

BMP 51.00. Hydraulic Erosion Control Products (HECP)

DESIGN CONSIDERATIONS

Objectives

Hydraulic Erosion Control Products (HECPs) are designed to reduce soil erosion and assist in the establishment and growth of vegetation. The HECP forms a protective layer that controls erosion and allows for enhanced seed germination and accelerated plant growth.

HECPs are often used in combination with seed and fertilizer for revegetation but can be used alone for temporary stabilization of bare soils.

Description

A HECP is a manufactured, temporary, degradable, pre-packaged fibrous material that is mixed with water and hydraulically applied as a slurry.

When applied, the HECP creates a continuous, porous, absorbent, moisture retaining, flexible blanket/mat/mulch/covering making intimate contact with, and adhering to, the sloped soil surface. The applied HECP permits water infiltration, resists erosion, and promotes rapid germination and accelerated plant growth.

The HECP will achieve maximum performance after a sufficient curing period, which will vary based upon the manufacturer's recommendations and site specific conditions.

Tackifiers are chemical compounds used in formulating adhesives to increase the stickiness of the surface. They are used to glue the fibrous HECP material to itself and the soil surface.

Other Names

Hydromulch, Bonded Fiber Matrix (BFM), Flexible Growth Medium (FGM), Fiber Reinforced Matrix (FRM), and many others. Some terms may be trademarked and describe a single product as opposed to a product category.

Applicability

HECPs vary in their functional performance longevity, strength to resist shear stress, and fiber types. Wood, straw, cotton, flax, and hemp fibers have all been used in the production of HECPs.

Many HECPs contain a tackifier to bind the fibers together and form a mat over the soil. Others do not.

HECPs without tackifiers are limited to flat or low slopes and infrequent or low amounts of rainfall. HECPs with tackifiers are more expensive, but have better performance in areas with moderate to steep slopes and frequent or moderate to heavy rainfall. They are applicable for any site where there is sufficient time for the tackifiers to cure. Some tackifiers will be able to cure in some precipitation, but none can cure during significant precipitation. Availability of water to mix with the product and site access constraints must be considered when specifying HECPs.

By themselves, HECPs are not applicable in areas with concentrated flow.

Selection Considerations

HECPs must be selected based on expected rainfall, prior performance, the length of time the product is needed to perform (i.e., the functional longevity), and the shear stress (a factor of the slope length and gradient) that the HECP will be exposed to. If site conditions require an expensive product because of harsh environmental conditions, then specify it or consider using a rolled product instead.

The Erosion Control Technology Council (ECTC) provides designers with selection information based on independent testing to supplement manufacturer's design standards

Design

The following table provides guidance on terms used in describing HECPs for typical applications:

Hydraulic Erosion Control Design				
Term	Functional Longevity	Typical Application Rates	Slope Gradient (H:V)	Slope Length
	months	lb/acre	< or =	feet
Moderate	3	2000-3000	4:1	25
Extended Moderate	6	2000-3500	3:1	50
Long	12	2500-4000	2:1	75
Extended Long	18	3000-4500	0.5:1	100

This table is for general guidelines only and is adapted from the Erosion Control Technology Council. Refer to manufacturer for application rates, instructions, gradients, maximum continuous slope lengths and other site specific recommendations

When estimating quantities needed, account for the increased surface area created as a result of surface roughening and due to the slope length, rather than horizontal length, on sloped sites. Surface roughening alone may require 30 percent more surface area to which the HECP must be applied. This 30 percent increase should be added to the planned seeding quantity too.

If a diversion is required at the top of the slope to handle run-on, then include the diversion details in the plans.

Relationship to Other Erosion and Sediment Control Measures

HECPs are most commonly used in conjunction with seed and fertilizer mixes to vegetate bare soil areas. The HECP is mixed into an homogenous slurry to carry the seed and fertilizer mixture. The HECP must last long enough to provide erosion control while the seed germinates and the vegetation establishes. In order to provide effective erosion control, the HECP must cover all the roughened bare soils to prevent raindrop erosion and the HECP must stay in place to prevent seed creep or migration.

Common Failures or Misuses

- The most common problem with the use of HECPs is a lack of adequate coverage. Without 100 percent of the soil covered, or with a thinner than specified coverage, raindrop erosion can

occur, leading to inadequate seed and fertilizer distribution, seed migration, and vegetation establishment failures. Without proper coverage of desired vegetation, weed species are likely to take root and crowd out the specified plants.

- Inadequate coverage may result from only applying the HECP from one direction.
- Areas to be seeded are frequently underestimated and actual disturbed areas are much larger than anticipated. Strict adherence to bid items based on under-estimated quantities may lead to inadequate coverage, erosion, and failed revegetation.
- Another leading cause of inadequate coverage is lack of accounting for the increased surface area created as a result of surface roughening, which can add 30 percent more surface area to the soils. Combined with take-off measurements on flat plan sheets for sloped sites, field crews often under-apply HECPs compared with the specified rate.

SPECIFICATIONS

Standard Specifications

- 651 and 751 Hydraulic Erosion Control Products