materials. Installation consists of preparing the area, laying out the fabric forms, and filling them with concrete through a small-line concrete pump. Wood or steel forming is not required. The fabric forms themselves assure that the concrete assumes the proper configuration, contours, dimensions, and thickness. Hydrotex Linings and Mats do not require steel reinforcement or concrete finishing. A small crew can handle the installation, and fabric forms can be installed without dewatering the site.

Simple Job Mobilization:

Fabric forms are extremely lightweight, so they can be rapidly shipped anywhere in the world. The “weight” component of a fabric-formed system, the fine aggregate concrete, is readily available from concrete suppliers.
worldwide. Once the site is prepared, simple hand tools and a concrete pump are all that is needed to fill the forms. And in areas with difficult or restricted access, the concrete can be pumped to the forms from as far away as 800 feet (250 meters). Because of the low mobilization costs, it is practical to install fabric forms on jobs as small as a hundred square feet (10 square meters). Regardless of the job size, the ease of mobilization and transportation and the reduced equipment and labor requirements mean that the job goes in faster and at less cost per square unit of protected area.

**Environmental Compatibility:**

Fabric forms are designed to provide the least possible environmental impact. The fabric used in the forms allows excess mixing water to escape while retaining the cement solids, fine aggregate, and sand. EL and EB Linings have been designed to provide defined areas that can be cut out after installation so that native vegetation can be planted or seeded to create a more natural appearance. And Hydrotex Linings and Mats are free of hazardous projections that could endanger pedestrians, animals, vehicles, or boats.

**Hydrocast™ Armor Units**

Hydrocast Armor Units are monolithic concrete structures which replace heavy rip rap and large precast concrete armor units, such as tetrapods. When the rectangular fabric forms are filled, they assume a flattened cylindrical cross section and range in size from roughly 180 pounds to in excess of 70 tons (80-64,000 kg) per unit. Available in custom sizes and shapes, the dimensions of the form control the concrete armor unit's length, width, height, and weight.

Armor Units have the mass and stability for the construction of gravity seawalls and revetments, groins, levees, dikes, dams, check dams, and other civil and marine structures subject to attack by waves or rapidly flowing water. Since they are filled in place, they adapt to variations in the subgrade and are ideal for preventing or repairing scour at bridge piers and abutments, culvert outfalls, or underwater pipelines. Hydrocast installations do not require dewatering, a crucial advantage in emergency repair situations.
Hydrotex™ Fabric-formed Concrete Erosion Control and Armoring Systems

Hydrotex systems outperform rip rap, gabions, precast concrete blocks, and concrete slope paving, yet are less expensive and far easier to install.

Hydrotex Fabric Forms are filled in place with fine aggregate concrete, delivering the durability and performance of concrete without the costly and difficult installation process of a conventionally-formed concrete slope paving.

Hydrotex systems are not only less expensive than rip rap, gabions, precast concrete blocks, or conventionally-formed concrete slope paving, they also deliver significant stability and performance advantages once installed.

Hydrotex systems can:
- adapt to variable subgrades,
- relieve uplift pressures,
- reduce wave run up, and
- manage channel velocities.

The result is a more cost-effective erosion control system with greater hydraulic efficiency, higher permissible velocities, and improved stability, durability, and performance.

Applications:
- Drainage Ditches
- Channels and Canals
- Streams, Rivers, and Bayous
- Lakes and Reservoirs
- Coastal and Intracoastal Shorelines
- Jetties and Groins
- Dikes and Levees
- Dune Protection
- Beach Renourishment
- Seawall and Bulkhead Scour Protection
- Boat Launching Ramps
- Wildlife Crossings
- Low-water Stream Crossings
- Embankments
- Underwater Pipeline Covers
- Bridge Abutments and Piers
- Check Dams
- Dams and Spillways
- Ponds and Holding Basins
- Landfill Caps
- Down Chutes
- Water Control Structures

A Wide Range of Solutions

Constructed of high strength, specially woven fabric, Hydrotex™ Fabric Forms come in a variety of form styles. Each style has been engineered to match a certain set of project parameters, allowing you to specify different forms to accommodate differing site conditions. Hydrotex Linings and Mats are used to create erosion and scour prevention systems ranging from ditch linings to coastal revetments. Hydrocast™ Armor Units are monolithic concrete structures that are used for the construction of seawalls and other civil and marine applications.

Proven in the Lab and in the Field

Hydrotex products have been extensively evaluated in an advanced hydraulics laboratory at a leading research facility. Flume testing of Hydrotex Linings and Mats has derived precise design values to assist you in selecting the appropriate fabric form style and mass per unit area to resist the expected hydraulic loading. Hydrotex products have proven their value, quality, and integrity in literally thousands of projects worldwide.

Backed with Technical Expertise

Synthetex’s team of technical, manufacturing, and field personnel work closely with engineers, owners, and contractors to derive the best design solutions. Our design philosophy demands solutions that meet strict performance, aesthetic, cost, and construction criteria. You are assured of quality materials, superior technical support, competitive prices, and a commitment to excellence. Our team is able to provide technical and design assistance, system specifications, cost estimates, and construction drawings.
Hydrotex Linings, Mats, and Armor Units are filled in place by pumping fine aggregate concrete into fabric forms. The results are reduced material and equipment costs, faster installation, and dependable erosion and scour prevention.

Whether you’re lining a channel; protecting landfill containment systems, underwater pipelines or dams; repairing bridge scour; or armoring a shoreline against storm damage, Synthetex LLC has the form that meets your needs.

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<th>Linings and Mats: Typical Installed Dimensions, Weights and Volumes</th>
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Note: Values shown are typical and will vary with weight of concrete and field conditions. Custom products of different thicknesses and dimensions can be manufactured.