



"Blanketing Nature With Nature"

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Effective: 4/14/2014

RE: Certificate of Conformance: Excel PP5-12™

To Whom it May Concern:

This letter is to certify that Western Excelsior manufactures the Rolled Erosion Control Product (RECP) marketed as EXCEL PP5-12. Each blanket is subjected to Western Excelsior's Quality Assurance Program and is manufactured to the specifications listed in document number WE\_EXCEL\_PP512\_SPEC. Further, Western Excelsior utilizes industry standardized test procedures to develop performance references for Excel PP5-12. Document number WE\_EXCEL\_PP512\_PERF presents the industry standardized testing and results. Installation instructions are provided in document numbers WE\_EXCEL\_PP512\_SII and WE\_EXCEL\_PP512\_CII for hillslope and channel installations, respectively. A copy of document number WE\_EXCEL\_PP512\_SPEC is attached; all other documentation may be obtained by calling Western Excelsior Technical Services at 1-866-540-9810, at [www.westernexcelsior.com](http://www.westernexcelsior.com) or by email at [wexcotech@westernexcelsior.com](mailto: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 PP5-12™**



## Specifications

Western Excelsior manufactures a full line of Rolled Erosion Control Products (RECPs). Excel PP5-12 Turf Reinforcement Mat is composed of 100% synthetic components. A matrix of green polypropylene fibers is mechanically (stitch) bound between two UV stabilized, heavy duty synthetic nets. Stitching is secured on two inch centers using UV stabilized, heavy duty polypropylene thread. Excel PP5-12 is a permanent, three-dimensional TRM that provides immediate erosion protection and long term turf reinforcement and is intended for slope or channel applications requiring erosion protection for greater than thirty-six months.

Each roll of EXCEL PP5-12 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 product characteristics are provided in Table 2.

Table 1- Specified Expected Values

Tested Property	Test Method	Value
Tensile Strength (MD) x (TD)	ASTM D6818	20.8 lb/in (3.6 kN/m) x 17.7 lb/in (3.1 kN/m)
Elongation (MD) x (TD)	ASTM D6818	25 % x 25 %
Mass Per Unit Area	ASTM D6566	12.0 oz/yd <sup>2</sup> (407 g/m <sup>2</sup> )
Thickness	ASTM D6525	0.38 in (10 mm)
Light Penetration	ASTM D6567	20 % open
Water Absorption	ASTM D1117	N/A %
Resiliency	ASTM D 6524	88 %
Porosity	Computed	96 %
UV Stability	ASTM D 4355	100% (500hr) / 90% (1000hr) %

Table 2 - Netting

Top Net Type	Synthetic, UV Stable
Bottom Net Type	Synthetic, UV Stable
Top Net Opening Dimensions	0.7 in (17 mm) x 0.7 in (17 mm)
Bottom Net Opening Dimensions	0.7 in (17 mm) x 0.7 in (17 mm)

Excel PP5-12 is available in multiple roll sizes ranging in width from 8.0 ft to 16.0 ft. and 112.5 ft to 600 ft in length. Standard roll sizes are 100 square yards, measuring 8.0 ft wide by 112.5 ft long. Custom roll sizes are available upon request.

Document # WE\_EXCEL\_PP58\_SPEC. This document has been developed to provide the characteristic properties of the product described. For questions, to request performance data or installation recommendations, contact Western Excelsior at 866-540-9810 or wexcotech@westernexcelsior.com. Updated 4/14/2014.

# DESIGN DATA AND TEST RESULTS



**EXCEL PP5-12™**



## 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 PP5-12 Turf Reinforcement Mat (TRM) 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	5.30
	4 in per hour	6.28
	6 in per hour	7.40
ASTM D7207 Bench Scale Shear Resistance Test	2.61 psf (125 PA)	0.5 in (12 mm)
ASTM D7322 Bench Scale Vegetation Establishment Test	Top Soil, Fescue, 21 Day Incubation	587 %

Table 2 - Texas Transportation Institute (TTI) Results

Class	Test Condition	Result
A	< 3H:1 Clay Slope Test	N/A
B	< 3H:1 Sand Slope Test	Approved
C	> 3H:1 Clay Slope Test	N/A
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	Approved
H	8 psf Partially Vegetated Channel Test	Approved

Table 3 - Recommended Design Values\*

Design Value	Unvegetated	Vegetated
Typical RUSLE Cover Factor (C Factor)**	0.03	N/A
Maximum Slope Gradient (RUSLE)	1H : 1V	N/A
Max Allowable Velocity (0.5 in (12mm) soil loss)***	9.0 ft/s (2.7 m/s)	15.0 ft/s (4.6 m/s)
Max Allowable Shear Stress (0.5 in (12mm) soil loss)***	2.8 psf (134 PA)	12.0 psf (575 PA)
CF <sub>veg</sub> /CF <sub>TRM</sub>	N/A	0.26

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

Table 4 - HEC-15 Resistance to Flow Values

Design Value	Unvegetated
Manning's n @ Tau <sub>lower</sub> (0.7 psf (34 PA))	0.027
Manning's n @ Tau <sub>mid</sub> (1.4 psf (67 PA))	0.027
Manning's n @ Tau <sub>upper</sub> (2.8 psf (134 PA))	0.027

\*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](http://www.westernexcelsior.com).

Document # WE\_EXCEL\_PP512\_PERF. This document has been developed to provide information regarding the bench scale and/or performance testing conducted on the Excel PP5-12 TRM. For questions or installation recommendations, contact Western Excelsior Technical Services Division at 866-540-9810 or [wexcotech@westernexcelsior.com](mailto:wexcotech@westernexcelsior.com). Updated 4/14/2014.





# Slope Installation

Instructions  
EXCEL PP5-12™

## 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 1.5' intervals along the terminal edge.

\* Drawings Not to Scale

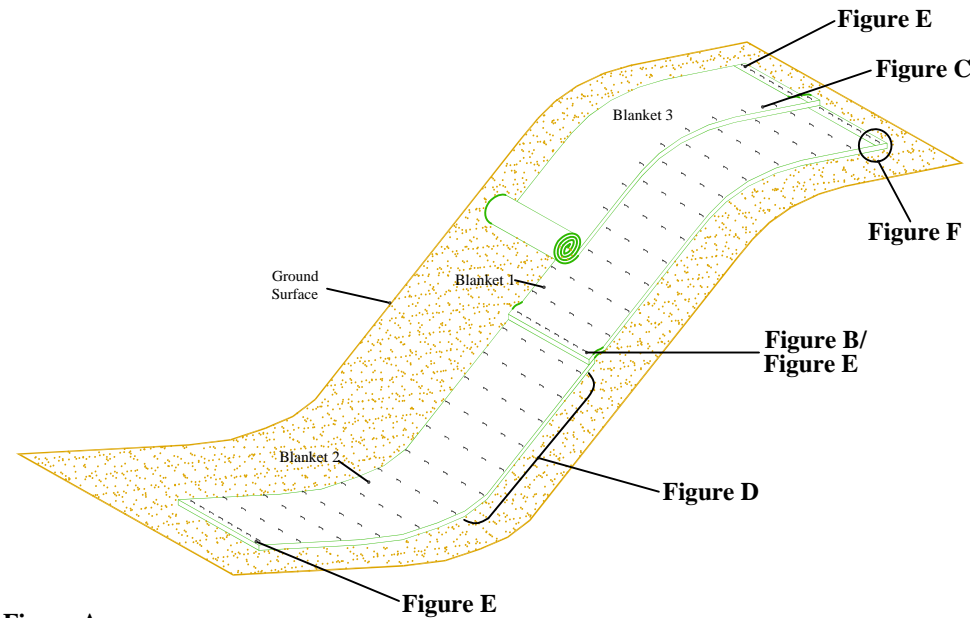


Figure A

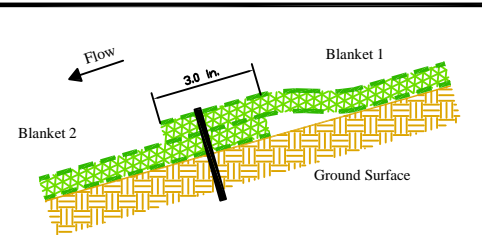


Figure B - Profile View

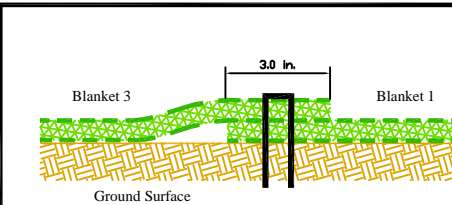
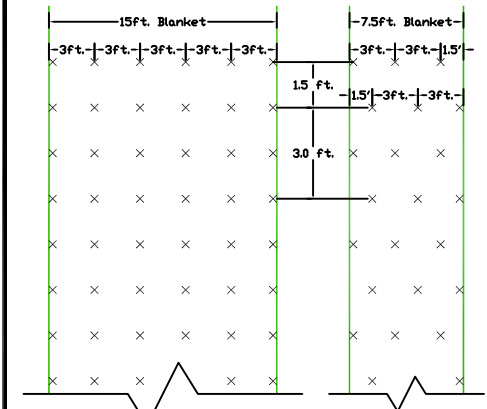


Figure C - Cross Section View

## Product Application/Equivalency Specifications

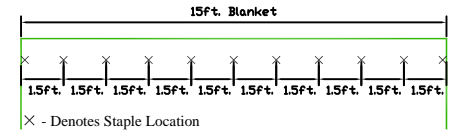
Excel PP5-12 is produced by Western Excelsior and consists of an permanent Rolled Erosion Control Product (RECP) comprised of a synthetic fiber blend matrix mechanically (stitch) bound between two, UV stable heavy duty synthetic nets (top and bottom). The expected longevity of Excel PP5-12 is greater than 36 months (actual longevity dependent on field and climatic conditions). Excel PP5-12 is designed and manufactured to provide immediate erosion control and permanent turf reinforcement and is comprised of physical properties sufficient to provide the intended longevity and performance. Product specifications may be found on document WE\_EXCEL\_PP512\_SPEC and performance information may be found on document WE\_EXCEL\_PP512\_PERF. All documents are available from Western Excelsior Technical Support or [www.westernexcelsior.com](http://www.westernexcelsior.com). Additional to above, equivalent products to Excel PP5-12 must meet identical criteria as Excel PP5-12 as follows:

1. Consist of synthetic fiber matrix confined between two UV stable, heavy duty sythetic nets.
2. Sufficient tensile strength, thickness and coverage to maintain integrity during installation and ensure material performance. Provide permanent turf reinforcement with longevity greater than three years, immune from moisture damage or chemical conditions within the soil.
3. Listing within AASHTO NTPEP database.
4. Meet ECTC specification for category 5C product.



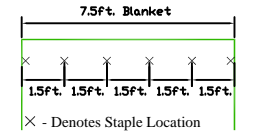
× - Denotes Staple Location

Figure D - Plan View



× - Denotes Staple Location

Figure E - Plan View



× - Denotes Staple Location

Figure E - Plan View

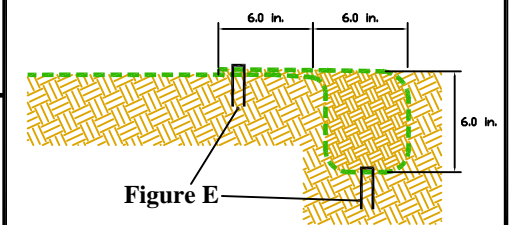


Figure E

Figure F - Profile View

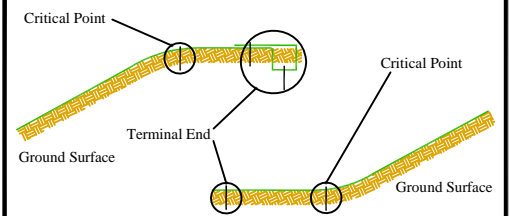


Figure G - Critical Point Securing



# Channel Installation

Instructions  
EXCEL PP5-12™

## 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 1.5' intervals along the terminal edge.

\* Drawings Not to Scale

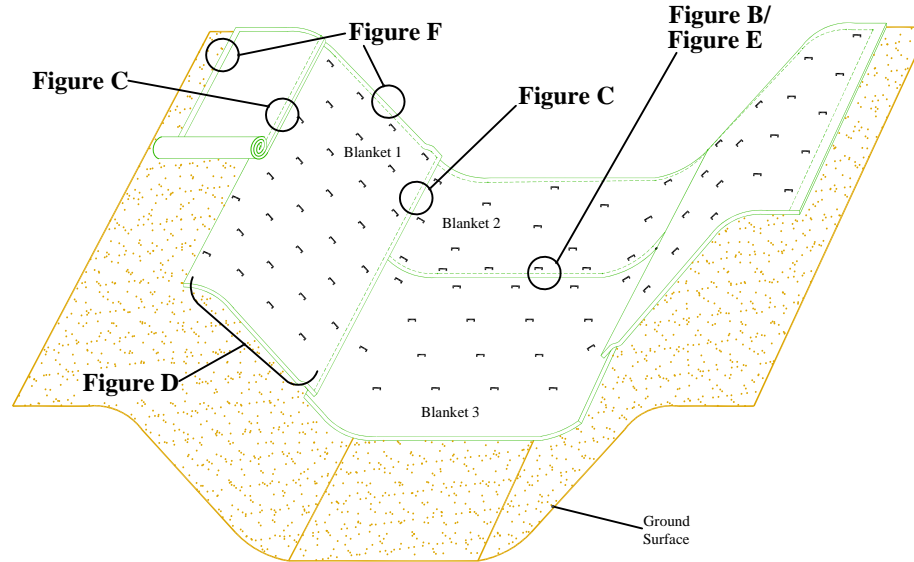


Figure A

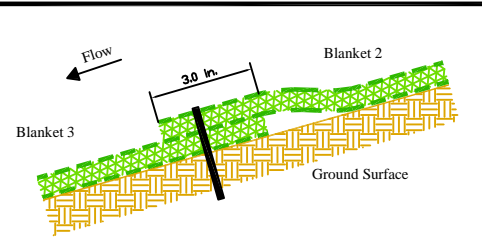


Figure B - Profile View

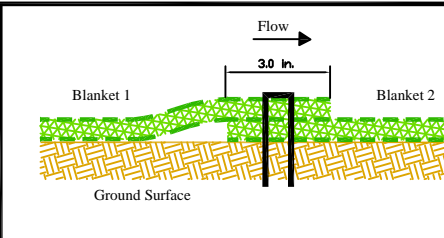
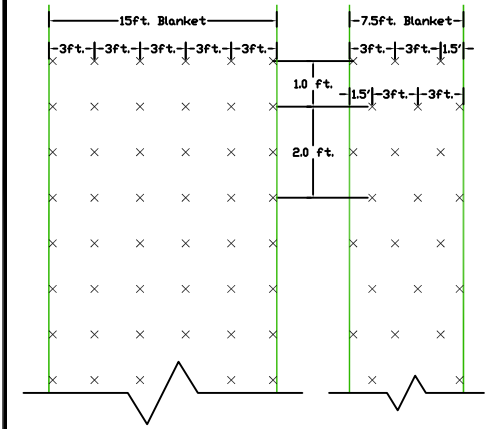


Figure C - Cross Section View

## Product Application/Equivalency Specifications

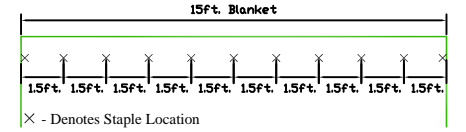
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1. Consist of synthetic fiber matrix confined between two UV stable, heavy duty sythetic nets.
2. Sufficient tensile strength, thickness and coverage to maintain integrity during installation and ensure material performance. Provide permanent turf reinforcement with longevity greater than three years, immune from moisture damage or chemical conditions within the soil.
3. Listing within AASHTO NTPEP database.
4. Meet ECTC specification for category 5C product.



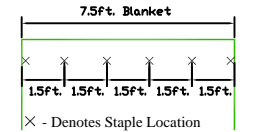
× - Denotes Staple Location

Figure D - Plan View



× - Denotes Staple Location

Figure E - Plan View



× - Denotes Staple Location

Figure E - Plan View

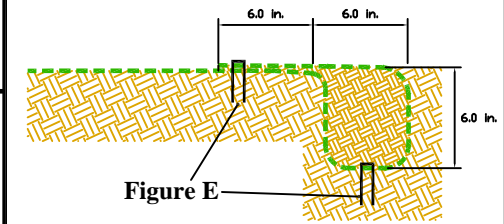


Figure E

Figure F - Profile View

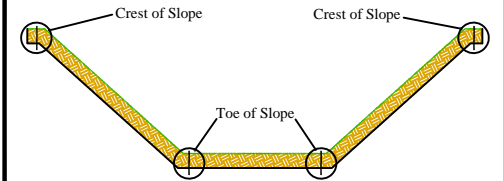


Figure G - Critical Point Securing



# Instalación en Pendiente

Instructions  
EXCEL PP5-12™

## Paso 1 - Preparación del Lugar

Prepare el lugar según el perfil del diseño y de la pendiente. Remueva el escombro, 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

Desenrole 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 1.5' a lo largo de la orilla.

\* El Dibujo No Está a Escala Se.

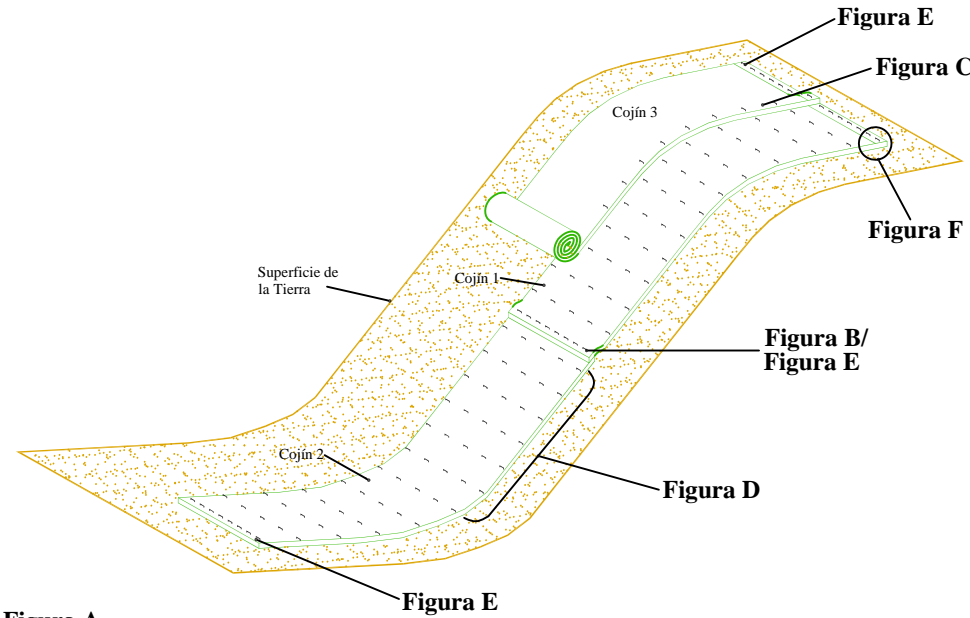


Figura A

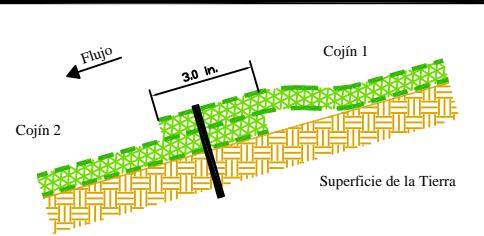


Figura B - Vista de Perfil

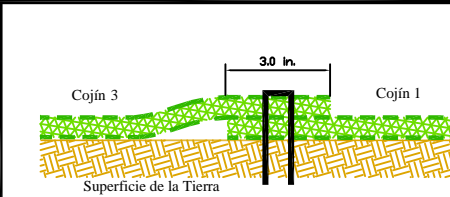


Figura C - Corte de Vista Transversal

## Aplicación del Producto/Especificaciones de Equivalencia

Excel PP5-12 es producido por Western Excelsior y consiste de un Producto permanente en Rollo para Control de la Erosión (PCER), formado de una matriz de una mezcla de fibra sintética unida mecánicamente (cosida) entre dos redes sintéticas, de uso rudo, estabilizadas UV (parte superior e inferior). La vida útil del EXCEL PP5-12 es más de 36 meses. (La vida útil real depende del campo y de las condiciones climáticas). El Excel PP5-12 está diseñado y fabricado para proporcionar control inmediato de la erosión y refuerzo permanente para el césped y tiene las suficientes propiedades físicas para proporcionar la vida útil y el rendimiento esperado. Las especificaciones del producto se encuentran en el documento WE\_EXCEL\_PP512\_SPEC y la información de rendimiento se puede encontrar en el documento WE\_EXCEL\_PP512\_PERF. Todos los documentos están disponibles en Western Excelsior Technical Support (Soporte Técnico de Western Excelsior) o en [www.westernexcelsior.com](http://www.westernexcelsior.com). Además de lo anterior, los productos equivalentes a Excel PP5-12 deben cumplir con los siguientes criterios idénticos a Excel PP5-12:

1. Consistente de una matriz de fibra sintética entre dos redes sintéticas de uso rudo, estabilizadas UV.
2. Suficiente fuerza de tensión, grosor y cobertura para mantener su integridad durante la instalación y asegurar el rendimiento del material. Proporcionar refuerzo para el césped con una vida útil de más de tres años, inmune al daño de la humedad o condiciones químicas dentro de la tierra.
3. Incluido en la base de datos AASHTO NTPEP.
4. Cumplir especificación ECTC para productos de categoría 5C.

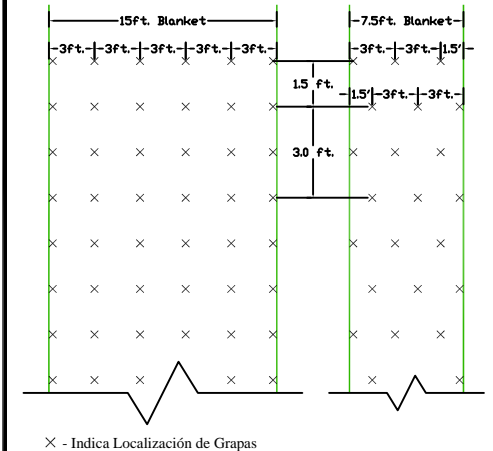


Figura D - Vista del Plano

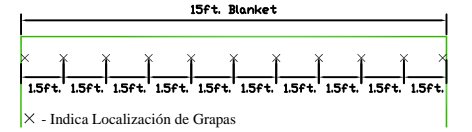


Figura E - Vista del Plano

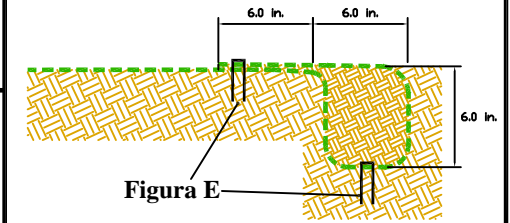
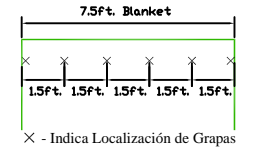


Figura F - Vista de Perfil

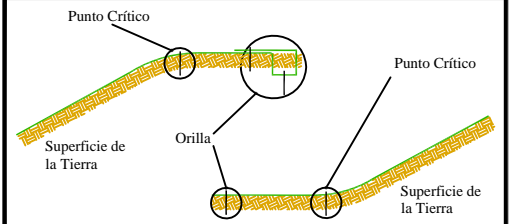


Figura G - Sujeción de Puntos Críticos





# Instalación en Canal

Instructions  
EXCEL PP5-12™

## 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 1.5' a lo largo de la orilla.

\* El Dibujo No Está a Escala Se.

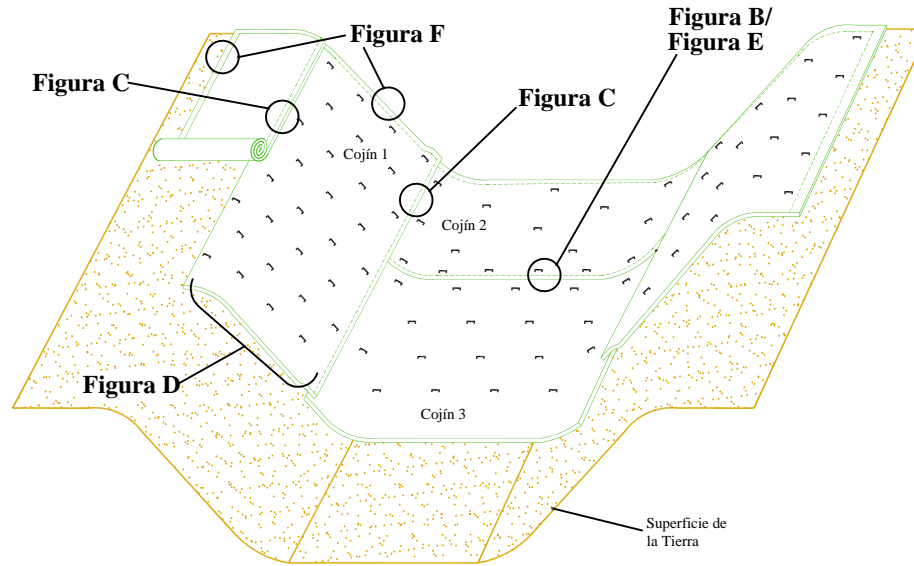


Figura A

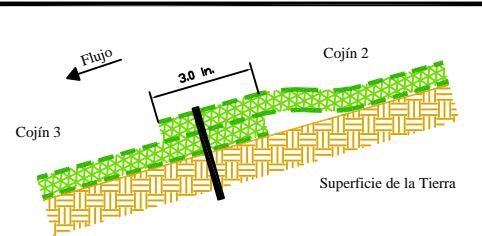


Figura B - Vista de Perfil

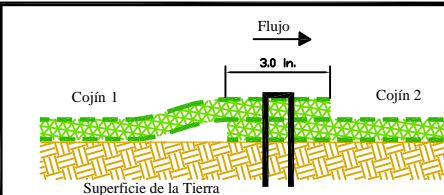
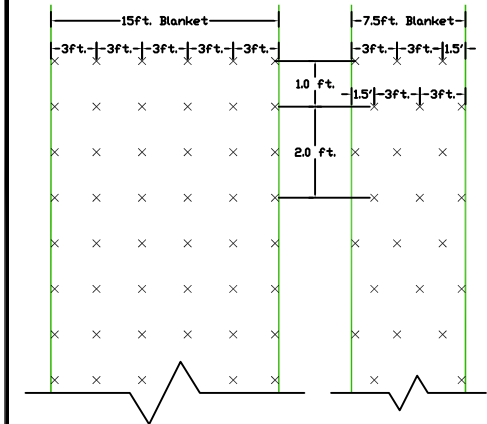


Figura C - Corte de Vista Transversal

## Aplicación del Producto/Especificaciones de Equivalencia

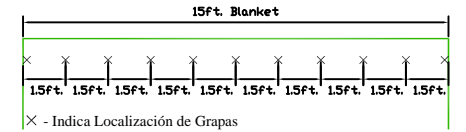
Excel PP5-12 es producido por Western Excelsior y consiste de un Producto permanente en Rollo para Control de la Erosión (PCER), formado de una matriz de una mezcla de fibra sintética unida mecánicamente (cosida) entre dos redes sintéticas, de uso rudo, estabilizadas UV (parte superior e inferior). La vida útil del EXCEL PP5-12 es más de 36 meses. (La vida útil real depende del campo y de las condiciones climáticas). El Excel PP5-12 está diseñado y fabricado para proporcionar control inmediato de la erosión y refuerzo permanente para el césped y tiene las suficientes propiedades físicas para proporcionar la vida útil y el rendimiento esperado. Las especificaciones del producto se encuentran en el documento WE\_EXCEL\_PP512\_SPEC y la información de rendimiento se puede encontrar en el documento WE\_EXCEL\_PP512\_PERF. Todos los documentos están disponibles en Western Excelsior Technical Support (Soporte Técnico de Western Excelsior) o en [www.westernexcelsior.com](http://www.westernexcelsior.com). Además de lo anterior, los productos equivalentes a Excel PP5-12 deben cumplir con los siguientes criterios idénticos a Excel PP5-12:

1. Consistente de una matriz de fibra sintética entre dos redes sintéticas de uso rudo, estabilizadas UV.
2. Suficiente fuerza de tensión, grosor y cobertura para mantener su integridad durante la instalación y asegurar el rendimiento del material. Proporcionar refuerzo para el césped con una vida útil de más de tres años, inmune al daño de la humedad o condiciones químicas dentro de la tierra.
3. Incluido en la base de datos AASHTO NTPEP.
4. Cumplir especificación ECTC para productos de categoría 5C.



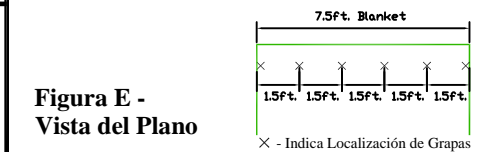
× - Indica Localización de Grapas

Figura D - Vista del Plano



× - Indica Localización de Grapas

Figura E - Vista del Plano



× - Indica Localización de Grapas

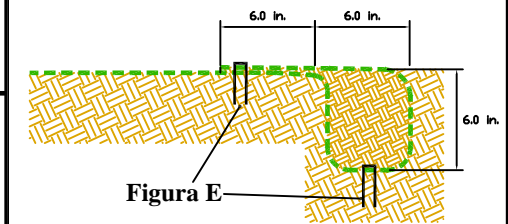


Figura E

Figura F - Vista de Perfil

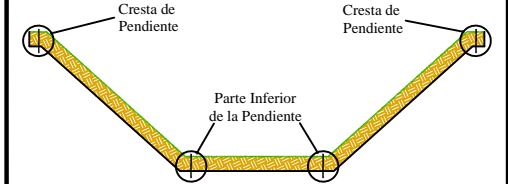


Figura G - Sujeción de Puntos Críticos