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Hydraulic Erosion Control Products (HECPs) General Usage and Installation Guidelines

Erosion Control Technology Council

IMPORTANT NOTICE on Safety Procedures: Manufacturer's of hydraulic planting equipment, hydraulic erosion control products and amendments all provide safety guidelines. ECTC recommends that the installer follow the instructions provided for their specific equipment and products.

Introduction

For many years, hydraulic seeding/ planting equipment, hydraulic mulches and performance enhancing additives have shown continuous evolution and improvement. The result has been in equipment and materials that offer enhanced performance and greater productivity over many traditional methods (i.e. blown straw and tracking) of controlling erosion and establishing vegetation. Despite the documented advantages and widespread use of these newly evolving technologies, the understanding of Hydraulic Erosion Control Products (HECPs) and their cost-effective benefits is still in its infancy. To an untrained eye, the materials exiting the hydraulic mulching equipment appear nondescript. However, contained within many of these slurries are a growing family of refined fiber matrices, tackifiers, super-absorbents, flocculating agents, synthetic fibers, plant biostimulants and other performance enhancing additives. ECTC has developed a "Standard Specification for Hydraulic Erosion Control Products (HECPs)" to assist users with the proper selection of HECPs.

The two primary goals when using HECPs are erosion control and vegetation establishment. HECPs can provide immediate erosion protection while creating an environment that assists in accelerating seed germination and plant growth. Vegetation then provides the long term erosion protection while improving site aesthetics and acting as a filter to prevent sediment and other undesirable storm water constituents from entering receiving water bodies.

This document will give the user step by step instructions for effective HECP installations.

Key Elements for Successful Product Installation

Step One: Site and Measurement Preparation. As in any erosion control application, it is necessary to prepare the site and the soil properly. An advantage to hydraulic erosion control products is that they can be applied to rough and uneven surfaces, sometimes even on areas where walking is not possible. Many HECPs can be applied to surfaces that are not practical for other BMPs. For best results:

Prepare seed bed to be free of rocks, roots, dirt clods and any other unwanted debris. Measure the total area to be treated using reliable equipment. Record the measurements in square feet or square meters.

Measure the area to be treated to calculate the amount of HECP needed at the desired application rate.

Key Elements for Successful Product Installation (cont.)

Note that HECPs are designed to provide surface erosion protection and should not be used alone on geotechnically unstable slopes.

Step Two: Calculate total amount of HECP needed for the entire project by weight, number of bags and number of tank loads. Use the area measurements from Step One to determine quantity of HECP required at the target application rate. See Figure 1 for an example.

An example calculation for total number of bags of HECP required for entire project:

Note: slight differences in Imperial and Metric calculations due to rounding.

Total size of project = 60,000 square feet (sf) [5,575 square meters (sm)]

Target HECP application rate = 3,000 lbs/acre [3,363 kg/ha]

Weight of mulch per bag = 50 lbs [22.6 kg]

Convert sf (sm) to acres (ha)

60,000 sf ÷ 43,560 sf/acre = 1.38 acres

5,575 sm ÷ 10,000 sm/ha = 0.5575 hectare

Calculate total weight of HECP at target application rate

3,000 lbs/acre x 1.38 acres = 4,140 lbs of mulch

3,363 kg/ha x 0.5575 ha = 1,875 kgs of mulch

Calculate total number of HECP bags (rounded up to next whole number)

4,140 lbs ÷ 50 lbs/bag = 83 bags

1,875 kgs ÷ 22.6 kg/bag = 83 bags

Therefore: a total of 83 bags of HECP would be required

Example 1.

Key Elements for Successful Product Installation

Next, determine the capacity of hydro-seeding tank (i.e. number of bags per tank load) See Figure 2 for equation and an example. If the number of tank loads required is greater than one, proceed to Step 3. If less than or equal to one, plan to mix all HECP bags with proper amount of water in one tank load, proceed to Step 4.

Step Three: Determine the total area one tank load will cover and mark treatment area(s) accordingly with high visibility stakes or flagging. See Figure 3 for example calculation.

Calculation to determine the number of bags of mulch to place into the tank:

$$\frac{\text{working capacity of tank (gallons or liters)}}{\text{Water Mixing rate per bag (gallons or liters)}} = \textbf{Tank Capacity} \text{ (number of bags per tank)}$$

Assuming use of HECP with water: HECP mix ratio of 100 gallons / 50 lb bag [378.5 liters / 22.6 kg bag]

$$\frac{\text{3,000 gallon tank}}{\text{100 gallons / bag}} = 30 \text{ bags} \qquad \frac{\text{11,355 liter tank}}{\text{378.5 liters / bag}} = 30 \text{ bags}$$

Determine the number of tank loads required to treat the total area:

$$\frac{\text{Total Number of Bags}}{\text{Tank Capacity (number of bags per tank)}} = \textbf{Number of Tank Loads}$$

$$\frac{\text{83 bags}}{\text{30 bags/tank}} = 2.77 \text{ tank loads}$$

Figure 2.

Key Elements for Successful Product Installation (cont.)

Step Four: There are two methods for installation of the HECP, seed and soil amendments. One way is to apply the HECP, seed and amendments in one application. The mulch, seed, fertilizer and other amendments are loaded into the tank of a hydraulic seeding machine, agitated and applied simultaneously.

Another method is a two part process where the seed, fertilizer and other amendments are applied to the soil first. The HECP is then sprayed on after the seed, fertilizer and soil amendments have been applied.

The seed may be applied by slitting or drilling it into the ground or by broadcasting it on the surface. The broadcast method may be performed hydraulically by applying the seed, soil amendments and small amounts of hydraulic mulch with a hydraulic seeding machine. For the hydraulic method, the mulch is utilized as a visual indicator to the applicator thus allowing them to know where the slurry has been applied.

Be sure to follow the manufacturer's application recommendation for the specific HECP used.

Total Area per Tank Load can be determined using the following:

$$\textbf{Tank Capacity (number of bags per tank)} \times \frac{\text{Weight of bag}}{\text{Target HECP application rate}} = \text{Total area per tank load}$$

$$30 \text{ bags} \times \frac{50 \text{ lb/bag}}{3{,}000 \text{ lb/acre}} = 0.5 \text{ acre} \qquad 30 \text{ bags} \times \frac{22.6 \text{ kg bag}}{3{,}363 \text{ kg/ha}} = 0.2 \text{ ha}$$

Therefore, one tank load will treat 0.5 acre or 0.2 ha. Since total area to be treated is 1.38 acres (0.5575 ha), the area should be staked off in half acre (0.2 ha) parcels, and each full parcel treated with one full tank load. The remaining area (0.38 acres or 0.158 ha, in this example) should be treated with a partial tank load comprised of the remaining HECP (23 bags) mixed at the recommend water/HECP ratio.

Figure 3.

Key Elements for Successful Product Installation (cont.)

Step Five: Proper mixing of the hydraulic slurry is very important to successful installation. The mixing procedure to ensure even distribution of mulch, seed, fertilizer and soil amendments includes:

- Purge pump, tower, and hose to insure that there are no obstructions.
- Close any recirculation valves if equipped.
- Fill machine with water to main agitator shaft.
- Engage agitator to the HECP manufacturer's recommended speed.
- Add mulch material and water at a rate that allows you time to add all bags desired for a load.
- If including seed, fertilizer, or other amendments, add these items when three-fourths of tank is full.
- Once all mulch has been added and target water level is achieved, increase agitator speed to full and mix to desired consistency. Reduction of agitator speeds may be required for thicker slurries.

Hose Technique

Tower Technique

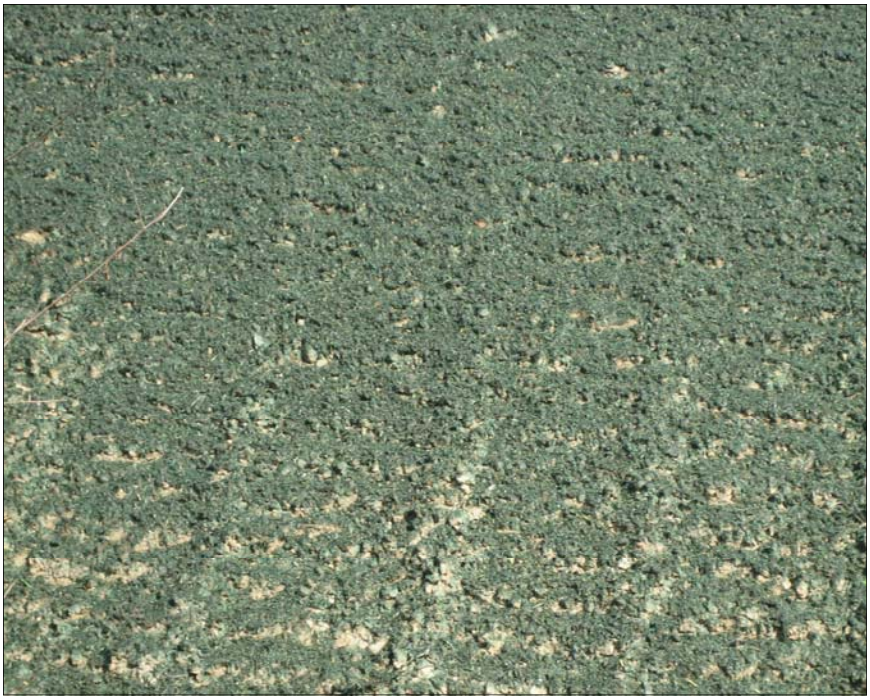
Step Six: Determine the HECP Application Technique. There are two techniques that can be utilized when applying hydraulic mulches: the tower technique and hose technique. Both techniques have their advantages. The tower technique is often utilized for hard to access locations such as steep slopes. The tower technique will also allow the hydraulic seeding machine to cover an area at a quicker

Key Elements for Successful Product Installation (cont.)

rate thus reducing the installation time as compared to the hose technique. However, the hose technique allows for greater control when applying the hydraulic mulch. For example, when applying next to curbing or other structures the hose technique will allow for more precision in the placement of the mulch.

Mulch manufacturers may provide additional guidance on the best method for applying their specific product. ECTC recommends that the user contact the manufacturers for this information.

Step Seven: Hydraulic mulch should be applied from opposing directions to ensure complete coverage of irregular soil surfaces. If the mulch is not applied in two opposing directions, a "shadowing" effect may occur. Ideally, the mulch will be applied from the toe of the slope and the top of the slope. However, this is not practical for all projects due to access feasibility. It is acceptable for when the contractor does not have access to both the top of the slope and bottom of the slope for the contractor to apply the hydraulic mulch from locations for which they have access. For such scenarios, the contractor can spray forward and then backward as their hydraulic seeding machine proceeds parallel to the slope.



Shadowing Effect

No Shadowing on the Slope

Manufacturer Recommended Installation

ECTC has an HECP specification for products. Visit the ECTC website to find this and more information on hydraulic erosion control products.

ECTC encourages specifiers, designers, installers and inspectors to contact the HECP manufacturers for additional guidance on product quality, testing and performance. They have specialists on staff that can further guide you on the proper use and application of HECPs.

About ECTC

The Erosion Control Technology Council (ECTC) is committed to promoting cost-effective erosion and sediment control solutions through leadership, standardization and education. ECTC assists agencies, engineers, designers, contractors and other entities in the proper application, installation and specification of erosion control technologies while establishing guidelines for product quality, testing and performance.

ECTC's mission has grown even more important as new end-users look for guidance in employing RECPs, HECPs and SRFRs to comply with more stringent erosion/sediment control regulations.

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