



Standard Material Certificatation for Conformance and Delivery - Excel R-1™

"Blanketing Nature With Nature"

To Whom it May Concern:

This document has been drafted to certify Western Excelsior manufactures the Rolled Erosion Control Product (RECP) marketed as EXCEL R-1. Excel R-1 has also been marketed as XCEL Regular and XCEL R-1. Each blanket is subjected to Western Excelsior's Quality Assurance Program and is manufactured to the specifications listed in document number WE_EXCEL_R1_SPEC. Further, Western Excelsior utilizes industry standardized test procedures to develop performance references for Excel R-1. Document number WE_EXCEL_R1_PERF presents the industry standardized testing and results. Installation instructions are provided in document numbers WE_EXCEL_R1_SII and WE_EXCEL_R1_CII for hillslope and channel installations, respectively. A copy of document number WE_EXCEL_R1_SPEC is attached; all other documentation may be obtained by calling Western Excelsior Technical Services at 1-866-540-9810, at www.westernexcelsior.com or by email at wexcotech@westernexcelsior.com.

Since most Western Excelsior products are sold to distributors and stocked, Western Excelsior is typically unable to certify material type or quantity delivered to the project/project site. However, space is provided below for distributor/contractor certification of materials delivered to the project/project site.

Regards,

A handwritten signature in black ink, appearing to read "Chad M. Lipscomb".

Chad M. Lipscomb, PE (CO), CPESC
Director, Technical Services
Western Excelsior Corporation
chad@westernexcelsior.com
866-540-9810

Standard Material Delivery Certification

Material Provided by (Distributor/Contractor): _____

Material Provided to (Contractor/Project): _____

Project Name / Project Number: _____

Rolls/Square Yards Provided: _____

Specification #: _____

Signature: _____

Date: _____

Title: _____



"Blanketing Nature With Nature"

Chad Lipscomb, PE (CO), CPESC
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Evansville, IN 47725
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Effective: 6/27/2017

RE: Certificate of Conformance: Excel R-1™

To Whom it May Concern:

This letter is provided to certify that Western Excelsior manufactures the Rolled Erosion Control Product (RECP) marketed as EXCEL R-1. Excel R-1 has also been previously marketed as XCEL R-1 and XCEL Regular. Each blanket is subjected to Western Excelsior's Quality Assurance Program and is manufactured to the specifications listed in document number WE_EXCEL_R1_SPEC. Further, Western Excelsior utilizes industry standardized test procedures to develop performance references for Excel R-1. Document number WE_EXCEL_R1_PERF presents the industry standardized testing and results. Installation instructions are provided in document numbers WE_EXCEL_R1_SII and WE_EXCEL_R1_CII for hillslope and channel installations, respectively. A copy of document number WE_EXCEL_R1_SPEC is attached; all other documentation may be obtained by calling Western Excelsior Technical Services at 1-866-540-9810, at www.westernexcelsior.com or by email at wexcotech@westernexcelsior.com.

Regards,

A handwritten signature in black ink, appearing to read "Chad M. Lipscomb".

Chad M. Lipscomb, PE (CO), CPESC
Director, Technical Services
Western Excelsior Corporation



Material Properties and Dimensions

Excel R-1™



Specifications

Western Excelsior manufactures a full line of Rolled Erosion Control Products (RECPs). Excel R-1 temporary Erosion Control Blanket is composed of a 100% machine produced High Altitude Rocky Mountain Aspen Excelsior matrix mechanically (stitch) bonded on two inch centers to a single photodegradable, synthetic net.

The excelsior matrix consists of curled, machine produced fibers with greater than eighty percent longer than six inches. The nominal weight of the product is 0.73 pounds per square yard. Excel R-1 blanket is available in natural color or dyed green and is recommended for use in channels or slopes requiring erosion protection for a period of up to fifteen months. Actual field longevity is dependent on soil and climatic conditions.

Each roll of EXCEL R-1 is made in the USA and manufactured under Western Excelsior’s Quality Assurance Program to ensure a continuous distribution of fibers and consistent thickness. Typical manufactured properties are provided in Table 1 and netting characteristics are provided in Table 2.

Table 1- Specified Expected Values

Tested Property	Test Method	Value
Tensile Strength MD x TD	ASTM D6818	5.0 lb/in (0.9 kN/m) x 4.0 lb/in (0.7 kN/m)
Elongation MD x TD	ASTM D6818	12 % x 10 %
Mass Per Unit Area	ASTM D6475	9.1 oz/yd ² (308 g/m ²)
Thickness	ASTM D6525	0.33 in (8 mm)
Light Penetration	ASTM D6567	37 % open
Water Absorption	ASTM D1117	275 %

Table 2 - Netting

Top Net Type	Synthetic, Photodegradable
Bottom Net Type	No Net
Top Net Opening Dimensions	0.8 in (20 mm) x 1.0 in (25 mm)
Bottom Net Opening Dimensions	N/A

Excel R-1 is available in multiple roll sizes ranging in width from 4.0 ft to 16.0 ft. and 45 ft to 600 ft in length. Standard roll sizes are 80 square yards, measuring 4.0 ft wide by 180.0 ft long or 8.0 ft wide by 90 ft long. Custom roll sizes are available upon request.

The information contained herein may represent product index data, performance ratings, bench scale testing or other material utility quantifications. Each representation may have unique utility and limitations. Every effort has been made to ensure accuracy, however, no warranty is claimed and no liability shall be assumed by Western Excelsior Corporation (WEC) or its affiliates regarding the completeness, accuracy or fitness of these values for any particular application or interpretation. While testing methods are provided for reference, values shown may be derived from interpolation or adjustment to be representative of intended use. For further information, please feel free to contact WEC.



Design Data and Test Results

Excel R-1™



Specifications

A variety of test methods are utilized to determine performance and conformance values for Rolled Erosion Control Products (RECPs). Information within this document is presented to provide conformance values and recommended design values. Test results obtained for the Excel R-1 extended term Erosion Control Blanket (ECB) and general design values are presented in Tables 1-4. For specific information detailing testing protocols, results and application of design values, refer to document number WE_EXCEL_PERF_GEN.

Table 1 - Bench Scale Testing / NTPEP

Test Method	Condition	Result
ASTM D7101 Bench Scale Rainfall and Rainsplash Test	2 in per hour	6.69
	4 in per hour	5.09
	6 in per hour	11.34
ASTM D7207 Bench Scale Shear Resistance Test	2.5 psf (117 PA)	0.5 in (12 mm)
ASTM D7322 Bench Scale Vegetation Establishment Test	Top Soil, Fescue, 21 Day Incubation	467 %
NTPEP Report Number	ECP-2016-03-009	

Table 3 - Recommended Design Values*

Design Value	Unvegetated	Vegetated
Typical RUSLE Cover Factor (C Factor)**	0.05	N/A
Maximum Slope Gradient (RUSLE)	2H : 1V	N/A
Max Allowable Velocity (0.5 in (12mm) soil loss)***	5.5 ft/s (1.7 m/s)	N/A
Max Allowable Shear Stress (0.5 in (12mm) soil loss)***	1.6 psf (77 PA)	N/A
CF _{veg} /CF _{TRM}	N/A	N/A

C Factor value compliant with ASTM D6459. * Shear Stress and Velocity values compliant with ASTM D6460.

Table 2 - Texas Transportation Institute (TTI) Results

Class	Test Condition	Result
A	< 3H:1 Clay Slope Test	Approved
B	< 3H:1 Sand Slope Test	Approved
C	> 3H:1 Clay Slope Test	Approved
D	> 3H:1 Sand Slope Test	Approved
E	2 psf Partially Vegetated Channel Test	Approved
F	4 psf Partially Vegetated Channel Test	Approved
G	6 psf Partially Vegetated Channel Test	N/A
H	8 psf Partially Vegetated Channel Test	N/A

Table 4 - HEC-15 Resistance to Flow Values

Design Value	Unvegetated
Manning's n @ Tau lower (0.4 psf (19 PA))	0.023
Manning's n @ Tau mid (0.8 psf (38 PA))	0.023
Manning's n @ Tau upper (1.6 psf (77 PA))	0.023

*Recommended Design Values are based on results of standardized industry full-scale testing and may not be applicable for all field conditions. For most accurate computation of field performance, consult Excel Erosion Design (EED) at www.westernexcelsior.com.

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Slope Installation Instructions EXCEL R-1™

* Drawings Not to Scale

Step 1 - Site Preparation

Prepare site to design profile and grade. Remove debris, rocks, clods, etc.. Ground surface should be smooth prior to installation to ensure blanket remains in contact with slope.

Step 2 - Seeding

Seeding of site should be conducted to design requirements or to follow local or state seeding requirements as necessary.

Step 3 - Staple Selection

At a minimum, 6 in. long by 1 in. crown, 11 gauge staples are to be used to secure the blanket to the ground surface. Installation in rocky, sandy or other loose soil may require longer staples.

Step 4 - Excavate Anchor Trench and Secure Blanket

Excavate a trench along the top of the slope to secure the upstream end of the blanket. The trench should run along the length of the installation, be 6 in. wide and 6 in. deep. Staple blanket along bottom of trench, fill with compacted soil, overlap blanket towards toe of slope and secure with row of staples (shown in Figures A, E and F).

Step 5 - Secure Body of Blanket

Roll blanket down slope from anchor trench. Staple body of blanket following the pattern shown in Figure D. Leave end of blanket unstapled to allow for overlap shown in Figure B. Place downstream blanket underneath upstream blanket to form shingle pattern. Staple seam as shown in Figure E. Secure downstream blanket with stapling pattern shown in Figure D. Stapling pattern shown in Figure D reflects minimum staples to be used. More staples may be required to ensure blanket is sufficiently secured to resist mowers and foot traffic and to ensure blanket is in contact with soil surface over the entire area of blanket. Further, critical points require additional staples. Critical points are identified in Figure G.

Step 6 - Continue Along Slope - Complete Installation

Overlap adjacent blankets as shown in Figure C and repeat Step 5. Secure toe of slope using stapling pattern shown in Figure E. Secure edges of installation by stapling at 1.0' intervals along the terminal edge.

Figure A

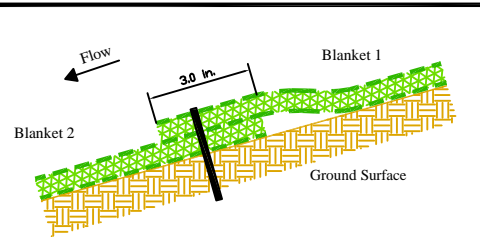


Figure B - Profile View

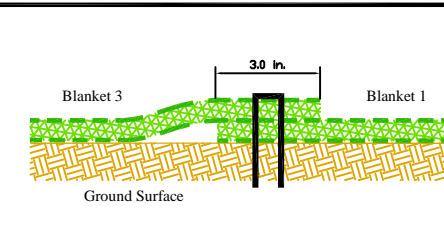


Figure C - Cross Section View

Product Application/Equivalency Specifications

Excel R-1 is produced by Western Excelsior and consists of a temporary Rolled Erosion Control Product (RECP) comprised of an excelsior matrix mechanically (stitch) bound to a single, photodegradable synthetic net (top). The expected longevity of Excel R-1 is approximately 18 months (actual longevity dependent on field and climatic conditions). Excel R-1 is manufactured to include physical properties sufficient to provide the intended longevity and performance. Product specifications may be found on document WE_EXCEL_R1_SPEC and performance information may be found on document WE_EXCEL_R1_PERF. All documents are available from Western Excelsior Technical Support or www.westernexcelsior.com. Additional to above, equivalent products to Excel R-1 must meet identical criteria as Excel R-1 as follows:

1. Consist of machine produced, weed and debris free excelsior bound to a single, synthetic, photodegradable net.
2. Sufficient tensile strength, thickness and coverage to maintain integrity during installation and ensure material performance.
3. Listing within AASHTO NTPEP database.
4. Meet ECTC specification for category 2C product.

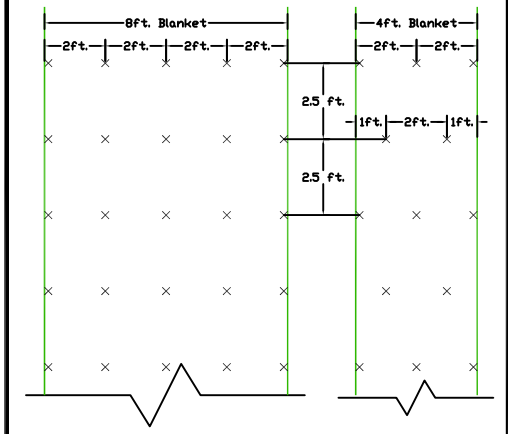
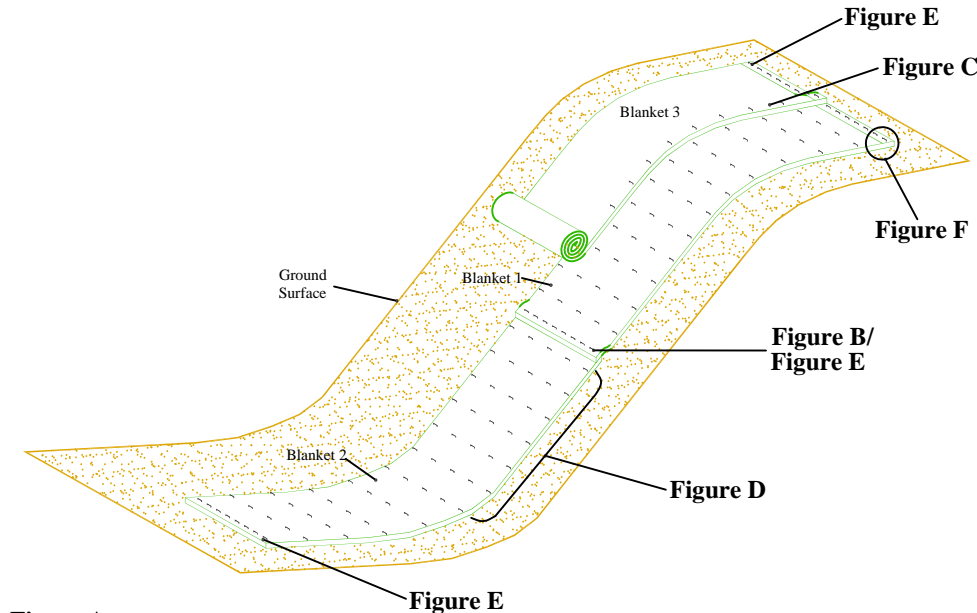


Figure D - Plan View

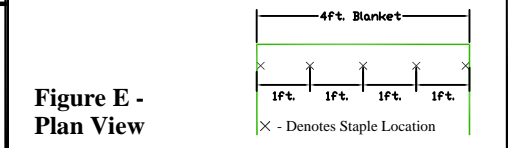
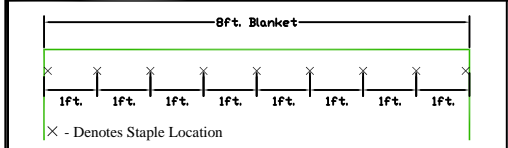


Figure E - Plan View

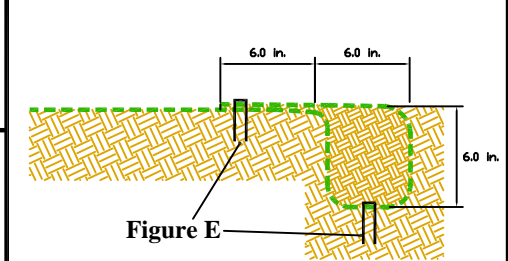


Figure F - Profile View

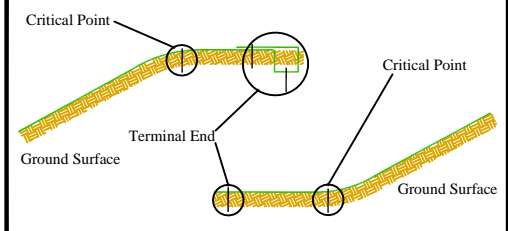


Figure G - Critical Point Securing



Channel Installation Instructions EXCEL R-1™

* Drawings Not to Scale

Step 1 - Site Preparation

Prepare site to design profile and grade. Remove debris, rocks, clods, etc.. Ground surface should be smooth prior to installation to ensure blanket remains in contact with slope.

Step 2 - Seeding

Seeding of site should be conducted to design requirements or to follow local or state seeding requirements as necessary.

Step 3 - Staple Selection

At a minimum, 6 in. long by 1 in. crown, 11 gauge staples are to be used to secure the blanket to the ground surface. Installation in rocky, sandy or other loose soil may require longer staples.

Step 4 - Excavate Anchor Trench and Secure Blanket

Excavate a trench along the top of the channel side slopes and the upstream terminal end of the channel to secure the edges of the blanket. The trench should run along the length and width of the installation, be 6 in. wide and 6 in. deep. Staple blanket along bottom of trench, fill with compacted soil, overlap blanket towards toe of slope and secure with row of staples (shown in Figures A, E and F).

Step 5 - Secure Body of Blanket

Roll blanket down slope from anchor trench. Staple body of blanket following the pattern shown in Figure D. Leave end of blanket unstapled to allow for overlap shown in Figure B. Place downstream blanket underneath upstream blanket to form shingle pattern. Staple seam as shown in Figure E. Secure downstream blanket with stapling pattern shown in Figure D. Stapling pattern shown in Figure D reflects minimum staples to be used. More staples may be required to ensure blanket is sufficiently secured to resist mowers and foot traffic and to ensure blanket is in contact with soil surface over the entire area of blanket. Further, critical points require additional staples. Critical points are identified in Figure G.

Step 6 - Continue Along Slope - Complete Installation

Overlap adjacent blankets as shown in Figure C and repeat Step 5. Secure toe of slope using stapling pattern shown in Figure E. Secure edges of installation by stapling at 1.0' intervals along the terminal edge.

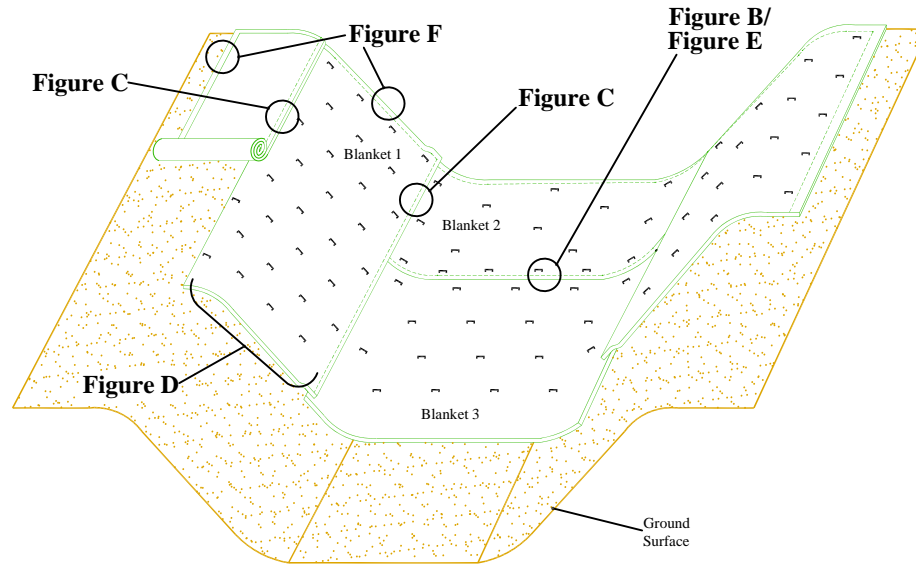


Figure A

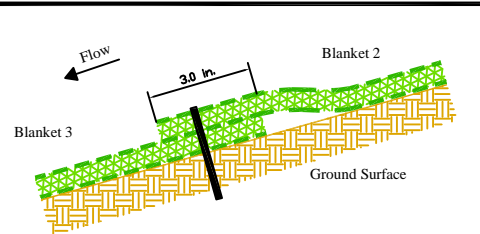


Figure B - Profile View

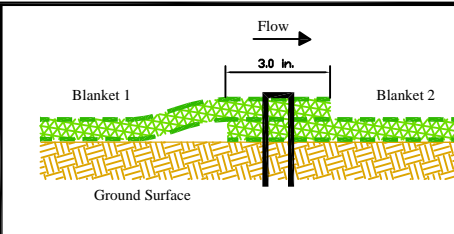


Figure C - Cross Section View

Product Application/Equivalency Specifications

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1. Consist of machine produced, weed and debris free excelsior bound to a single, synthetic, photodegradable net.
2. Sufficient tensile strength, thickness and coverage to maintain integrity during installation and ensure material performance.
3. Listing within AASHTO NTPEP database.
4. Meet ECTC specification for category 2C product.

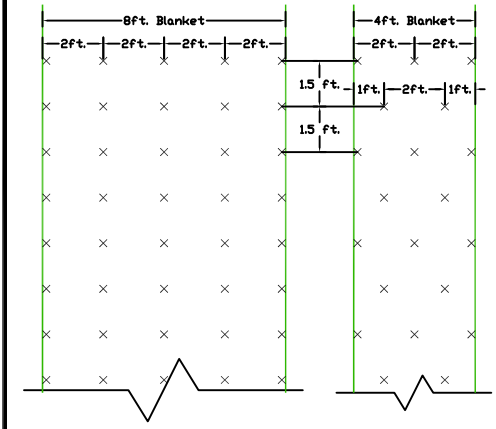


Figure D - Plan View

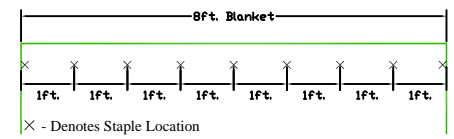


Figure E - Plan View

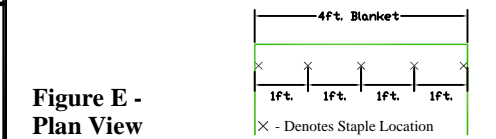


Figure E

Figure F - Profile View

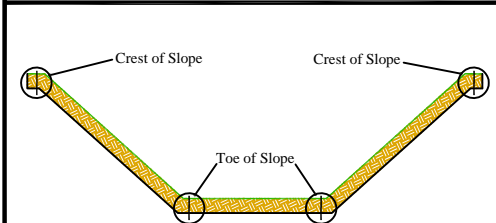


Figure G - Critical Point Securing



Instalación en Pendiente Instrucciones EXCEL R-1™

Paso 1 - Preparación del Lugar

Prepare el lugar según el perfil del diseño y de la pendiente. Remueva el escombros, piedras, y terrones, etc. La superficie de la tierra debe estar lisa antes de la instalación para asegurar que el cojín permanezca en contacto con la pendiente.

Paso 2 - Semilla

El sembrado de la semilla en el lugar se debe hacer de acuerdo a los requisitos del diseño o a los requisitos locales y estatales, según sea necesario.

Paso 3 - Selección de Grapas

Lo mínimo que se debe usar son grapas de calibre 11, de 6 in. de largo y 1 in. de corona para sujetar el cojín a la superficie de la tierra. La instalación en tierra rocosa, arenosa o suelta puede requerir grapas más largas.

Paso 4 - Excave Zanja para Anclaje y Sujete el Cojín

Excave una zanja a lo largo de la parte superior de las pendiente para sujetar la punta de arriba del cojín. La zanja debe correr a lo largo de la instalación, tener 6 in. de ancho y 6 in. de profundidad. Engrape el cojín a lo largo del fondo de la zanja; llénela con tierra compactada, empalme el cojín hacia la parte inferior de la pendiente y sujételo con una hilera de grapas (Vea las Figuras A, E y F).

Paso 5 - Sujete el Cuerpo del Cojín

Desenrolle el cojín hacia abajo desde la zanja de anclaje. Engrape el cuerpo del cojín siguiendo el patrón que se muestra en la Figura D. Deje la punta del cojín sin engrapar para que lo pueda empalmar como se muestra en la Figura B. Coloque el cojín que baja por debajo del de arriba para formar un patrón como de tejas. Engrape las uniones como se muestra en la figura E. Sujete el cojín de bajada con el patrón de engrapado que se muestra en la Figura D. El patrón de engrapado de la Figura D refleja el mínimo de grapas que se debe usar. Se pueden requerir más grapas para asegurar que el cojín quede sujetado suficientemente para resistir podadoras y tráfico a pie y para asegurar que el cojín permanezca en contacto con la superficie de la tierra en toda el área. Además, los puntos críticos requieren grapas adicionales. Los puntos críticos están identificados en la Figura G.

Paso 6 - Continúe a lo largo de la Pendiente - Termine la Instalación

Empalme los cojines adyacentes como se muestra en la Figura C y repita el Paso 5. Sujete la parte inferior de la pendiente usando el patrón de grapas que se muestra en la Figura E. Sujete las orillas de la instalación engrapando a intervalos de 1.0' a lo largo de la orilla.

* El Dibujo No Está a Escala Se.

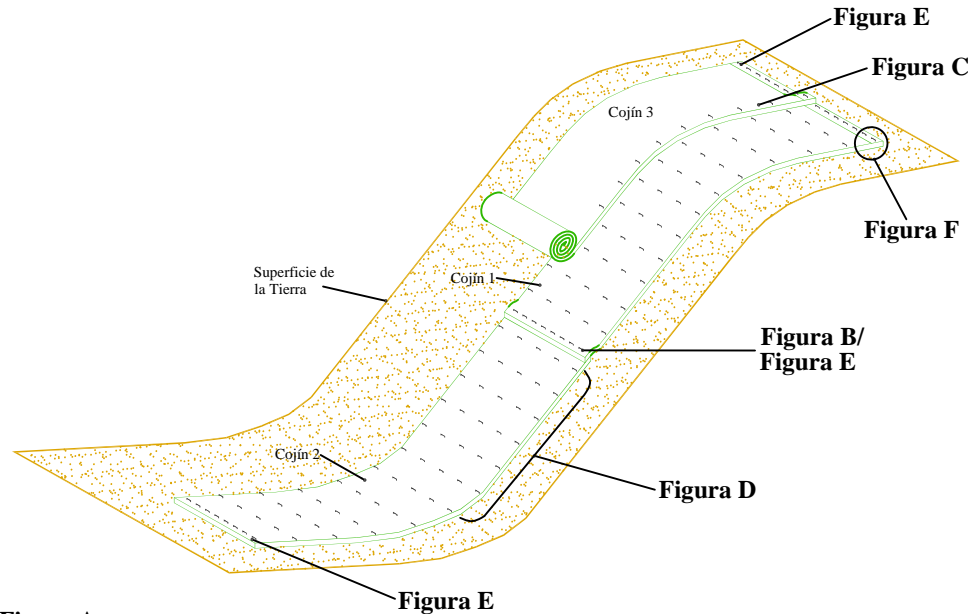


Figura A

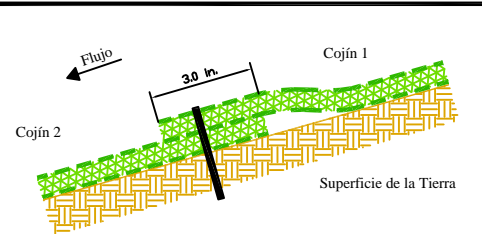


Figura B - Vista de Perfil

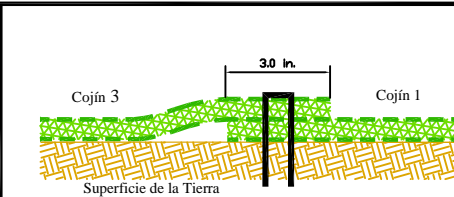


Figura C - Corte de Vista Transversal

Aplicación del Producto/Especificaciones de Equivalencia

Excel R-1 es producido por Western Excelsior y consiste de un Producto en Rollo para Control temporal de la Erosión (PCER), formado de una matriz de excelsior unida mecánicamente (cosida) a una sola red sintética fotodegradable (parte superior). La vida útil del EXCEL R-1 es aproximadamente 18 meses. (La vida útil real depende del campo y de las condiciones climáticas). El Excel R-1 se fabrica para incluir propiedades físicas suficientes para proporcionar la vida útil y rendimiento esperado. Las especificaciones del producto se encuentran en el documento WE_EXCEL_R1_SPEC y la información de rendimiento se puede encontrar en el documento WE_EXCEL_R1_PERF. Todos los documentos están disponibles en Western Excelsior Technical Support (Soporte Técnico de Western Excelsior) o en www.westernexcelsior.com. Además de lo anterior, los productos equivalentes a Excel R-1 deben cumplir con los siguientes criterios idénticos a Excel R-1:

1. Consistente en excelsior producido a máquina, libre de hierbas y basura unido con una sola red sintética fotodegradable.
2. Suficiente fuerza de tensión, grosor y cobertura para mantener su integridad durante la instalación y asegurar el rendimiento del material.
3. Incluido en la base de datos AASHTO NTPEP.
4. Cumplir especificación ECTC para productos de categoría 2C.

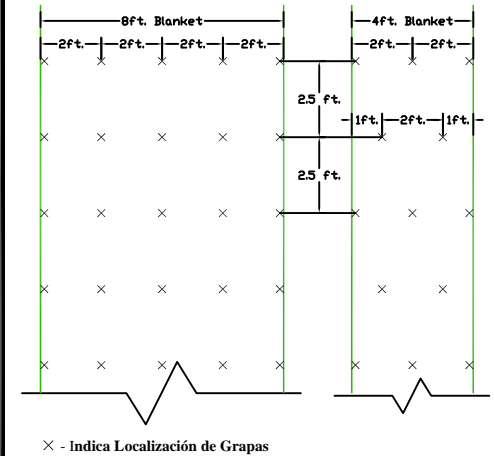


Figura D - Vista del Plano

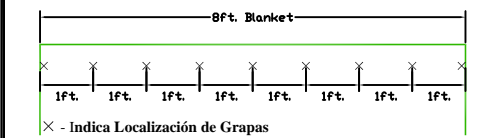


Figura E - Vista del Plano

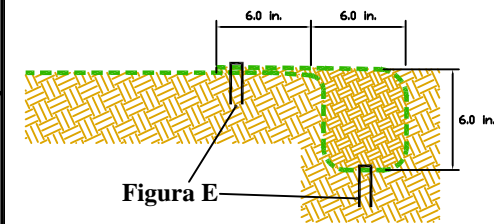
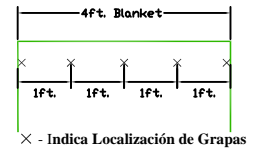


Figura F - Vista de Perfil

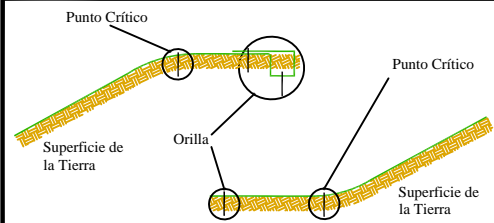


Figura G - Sujeción de Puntos Críticos



Instalación en Canal

Instrucciones EXCEL R-1™

Paso 1 - Preparación del Lugar

Prepare el lugar según el perfil del diseño y de la pendiente. Remueva el escombros, piedras, y terrones, etc. La superficie de la tierra debe estar lisa antes de la instalación para asegurar que el cojín permanezca en contacto con la pendiente.

Paso 2 - Semilla

El sembrado de la semilla en el lugar se debe hacer de acuerdo a los requisitos del diseño o a los requisitos locales y estatales, según sea necesario.

Paso 3 - Selección de Grapas

Lo mínimo que se debe usar son grapas de calibre 11, de 6 in. de largo y 1 in. de corona para sujetar el cojín a la superficie de la tierra. La instalación en tierra rocosa, arenosa o suelta puede requerir grapas más largas.

Paso 4 - Excave Zanja para Anclaje y Sujete el Cojín

Excave una zanja a lo largo de la parte superior de las pendientes de los lados del canal y la orilla de arriba del canal para sujetar las orillas del cojín. La zanja debe correr a lo largo y ancho de la instalación, tener 6 in. de ancho y 6 in. de profundidad. Engrape el cojín a lo largo del fondo de la zanja; llénela con tierra compactada, empalme el cojín hacia la parte inferior de la pendiente y sujételo con una hilera de grapas (Vea las Figuras A, E y F).

Paso 5 - Sujete el Cuerpo del Cojín

Desenrolle el cojín hacia abajo desde la zanja de anclaje. Engrape el cuerpo del cojín siguiendo el patrón que se muestra en la Figura D. Deje la punta del cojín sin engrapar para que lo pueda empalmar como se muestra en la Figura B. Coloque el cojín que baja por debajo del de arriba para formar un patrón como de tejas. Engrape las uniones como se muestra en la figura E. Sujete el cojín de bajada con el patrón de engrapado que se muestra en la Figura D. El patrón de engrapado de la Figura D refleja el mínimo de grapas que se debe usar. Se pueden requerir más grapas para asegurar que el cojín quede sujetado suficientemente para resistir podadoras y tráfico a pie y para asegurar que el cojín permanezca en contacto con la superficie de la tierra en toda el área. Además, los puntos críticos requieren grapas adicionales. Los puntos críticos están identificados en la Figura G.

Paso 6 - Continúe a lo largo de la Pendiente - Termine la Instalación

Empalme los cojines adyacentes como se muestra en la Figura C y repita el Paso 5. Sujete la parte inferior de la pendiente usando el patrón de grapas que se muestra en la Figura E. Sujete las orillas de la instalación engrapando a intervalos de 1.0' a lo largo de la orilla.

* El Dibujo No Está a Escala Se.

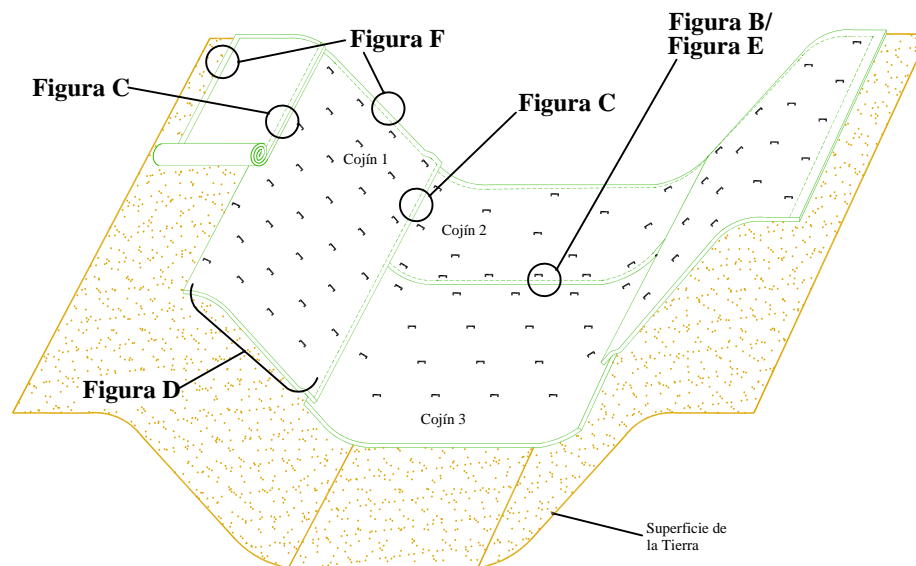


Figura A

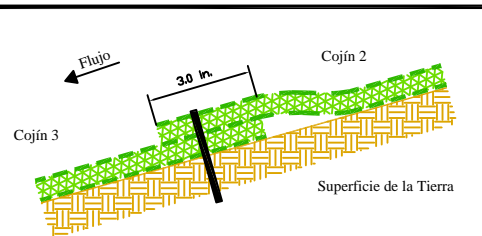


Figura B - Vista de Perfil

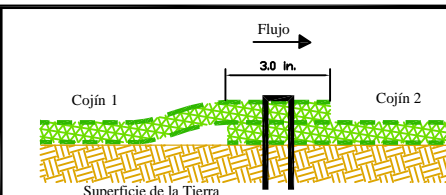
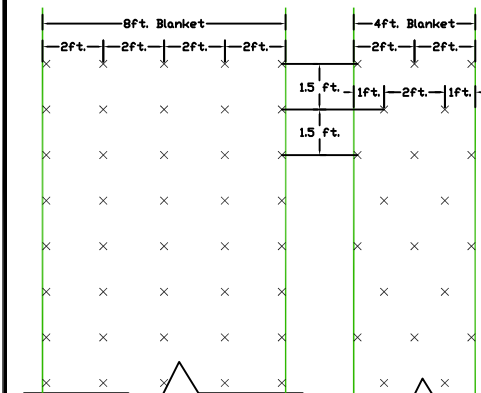


Figura C - Corte de Vista Transversal

Aplicación del Producto/Especificaciones de Equivalencia

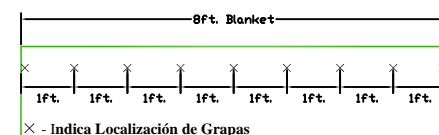
Excel R-1 es producido por Western Excelsior y consiste de un Producto en Rollo para Control temporal de la Erosión (PCER), formado de una matriz de excelsior unida mecánicamente (cosida) a una sola red sintética fotodegradable (parte superior). La vida útil del EXCEL R-1 es aproximadamente 18 meses. (La vida útil real depende del campo y de las condiciones climáticas). El Excel R-1 se fabrica para incluir propiedades físicas suficientes para proporcionar la vida útil y rendimiento esperado. Las especificaciones del producto se encuentran en el documento WE_EXCEL_R1_SPEC y la información de rendimiento se puede encontrar en el documento WE_EXCEL_R1_PERF. Todos los documentos están disponibles en Western Excelsior Technical Support (Soporte Técnico de Western Excelsior) o en www.westernexcelsior.com. Además de lo anterior, los productos equivalentes a Excel R-1 deben cumplir con los siguientes criterios idénticos a Excel R-1:

1. Consistente en excelsior producido a máquina, libre de hierbas y basura unido con una sola red sintética fotodegradable.
2. Suficiente fuerza de tensión, grosor y cobertura para mantener su integridad durante la instalación y asegurar el rendimiento del material.
3. Incluido en la base de datos AASHTO NTPEP.
4. Cumplir especificación ECTC para productos de categoría 2C.



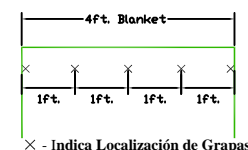
× - Indica Localización de Grapas

Figura D - Vista del Plano



× - Indica Localización de Grapas

Figura E - Vista del Plano



× - Indica Localización de Grapas

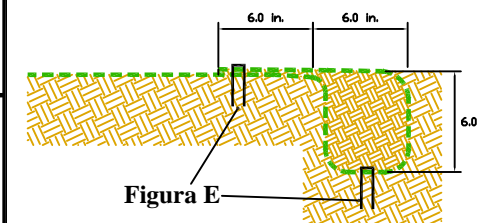


Figura E

Figura F - Vista de Perfil

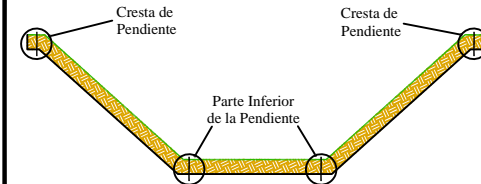


Figura G - Sujeción de Puntos Críticos