



*Wisconsin Department of Transportation*

# **Erosion Control and Storm Water Product Acceptability Lists User Guide and Submittal Procedures**

Updated 4/30/2019



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## **INTRODUCTION -**

The PAL is maintained for Wisconsin Department of Transportation (WisDOT) projects. It may not be a complete list of applicable practices for private and commercial projects administered or permitted through other State agencies. Please contact those agencies directly for alternate approval processes.

WisDOT reserves the right to conduct field trials or limited use of products on projects even if all requirements for approval are satisfied. All products in these lists shall be installed per the WisDOT Standard Specifications for Highway and Structure Construction (Std. Spec.) unless noted otherwise in the plans or special provisions.

**Products included in these lists shall be manufactured with the same quality and composition as the test material originally submitted for evaluation.**

WisDOT maintains the Erosion Control Product Acceptability Lists (PAL) for the following practices:

- |                           |  |
|---------------------------|--|
| 1. Tackifier              | Std. Spec. 627.02XX – Incidental/non-pay |
| 2. Erosion Mat            | Std. Spec. 628.20XX                      |
| 3. Soil Stabilizer        | Std. Spec. 628.65XX                      |
| 4. Inlet Protection       | Std. Spec. 628.70XX                      |
| 5. Temporary Ditch Checks | Std. Spec. 628.7504                      |

This document is part of the PAL as noted in the WisDOT Standard Specification for Highway and Structure Construction (Std. Spec.) Section 628.2.1.2(1) and is intended to clarify acceptance and application criteria for each category. The lists are updated annually, and posted online at the following location:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

Interim updates may be done based on policy or other changes, as required.

Requests for information and product submittals should be directed electronically or in writing to:

New Products Engineer

WisDOT

3502 Kinsman Blvd

Truax Center

Madison, WI 53704

[DOTProductSubmittal@dot.wi.gov](mailto:DOTProductSubmittal@dot.wi.gov)

## **WisDOT PROCEDURES and STANDARDS**

Standard Specifications for Highway and Structure Construction –

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/rdwy/stndspec.aspx>

Facilities Development Manual –

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/rdwy/fdm.aspx>

Construction and Materials Manual –

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/rdwy/cmm.aspx>

Approved Products Lists –

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/appr-prod/default.aspx>



## **INSTALLATION METHODS -**

Manufacturers' installation instructions for all practices/products are considered part of the practice/product as approved. A copy of the installation instructions shall be included with the original product submittal and with each product packaging or shipping unit. All products on the PAL are to be installed according to manufacturer or distributor-provided instructions, except as noted in the PAL itself, project specifications, plans, or special provisions.

Anchoring and application rate requirements for erosion mats and soil stabilizers shall be as noted in the product PAL listing. The tested anchorage frequencies for matted materials, and the tested application rates for distributed materials, are the minimum frequencies/rates for which product installations will be approved, as performance at lower frequencies/rates cannot be corroborated from testing at higher frequencies/rates. If testing data is unavailable, WisDOT will set requirements based on field experience and engineering judgment.

## **SUBMITTAL SCHEDULE -**

The annual erosion control submittal review cycle runs from 4/1 to 3/31. Review of submittals received after 3/31 will default to the next cycle. The annual update will be posted online by 4/30.

## **SUBMITTAL TERMS & CONDITIONS -**

WisDOT retains the right to make any changes, additions or deletions to the PAL as needed and to seek concurrence from other State or Federal agencies regarding product use or performance. Products not environmentally compatible will be disallowed.

WisDOT reserves the right to remove or re-categorize product(s) when laboratory or field performance proves to be unsatisfactory, or to reflect revisions to the specifications or WisDOT policy. Per WisDOT Standard Spec. 101.2(2), the PAL in effect as of the project bid closing date constitutes the reference for that project; however products added to the PAL after that date may be allowed at the discretion of the engineer.

Confidentiality requests regarding product information will be honored to the extent feasible; however vendors should be advised that certain communications with public agencies are subject to State open-records laws.

## **AASHTO NTPEP ASSOCIATION –**

WisDOT maintains membership in the American Association of State Highway and Transportation Officials (AASHTO) National Transportation Product Evaluation Program (NTPEP), and uses research, testing, and evaluation data from that program as part of its material acceptance criteria in several markets, including erosion control. Information on NTPEP and the erosion control product evaluation program can be found here: <http://www.ntpep.org/Pages/ECPDocuments.aspx>

### **\*\*\* 2019 LARGE-SCALE TESTING DEADLINE \*\*\***

As of 3/31/2019, WisDOT is requiring submittal of large-scale test results as required for **ALL** products in the categories of **EROSION MAT, SOIL STABILIZER, and INLET PROTECTION DEVICES**. Test results shall be no older than **Five (5)** years; i.e., testing must have been completed between 3/31/2014 and 3/31/2019. If older or non-NTPEP large-scale test results are available, those will be considered on a per-product basis. There is no cyclical re-testing requirement for large-scale, and none is planned. Re-testing will only be required if the manufacturer cannot provide signed certification that the product is substantially equal to that tested.



## **WISCONSIN DNR LAND-APPLIED ADDITIVE TOXICITY REVIEW –**

Based on Wisconsin Statutes Section 283, and Wisconsin Administrative Code Section 105, Wisconsin Department of Natural Resources (WDNR) has issued guidance for toxicity reviews of land-applied additives.

WDNR defines an additive as a “..commercial product that has the potential to be directly discharged to a surface water.. without receiving treatment..”. Such products are to be reviewed for toxicity under this guidance prior to use. Erosion control materials covered under this definition include:

- Mulch Tackifier (Incidental to Std. Spec. 627.0200/05)
- Soil Stabilizer Type A (Std. Spec. 628.6505)
- Soil Stabilizer Type B (Std. Spec. 628.6510)

As of 5/15/2015, WisDOT will require all products submitted for initial inclusion on the erosion control product acceptability list in the foregoing categories to undergo toxicity testing per this guidance, and to have been issued a maximum usage rate restriction from WDNR. Toxicity testing is not required for products listed prior to the effective date whose formulation has not changed.

WDNR Contact for Additive Review:

Jan Kucher, P.E. –

[jan.kucher@dnr.wisconsin.gov](mailto:jan.kucher@dnr.wisconsin.gov)

WDNR Policy on Additive Reviews:

<http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=117491352>



**PRIVATE LABELLING / RESELLING / SUB-CONTRACT MANUFACTURING -**

The PAL is not intended to support private label or reselling/distribution agreements. Products are listed according to the entity which submits appropriate test data in their name (Submitter). Products will not be cross-listed under multiple trade names.

**ACCEPTANCE CRITERIA FOR PRIVATE LABELLED, RESOLD, OR SUBCONTRACT-MANUFACTURED MATERIALS:**

- No material will be accepted that is not labelled consistent with a PAL entry.
  
- The entity submitting the initial application and testing for a PAL product is considered the original manufacturer (OEM) for that product.
  
- Qualifying testing is considered the property of the OEM. The same testing cannot be used to qualify more than one product, except as noted for variations in polymer netting chemistry in products with bio- or uv-degradable erosion mats.
  
- Qualifying testing, and the corresponding list entry, can be used for legacy approvals for the same or altered product names; companion certifications from both the OEM and the legacy party must be furnished to WisDOT for changes of this type.



## **PRODUCT CATEGORIES & CRITERIA -**

### **1. TACKIFIER –**

#### **General -**

Tackifier is sticky material intended to assist in binding mulch together.

#### **Primary Acceptance Criteria –**

This product category is restricted to water-soluble materials composed of a minimum of 95% vegetable gum (e.g.; guar, natural latex), or polysaccharide (e.g.; starch, cellulose, glucosamide). **Synthetics and petroleum-based materials are not allowed.**

#### **Submittal Requirements –**

- Manufacturer's product data and installation/application instructions
- Material Safety Data Sheet(s)
- WDNR land-applied additive toxicity review and use restriction – see above for details

#### **Construction Methods -**

Tacking of mulch shall be per the Standard Specifications. Tacking shall not be performed during periods of windy conditions that would prevent the proper placement of adhesive. The Contractor shall protect all traffic, signs, structures, and other objects from being marked or disfigured by the tackifier material.



**2. EROSION MAT –**

**General -**

WisDOT defines "erosion mat" (Erosion Control Revegetative Mat, or ECRM) as a manufactured blanket or mat that is delivered to the work site in rolls or strips. These are for temporary erosion control during vegetation establishment. Turf Reinforcement Mats (TRM) are also classified in this category, and are for use as permanent root zone reinforcement under higher shear applications.

**Classification and Primary Acceptance Criteria -**

	Min. Thickness <sup>1</sup> (in)	Max. C (cover) Factor ASTM D6459	Min. Perm. Shear (psf) ASTM D6460	Max. Slope	Channel use	Netting (Non, Single, Double, Any, TRM)	Organic/Synthetic/Either
<b>CLASS 1</b>							
Type A	0.25	0.10	1.0	2.5:1	No	Non or Single	Either
Type B	0.25	0.10	1.5	2.0:1	Yes	Double	Either
<b>CLASS 1, URBAN</b>							
Type A	0.38	0.20	1.0 <sup>2</sup>	4:1	No	Any	Organic
Type B	0.38	0.10	1.0	2.5:1	No	Any	Organic
<b>CLASS 2</b>							
Type A	0.25	0.10	1.5	2:1	Yes	Single <sup>3</sup>	Organic (Jute)
Type B	0.25	0.10	2.0	2:1	Yes	Any	Either
Type C	0.25	0.10	2.0	2:1	Yes	Any <sup>4</sup>	Organic
<b>CLASS 3</b>							
Type A	0.25	0.10	2.0	2:1	Yes	Any	Either
Type B	0.4	0.20	2.0	2:1	Yes	TRM	Synthetic
Type C	0.7	0.20	3.5	2:1	Yes	TRM	Synthetic
Type D	0.7	0.20	5.0	1:1	Yes	TRM	Synthetic

1. Guideline; flexibility exists on this parameter depending on evaluation and test results
2. No minimum permissible shear for netted products
3. Sod reinforcement only
4. 1/2" max opening for woven

See FDM 10-5-35 and 10-10-15 for further information on applications:

<http://wisconsindot.gov/rdwy/fdm/fd-10-05.pdf>

<http://wisconsindot.gov/rdwy/fdm/fd-10-10.pdf>





## Additional Criteria -

- **Class 1 –**

- Photo- or bio-degradable netting and stitching is allowed provided it can hold the parent material in place for at least 6 months, and is not used in installations after September 1 of a given year
- Netting shall comprise no more than 15% of the total mat weight
- Bonding of the netting and parent material shall be sufficient to prevent separation of the two components
- Type B mats may be used in lieu of Type A at the contractor's option, with no additional cost to the Department

- **Class 1 Urban –**

- Bonding of the netting and parent material shall be sufficient to prevent separation of the two components
- Mat and installation shall be able to sustain moderate foot traffic without damage or presenting a safety hazard to pedestrians
- Anchoring devices for Urban mats shall:
  - Be completely biodegradable per ASTM D6400 specification and D5338 testing
  - Contain no petroleum-based materials
  - Pose no soil or water contamination risk
  - Not be made of metal or solid wood
  - Maintain anchorage capacity for a minimum of 2 months and degrade substantially within 4 months with soil temperature above 53°F
  - Be barbed or shaped to enhance mechanical anchorage
- Type B mats may be used in lieu of Type A at the contractor's option, with no additional cost to the Department

- **Class 2 –**

- Netting shall comprise no more than 15% of the total mat weight
- Bonding of the netting and parent material shall be sufficient to prevent separation of the two components
- Type B mats may incorporate photo- or bio-degradable netting and stitching provided it can hold the parent material in place for at least 6 months, and are not used in installations after September 1 of a given year
- Type C mats for use in environmentally sensitive areas where animal entrapment is a concern
- Class 2 Types B & C shall have the following properties:
  - Maximum water absorption of 300% by weight per ASTM D1117
  - Maximum swell (wet thickness change) of 30% per ASTM D1777
  - Minimum lignin content equal to or greater than 33% per Klason method<sup>1</sup>

<sup>1</sup> Technical Association of the Pulp and Paper Industry Test Method for Acid Insoluble Lignin in Wood Pulp, T222 om-98



- **Class 3 -**
  - Class 3A mats are heavy-duty ECRM's that may contain stitched and/or discontinuous fibers
  - Class 3B-C-D mats are TRM's shall be continuously bonded at all filament intersections; discontinuous or loosely woven, stitched, or glued filaments are not permitted in these categories
  - Degradable components are allowed but may only serve as revegetative enhancement and may not contribute to the measured minimum mat thickness.
  - Required soil holding capacity for TRM's:
    - Type B: 450 in<sup>3</sup>/Yd<sup>2</sup>
    - Types C & D: 900 in<sup>3</sup>/Yd<sup>2</sup>
  - Fill all TRM's with soil immediately upon installation
- **All mats:** Vegetative enhancement shall be a minimum of 80% when compared to mulched soil under ASTM D7322 test conditions:
- **Airport Restrictions:** The following apply to **ALL** airport projects:
  - Only Class I, Urban erosion mats that are double netted shall be allowed within 10 feet (3.05 m) of any airport pavement used by aircraft except for airports classified as air carrier or corporate/transport. If the airport is classified as an air carrier or corporate/transport, there will be no erosion mats allowed within 30 feet (9.14 m) of pavement used by aircraft.
  - Only anchoring devices meeting the requirements specified for Class I Urban, Type A, erosion mat anchoring devices shall be allowed in the installation of any erosion mat for airport applications.

## Submittal Requirements -

- Manufacturer's product data and installation/application instructions
- Certified results of NTPEP-administered independent laboratory testing under ASTM D6459 and ASTM D6460 large-scale test conditions (D6460 test not required for netted products submitted as Class 1 Urban Type A). The D6459 and D6460 test methods are revised to conduct testing using one soil type, "Sandy Loam", as defined in the NTPTP ECP evaluation work plan.
- Products that can be certified as identical except with respect to bio- or uv-degradability of the polymeric netting do not require separate testing.
- Certified results of NTPEP- administered independent laboratory testing under the following bench-scale conditions:
  - ASTM D6475 – Mass per Unit Area
  - ASTM D6818 – Ultimate Tensile Strength/Strain
  - ASTM D6525 – Thickness
  - ASTM D6567 – Ground Cover/Light Penetration
  - ASTM D1117 – Water Absorption
  - ASTM D7101 – Unvegetated Rain Splash/Runoff
  - ASTM D7101 – Hydraulic Shear Capacity
  - ASTM D7322 – Vegetative Enhancement



**Submittal Requirements for Urban Mat Anchoring Devices –**

- Manufacturer's product data and installation/application instructions
- Certified results of independent laboratory testing under ASTM D5338 conditions, in compliance with the ASTM D6400 specification.

**Continued Acceptance -**

Once a product is on the PAL, random sampling may be conducted by WisDOT for comparison with the samples originally submitted to the State for approval. Comparative evaluation will be done against the representative sample. **Inconsistencies between initially-submitted and field-obtained product samples may result in the product's removal from the PAL until recertification data is provided.**



### 3. SOIL STABILIZERS –

#### General -

Soil stabilizers are soil binders or flocculants intended to prevent or minimize erosion of bare soil. They are intended to form a crust or mat-like barrier that limits water and wind induced erosion.

#### Classification -

- **Type A -**  
Soil stabilizer, Type A, is flocculent or soil binder combined with mulch or fibrous material of organic or synthetic origin.
  
- **Type B -**  
Soil stabilizer, Type B, is flocculent alone intended to reduce the erodibility of bare soils or to enhance the performance of pre-applied mulch.

#### Primary Acceptance Criteria –

Soil stabilizers may contain synthetics, however **asphalt-based materials are not allowed**.

- **Type A -**
  - Maximum calculated C (cover) factor of 0.10
  - Minimum vegetative enhancement when compared to mulched soil same as for erosion mats
  
- **Type B -**
  - Maximum calculated C (cover) factor of 0.50

#### Additional Criteria -

- Only anionic form of polyacrylamide (PAM) may be used, with a maximum of 0.05% acrylic monomer; **cationic PAM is toxic and shall not be used**.
- All materials shall be non-combustible

#### Submittal Requirements -

- **Type A –**
  - Manufacturer's product data and installation/application instructions
  - Material Safety Data Sheet(s)
  - Certified results of NTPEP-administered independent laboratory testing under ASTM D6459 large-scale test conditions, as described above for erosion mats.
  - Certified results of independent laboratory testing under ASTM D7322 bench-scale test conditions, as described above for erosion mats.
  - WDNR land-applied additive toxicity review and use restriction – see above for details
  
- **Type B –**
  - Manufacturer's product data and installation/application instructions
  - Material Safety Data Sheet(s)
  - Certified results of independent laboratory testing under ASTM D6459 large-scale test conditions, as described above for erosion mats. (This testing need not be through NTPEP)
  - WDNR land-applied additive toxicity review and use restriction – see above for details



**Construction Methods –**

- Short term duration (6 months or less) use only, not for use over-winter.
- For use on 3:1 slopes or flatter
- **Not for use in channels**
- Application is intended to be done with conventional hydraulic seeding equipment. Type B may also be placed through dry spreading. When dry spreading is used, the contractor must ensure that the material is applied uniformly.
- The manufacturer shall provide detailed instructions on the storage, mixing and application procedures to insure proper safety and effectiveness of the product.
- For optimum performance of soil stabilizers Type B, soils that are either very acidic or very alkaline may need to be neutralized; refer to manufacturers' recommendations.
- Seeding must be done in a manner that ensures direct contact with the soil. For Soil Stabilizer, Type A, seed must be sown separately and prior to the application of the soil stabilizer.
- Minimum application rates shall be as noted in the chart based upon submitted performance testing regardless of other application rates recommended by the manufacturer.
- For Soil Stabilizer Type B, when used in conjunction with permanent seeding, WisDOT approved mulch must be applied in addition to the Soil Stabilizer Type B to protect the seed.



**4. INLET PROTECTION**

**General -**

Inlet protection devices are intended to intercept, pond, and filter sediment-laden runoff as it arrives at storm water drain inlets. They consist of fabricated geotextile catchment and hold-down assemblies as shown on the Department’s details or plans, or of proprietary configuration.

WisDOT Inlet Protection Standard Details: <http://wisconsindot.gov/rdwy/sdd/sd-08e10.pdf#sd8e10>

**Classification and Application –**

- **Type A -**  
Inlet protection Type A shall be utilized around field inlets until permanent stabilization methods have been established, and on pavement inlets prior to installation of curb and gutter or pavement.
- **Type B -**  
Inlet protection Type B shall be utilized on street inlets without curb head, once surrounding finished surfaces are in place.
- **Type C -**  
Inlet protection Type C shall be utilized on street inlets with curb heads.
- **Type D -**  
Inlet protection Type D shall be utilized in areas where other types of inlet protection are identified as incompatible with roadway and traffic conditions causing possible safety hazards when ponding occurs at the inlet.

**Acceptance Criteria –**

WisDOT generic inlet protection devices below are detailed in FDM, linked above. All devices supplied shall comply with these details, unless the specific device is listed on the PAL. Geotextiles used as part of inlet protection devices made to the WisDOT standard details must be included on the list of geotextiles certified for Inlet Protection, Geotextile Type FF in the current edition of the PAL.

- Acceptance criteria for Geotextile Type FF:  
Product Material: Woven polypropylene monofilament

Physical Property	Unit	Test Method	Value <sup>1</sup>
Grab Tensile Strength	LB	ASTM D4632	200 (min)
Index Puncture Resistance Or Static Puncture Strength	LB	ASTM D4833 Or ASTM D6241	105 (min) Or 525 (min)
Apparent Breaking Elongation	%	ASTM D4632	
		Machine Direction	24 (min)
		Cross Direction	10 (min)
Apparent Opening Size	µm	ASTM D4751	600 (max)
Permittivity	s <sup>-1</sup>	ASTM D4491	1.9 (min)

<sup>(1)</sup>All target values represent Minimum Average Roll Values as defined in ASTM D4439, with sampling performed per ASTM D4354, Procedure B. Lot and packaging unit size data shall be included in the test report to establish compliance with ASTM D4354. Each sample shall be a minimum of 3 feet in length and the full width of the roll.



**Submittal Requirements -**

Submittal requirements for the geotextile Type FF, from which all non-proprietary (i.e., fabricated to WisDOT standard details) inlet protection assemblies are to be fabricated are:

- Manufacturer's product data
  - Certified report of test(s) for the properties listed above
  - Private label identification: In cases where the vendor is not the manufacturer(s), certifications from ALL relevant entities as to the physical properties are required, that also tie together any applicable trade names.
- Proprietary inlet protection devices not fabricated to the standard details, or fabricated from non-Type FF materials, may be submitted for approval. Such submittals must include the following:
- Manufacturer's product data and installation/application instructions
  - Material Safety Data Sheet(s)
  - Certified results of NTPEP-administered independent laboratory testing under ASTM D7351 large-scale test conditions meeting the following test values:
    - For Type A/Field inlet products with weir bypass:
      - 90% soil retention efficiency with 85% seepage efficiency
    - For Type B/Paved areal Inlet products with no bypass:
      - 90% soil retention efficiency with 75% seepage efficiency
    - For Type C/Non-bagged curb inlet products with curb-head bypass:
      - 80% soil retention efficiency with 95% seepage efficiency
    - For Type D/Bagged curb inlet products with integral bypass:
      - 60% soil retention efficiency with 95% seepage efficiency



**5. TEMPORARY DITCH CHECKS**

Products in this category are accepted based on review of product data and physical samples by the Environmental Services Section.

Send product data to the submittal contact at the beginning of this User Guide for initial review; sampling requirements will be provided after the initial data review is complete.