

Canal³[®]

Geocomposite for Canals & Water Containment Applications



HUESKER
Engineering with Geosynthetics

Why Is Canal³® The Preferred Choice?

A Geocomposite For Canals And Water Containment Applications

Canal³® is a high performance composite consisting of a polymeric liner encapsulated within nonwoven geotextiles. It is designed for water containment applications offering an easy, reliable and cost effective canal lining solution. Canal³® provides superior puncture resistance and increased interface friction properties that allow the liner to be deployed directly in contact with most existing soils and steepened side slopes.



Puncture Resistance

The standard Canal³® product types provide proven puncture protection for most applications. Further, the nonwoven layers can be designed for increased puncture protection if deemed necessary by site conditions, allowing onsite soils to be used as the subgrade material without the cost of placing an expensive bedding material or placement of separate nonwoven layers.



Interface Friction

Lining an existing earthen canal typically requires reshaping the bottom and side slopes prior to installing the Canal³® geocomposite. The side slopes can range from relatively flat to very steep depending on site conditions and property boundaries. The bottom nonwoven on Canal³® provides a superior interface friction response with onsite soils which prevents Canal³® from sliding. The top nonwoven layer also allows for soil or shotcrete to be used as cover material even for 1 V : 1.5 H slopes.



Canal³® Geocomposite. When Every Drop Counts.



The demand for water and the high costs of delivery require implementation of proven conservation practices. With seepage rates of unlined canals up to 60%, lining canals with HUESKER's Canal³® geocomposite is the most effective step towards water conservation.

HUESKER's Canal³® is made of polyester nonwovens as a standard. However, polypropylene nonwovens

are available if required by project specific design parameters. Manufactured to a standard width of 5.2m and a custom width of up to 7.6m, Canal³® can be installed parallel or perpendicular to the centerline of the canal in order to minimize wastage in exposed, buried, or shotcreted applications.



BEFORE RESHAPING

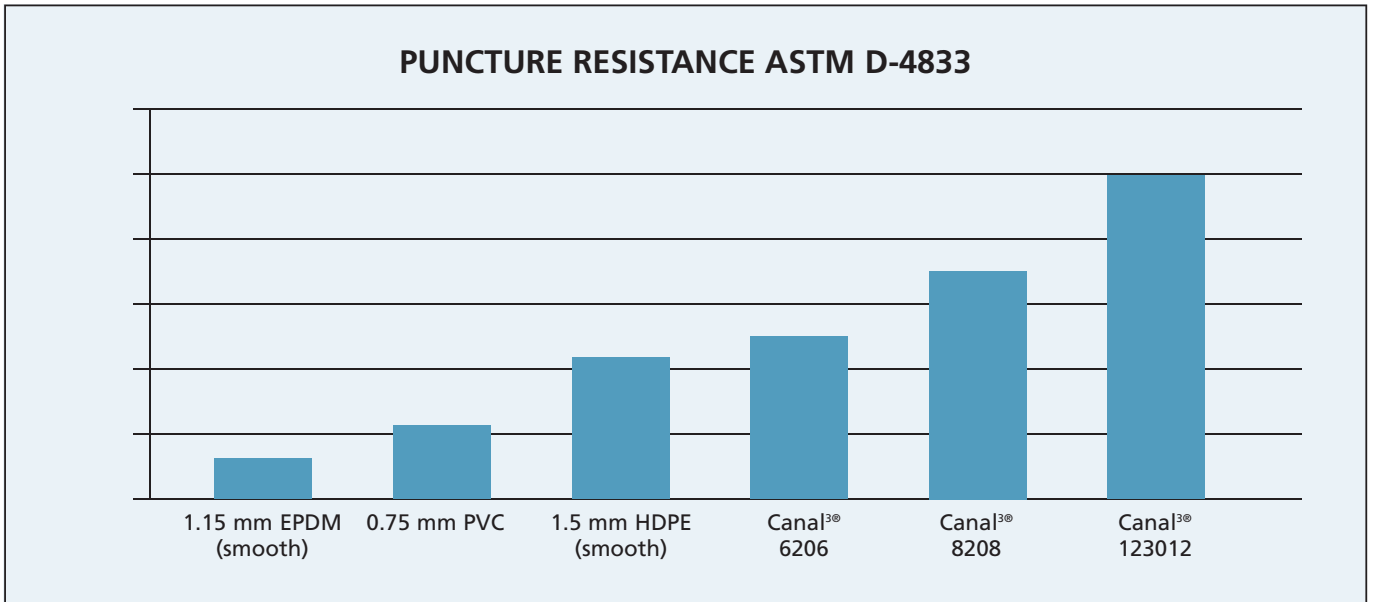


PREPARED CANAL



CANAL³® INSTALLATION

Canal³® Proven Performance.



Canal lining installations require cleaning and reshaping of the canal prior to the liner installation. Typically other liners call for a sand bedding layer or a nonwoven cushion above the reshaped canal to provide puncture protection for the liner. Canal³® is designed with a high puncture protective layer beneath and above the membrane liner, and can be placed directly on the existing reshaped soils eliminating the costs of placing a sand layer.

The above chart indicates published ASTM D-4833 puncture index test values for typical canal liners. Recently, a thorough field assessment of various types of canals concluded: "Without question, liners with a protective barrier performed the best and have required no maintenance, while the performance on the

liners without a protective barrier has varied significantly," (Evaluation of Canal Lining Projects in the Lower Rio Grande Valley of Texas, Karimov, Leigh, Fipps, P.E., 2009.)

Canal³® provides superior puncture properties for various site conditions from smooth to rough subgrades and is available in several styles. Irrigation districts and contractors agree that the ease of installing Canal³® over other liners is not only cost effective but also reduces installation time by using our wider width materials. Installations of Canal³® can be performed by a subcontractor or by irrigation personnel. The following are recommendations for the proper selection of the Canal³® products for various site conditions.

Material	Subgrade			Application		
	Smooth	Moderate	Rough	Buried	Exposed	Shotcreted
Canal ³ ® 6206	✓			✓		
Canal ³ ® 8208	✓	✓		✓	✓	✓
Canal ³ ® 123012	✓	✓	✓	✓	✓	✓

Installation

In order to achieve a successful installation, the first step is to deliver materials safely to the site. Each roll of **Canal³** is wrapped with heavy duty plastic for protection during shipment along with two lifting straps for ease of unloading at the jobsite.

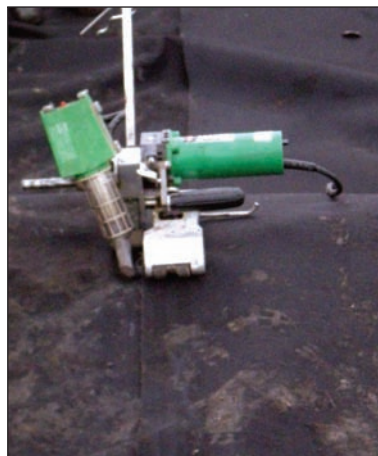
HUESKER supplies an installation guide which provides a detailed overview for installing **Canal³**. The material can be installed perpendicular or parallel to the centerline depending on the size of the canal and its alignment. Details of the typical anchoring methods are included in the Installation Manual.

Recommended seaming methods include using a hot melt adhesive, hot air/wedge welding, or a combination of both.

When mechanical fastening is required, **Canal³** is easily attached to concrete structures by using batten strips which are anchored into the concrete using expansion anchors.

HUESKER's **Canal³** composite has been installed worldwide in various applications with successful results. In today's water conservation environment, eliminating costly seepage has become a priority.

For more information on **Canal³**, contact your local HUESKER representative or visit our website at www.huesker.com.





Case Study

In 2004, after years of concrete repairs, and high seepage rates, Hidalgo County Irrigation District No. 2 located in San Juan, Texas decided to rehabilitate their Lateral "A" canal. The 11.7km lateral was drained, and cleaned of loose debris, and large cracks were filled prior to the installation of Canal³® 8208 geocomposite above the existing concrete canal. Approximately 79,000m² of Canal³® were supplied in standard and custom roll widths to reduce waste along the entire reach of the canal. The material was placed directly on the existing concrete canal and was then covered with 7.6cm of shortcrete. In order to install this cover layer above the Canal³® material most efficiently, the Contractor employed a modified shortcreting method which enabled them to install over 95m³/day (see picture). By having Canal³® as a "secondary" liner underneath the shortcrete cover, the design life of the canal could be extended to beyond 50 years according to a 10-year study written by the Bureau of Reclamation.

Project: Rehabilitation of Lateral "A" Canal
Location: San Juan, Texas
Owner: Hidalgo County Irrigation District No.2
Contractor: McAllen Construction
Material: Canal³® 8208

Case Study

In 2007, the Porter Canal, owned by the New Sweden Irrigation District located in Idaho Falls, Idaho, was reshaped and lined with Canal³® 123012 by a commercial developer, due to seepage onto a proposed industry park. The project consisted of reshaping 427m of the Porter Canal and installing 14,630m² of Canal³® geocomposite liner by HK Contractors, Inc. The custom roll size of 7.6m wide x 91.4m long reduced the number of seams and expedited the installation process. The entire project took approximately 2 weeks: 1 week to reshape the existing canal, 4 days to install the Canal³®, and another 3 days to seam and attach to a bridge structure. After construction, the Developer built on the now dry area adjacent to the canal.

Project: Lining of Porter Canal
Location: Idaho Falls, Idaho
Owner: New Sweden Irrigation District
Contractor: HK Contractors, Inc.
Material: Canal³® 123012



Variety of Canal Designs



Canal³® exposed application
Soham Lode Project, Soham, United Kingdom



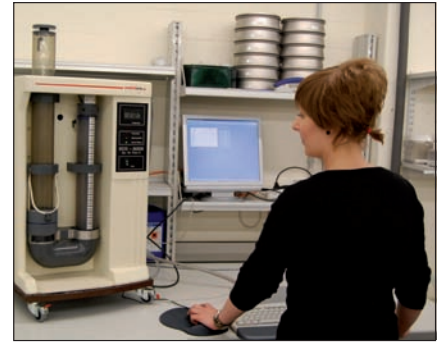
Canal³® covered with soil
WAVE Project, Muscat, Oman



Canal³® covered with gravel
Quincy Project, South Columbia, Washington, USA



Canal³® covered with shotcrete
Dryden Canal Project, Wenatchee, Washington, USA



HUESKER Synthetic GmbH is certified by:



HUESKER offers a wide range of technically demanding solutions relying on our many years' experience. Our solutions are economical, reliable and up-to-date and used in:

Earthworks and foundation engineering, landfill construction, hydraulic engineering, road construction

Technical assistance, planning, support - worldwide
Reliable and advanced techniques characterise our products in many applications:

Fortrac® - a flexible, high-modulus and low-creep geogrid for soil reinforcement

HaTelit® - a flexible, high-modulus and temperature resistant grid for asphalt reinforcement

Stabilenka® - a high-modulus polyester woven for reinforcement and separation of soils

Robutec® - a very high-modulus and alkali-resistant woven for reinforcement and separation of soils

Fornit® - a biaxial geogrid for subbase reinforcement

Comtrac® - a geocomposite for reinforcement, separation and filtration of soils

Duogrid® - a geocomposite made of biaxial high-modulus, flexible geogrid and a nonwoven

NaBento® - geosynthetic clay liner for sealing

Incomat® - a concrete- or sand-mat for sealing and erosion control

Ringtrac® - geotextile tube for reinforcement and soil containment

HaTe® - wovens and nonwovens for separation, filtration, drainage and protection

SoilTain® - systems for hydraulic engineering and dewatering

Geosynthetics made by HUESKER
- reliability by experience!

HUESKER

HUESKER Synthetic GmbH

Fabrikstraße 13-15 · D-48712 Gescher

P.O. Box 1262 · D-48705 Gescher

GERMANY

Phone: +49 (0) 25 42 / 7 01-0

Fax: +49 (0) 25 42 / 7 01-499

E-Mail: info@huesker.de

Internet: www.huesker.com