| | | | |
|---|---|---|---|
| **Project:** | 2022-RFT-026<br>821131 – Solid Waste WTS Construction | | |
| **Addendum No.** | 07 | **No. of Pages:** | 6 |
| **Date:** | 2022-08-23 | **Doc. No.:** | P7201-1591092266-192(1.0) |

The following change(s) in the Request for Proposal Documents are effective immediately.
This Addendum forms part of the Contract Documents.

The purpose of this Addendum is to clarify and answer for bidder's question on tender 2022-RFT-026 issued for bid on July 12, 2022.

**Question 1:**

**Can we have clarification on who will be responsible for the controls, control wiring and control install for the following equipment,**
- Weigh scale control and signal lights
- Shredder and control panel
- equipment linked to shredder control panel
- boiler
- steel belt conveyor
- bale wrapper
- solid waste baling unit
- HRU
- heating controls and pumps

**Response 1**
The Contractor or a subcontractor to the Contactor shall be responsible.

**Question 2:**

**Can we get clarification, if wiring in office building and scale house will be completed during fabrication or completed on site as per drawing WTS-E06?**

**Response 2:**
It is the expectation that the scale house and office building be supplied complete with the electrical equipment as specified in the Contract documents, however it is the responsibility of the Contractor to coordinate responsibility of this work between the building supplier and electrical contractor.

**Question 3:**

**REF: REQUEST FOR ACCEPTANCE OF EQUIVALENT PRODUCT**

Could we please have the following products approved as equivalent for the geomembrane and geotextile (Appendix A):

1. Equivalence for Terrafix 420R Geotextile : *Geotextile LP8. See specs sheet, Geotextile TE-8. See specs sheet*
2. Equivalence for Terrafix 270R Geotextile : *Geotextile LP4. See specs sheet, Geotextile TE-4. See specs sheet.*
3. Equivalence for Hazgard 635FR Geomembrane *: Geomembrane Liner 8130 XR-FR. See specs sheet*

**Response 3:**

Response 1 – We note the Terrafix 420R was changed to a Propex Geotex 3201 in addendum 6.
Response 2 – The Titan TE-4 is considered to be an equivalent for a Terrafix 270R.
Response 3 - The XR Geomembrane 8130 XR-FR is not considered as an equivalent for the Hazgard 635FR.

**Question 4:**

**REF: SPECIFICATION SECTION 33 47 13**
There seems to be a typo at point 1.6.5. The specs ask for geomembrane to be HAZGARD 625FR but the drawings are specifying HAZGARD 635FR. Please confirm the product to be supplied is HAZGARD 635FR.

**Response 4:**
Hazgard 635FR is to be provided.

**Question 5:**

**REF**: **DRAWINGS WTS-S03 , WTS-S06, WTS-S07 and WTS-S08**
Drawings are indicating that the HAZGARD 635FR Liner needs to be supplied in maximum two fabricated panels. The layout of the liner to be installed is not totally rectangle due to the extension of the concrete slab as per detail A and E from drawing WTS-S03.
Having prefabricated panels of liner for these liner extension could be problematic if there are any changes to the drawings between the time the material is ordered and the time the panels would be installed on site.

The other options would be to have bigger prefabricated panels and then cut back on site but this would represent a lot of material loss. Can you please advise ?
Furthermore we believe that having prefabricated panels is not possible with all the slopes of the liner as per sections H, J and K from drawing WTS-07 and sections L, N and P from drawing WTS-S08. The concrete extensions indicated on sections A and E of drawing WTS-S06 would also make it difficult to have prefab panels that would perfectly fit on site due to the irregular shape of the area to be covered with liner.
Would it be possible to have the rolls welded on site instead of having prefabricated ?
This would be easier for the installation on site.

**Response 5:**
The liner can be welded on site with a QA/QC report prepared by the installer of the liner.

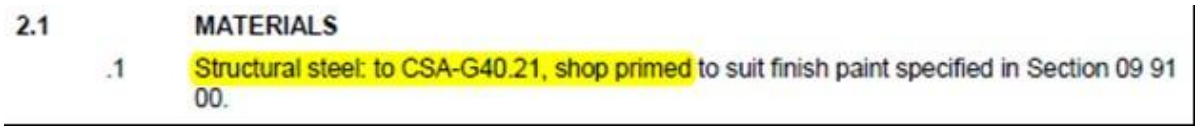
**Question 6:**

**REF: SPECIFICATION SECTION 33 47 14**
Point 1.4 implies that it is the contractor responsibility to engage a independent third party for the quality control plan for the geomembrane installation. However, the term “independent” can be misleading considering section 01 45 00 where it is mentioned that the independent inspection/testing agencies will be engaged by the engineer.

**Response 6:**
The geomembrane installation company, engaged by the Contractor, would be considered to be an independent third party.

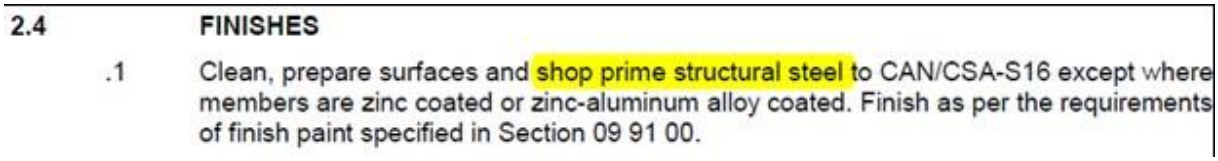
**Question 7:**

**REF: SPECIFICATION SECTION 13 34 19**
Item 2.1 indicates de following:



2.1 MATERIALS

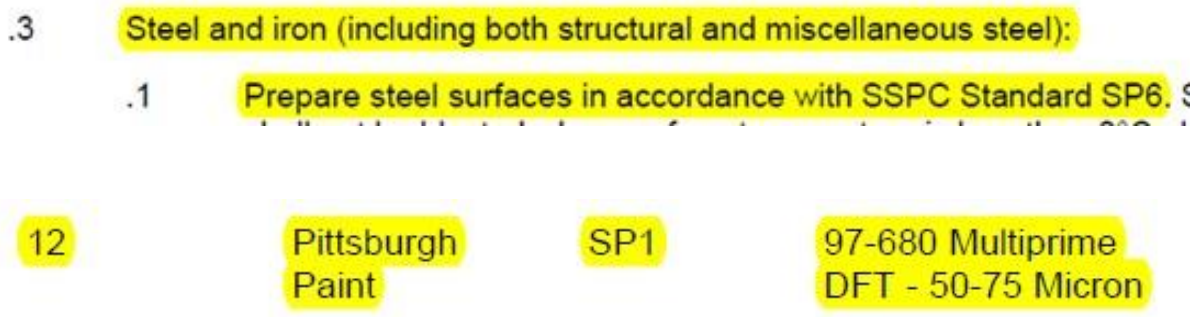
.1 Structural steel: to CSA-G40.21, shop primed to suit finish paint specified in Section 09 91 00.



2.4 FINISHES

.1 Clean, prepare surfaces and shop prime structural steel to CAN/CSA-S16 except where members are zinc coated or zinc-aluminum alloy coated. Finish as per the requirements of finish paint specified in Section 09 91 00.

The preparation for steel surfaces is specified in 3.3.3.1 is SSPC SP6 and the primer specified In system 12 is Pittsburg Paint 97-680 Multiprime at DFT - 50-75 Microns.



.3 Steel and iron (including both structural and miscellaneous steel):

.1 Prepare steel surfaces in accordance with SSPC Standard SP6.

12 Pittsburgh Paint SP1 97-680 Multiprime DFT - 50-75 Micron

The SP6 surface prep is not inappropriate considering how much total DFT there will be once the coating system is completed.
The shop primer is basically a "holding" primer, but the concern is whether 50-75 microns (2-3 mils) DFT of primer will truly cover the SP6 profile during transport and possible site storage while awaiting erection.
Based on this, we would like to propose the following for the prep and shop prime coat:

- Preparation – SSPC SP6
- Primer – International Protective Coatings - Intergard 345 at 125-150 microns (5-6 mils) DFT.

The steel would certainly be well protected, and once on site, the field painting could be reduced to two coats of epoxy and still achieve the sufficient amount of DFT to provide protection in the interior environment.
Please review and advise if the above will be acceptable.

**Response 7:**
Bid on the specified coating system, proposed alternate coating systems will not be considered for bidding.

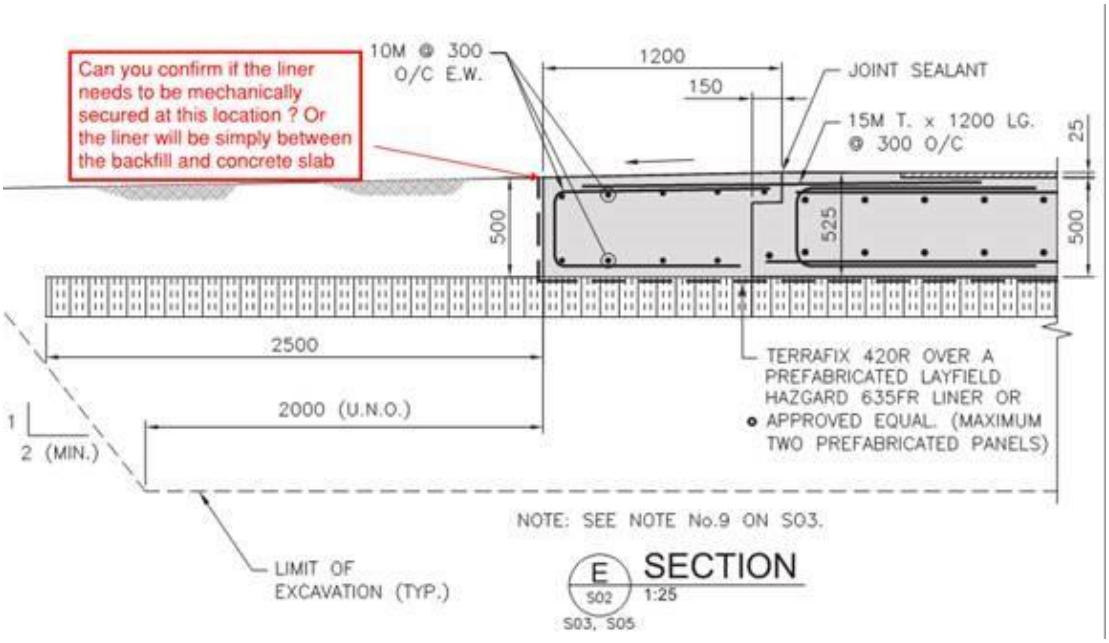
**Question 8:**

**REF: DRAWING WTS-S06**
Detail 3/WTS-S06 shows a galv. Kwik bolt along with an angle around the perimeter. Can you confirm how we are to seal the geomembrane liner at this location?

**Response 8:**
We refer you to Addendum 6 Drawing WTS-06 Slab Sections and Details, Item 2 for clarification.

**Question 9:**

**REF: DRAWING WTS-S06**
Can you confirm if the vertical liner of sections A, B, C and E from drawing WTS-S06 needs to be mechanically fastened or secured to the concrete slab ? If so, please provide detail on how to secure the liner.




**Response 9:**
We refer you to Addendum 6 Drawing WTS-06 Slab Sections and Details, Item 2 for clarification.

**Question 10:**

**REF: CLARIFICATION REQUIRE FOR FIRE PROTECTION DESIGN**
Usually, 550@650 usgpm requested for OH2 (,170 000l = 44 000 usgal is 60 to 75 min operation. technically 78 000 us gal requested minimally...for 2hrs. (650usgpm x 120min). 78 000 usgal ( 294 840 L).
Can you provide clarification on the current design as it does not match the ROT calculations to the current Fire Water Storage Tank.

**Response 10:**

Our hydraulics calculations show a sprinkler demand of 581 usgpm. NFPA 13 requires a 60 minute water supply for Ordinary Hazard Occupancy where the fire alarm system is monitored and we have confirmed it is monitored. A 60 minute flow of 581 usgpm requires 34,860 us gallons of usable water in the storage tank.

**Question 11:**

**REF: CLARIFICATION REQUIRE FOR FIRE PROTECTION DESIGN**
Partial storage accepted... 8 ft max or less, racking or idle pallet ( included) for OH2. No vrac combustible storage accepted at OH2. Provide clarification on design intent.

**Response 11:**
The design is based on the following :

- There is no separation of material prior to arriving here. Anything could be in the mixed garbage.
- Piles of garbage no higher than 8' high (potential for high rates of heat release) as NFPA 13 definition of OH II. If the end user feels the 8' high limit is too low the upper limit of storage could be raised to 10' by changing the sprinkler system to a wet system, but more attention would need to be paid to keeping the space continuously heated above freezing.
- Sprinkler design is based on OH II and the requirements of Chapter 11 of NFPA 13 (2013)
- Sprinkler System is a dry system to lessen the possibility of freezing, design area was increased by 30% fr 1500 sq ft to 1950 sq ft.
- Tires and Unused pallets stored outside.
- The Tipping Floor will be continuously covered with stockpiles of garbage but that there is no long term dedicated storage in the building.

**Question 12:**

**REF: CLARIFICATION REQUIRE FOR FIRE PROTECTION DESIGN**

With the design concerns, can you clarify if the Fire Protection system is to be redesigned by the Fire Protection Consultant or will the Design team provide updated Fire Protection drawings
for construction including hydraulic calculations, field reviews, and Schedules accordingly.
The above is represented of NFPA and design concerns, and clarification is required promptly to ensure quoting is accurate.

**Response 12:**
We feel the design meets the necessary requirements. We can provide design calculations for the design provided. If the contractor chooses to change the design (pipe size, routing, different pump, schedule issues, etc) they are permitted to do so but must provide revised calculations confirming their design meets the intent of the drawings (water density and water supply duration).

- The designers will be providing field reviews but expects the contractor to also provide reviews.
- Issues of schedule are the responsibilities of the successful contractor.

**Question 13:**

**REF: DISPOSAL OF EXCAVATED MATERIAL**
Where do you intend the excavated material be disposal ?

**Response 13:**
The material may be disposed of at the West 40 Landfill.

**Question 14:**

In addendum #4, Tank Schedule noted to change description from, “water storage tank by general contractor …” to “see fire protection drawing WTS-FP02”.
Can you clarify if the water tank is expected to be included in the scope for the mechanical & fire protection subcontractor? Or is this to still be by general contractor.

**Response 14:**
The Contractor or a subcontractor to the Contactor shall be responsible.

# Appendix A

## 1. Product Description

Needle-punched nonwoven geotextiles are made from polypropylene fibres that are tangled together in a needle-punching process. The fibres may be made in continuous or short lengths and achieve their strength by interlocking. Needle-punched nonwoven geotextiles have excellent water flow rates and are used for filtration of soil fines. Needle-punched nonwoven geotextiles have been used in drainage applications, including trench drains (also known as french drains). It can also be used for wrapping a perforated pipe, erosion protection, separation of a road sub-base and base course, and combined with three-dimensional structures to create prefabricated drains. They are also commonly used with geomembranes to provide a protective cushion. Needle-punched nonwoven primary functions: filtration; separation; protection; drainage.

Looking for something else? We've got you covered.

Looking for a more economical solution for soil separation?

Show me more geotextile products

Reach out to one of our experts

## 2. Technical Data

Materials information is on page 2.

## 3. Installation

General Installation: Place the roll of needle-punched nonwoven geotextile at the top of the slope/grade and roll down grade, over lap successive and adjacent rolls by 450mm minimum. Do not allow vehicles to drive directly on the geotextile. Geotextile should be stored such that it is protected from rain and direct sunlight. Geotextile Filtration for Trench Drain (French Drain): Cut the geotextile to width and install such that there is sufficient material to wrap around the drain system with a overlap at the top the width of the trench. Other Uses: Please contact your local Layfield Representative for installation instructions for all other uses.


## 4. Availability and Cost

Available from Layfield or distributors. Call
425-254-1075 Pacific time
780-453-6731 Mountain time, or
905-761-9123 Eastern time

## 5. Manufactured For

Layfield USA Corp.
Layfield Canada Ltd.

## 6. Warranty

Products sold will meet Layfield's published specifications at time of sale. Full warranty details are available from Layfield.

## 7. Maintenance

Once geotextiles and geogrids are installed and carefully backfilled they do not require ongoing maintenance.

## 8. Filing Systems

**9.**

| 13 July 2022 | Non-Woven Needle-Punched Geotextiles - US Values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ASTM | **LP3.5** | **LP4** | **LP4.5** | **LP6** | **LP7** | **LP8** | **LP10** | **LP12** | **LP16** |
| Grab Tensile (lbs) | D4632 | 90 | 100 | 120 | 160 | 180 | 205 | 250 | 300 | 380 |
| Elongation (%) | D4632 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Tear (lbs) | D4533 | 40 | 45 | 50 | 60 | 75 | 80 | 100 | 115 | 140 |
| CBR Punc (lbs) | D6241 | 250 | 250 | 310 | 410 | 450 | 500 | 700 | 800 | 1025 |
| AOS (sieve) | D4751 | 50 | 70 | 70 | 70 | 70 | 80 | 100 | 100 | 100 |
| Permittivity (sec-1) | D4491 | 2.0 | 2.0 | 1.7 | 1.5 | 1.4 | 1.4 | 0.8[3] | 0.8[3] | 0.7 |
| Water Flow ($gpm/ft^2$) | D4491 | 145 | 140 | 120 | 110 | 100 | 95 | 75 | 65 | 50 |
| UV (500 hrs) | D4355 | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% |
| Roll Size (ft) | | 15 x 360 | 15 x 360 | 15 x 360 | 15 x 300[2] | 15 x 300[2] | 15 x 300[2] | 15 x 300 | 15 x 300 | 15 x 150 |
| Roll Weight[1,4] (lbs) | | 160 | 167 | 190 | 202 | 220 | 250 | 308 | 400 | 250 |

Note[1]: Typical values. All other values are minimum average roll values (MARV).

Note[2]: LP6, LP7, and LP8 may be 15 x 360 ft depending on inventory.

Note[3]: LP10 also available in 1.2 and LP12 in 1.0

Note[4]: This is average shipping roll weight - it's not to be used to calculate grams/m2 weight of the actual material.

**10.**

| 13 July 2022 | Non-Woven Needle-Punched Geotextiles - Metric Values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ASTM | **LP3.5** | **LP4** | **LP4.5** | **LP6** | **LP7** | **LP8** | **LP10** | **LP12** | **LP16** |
| Grab Tensile (N) | D4632 | 401 | 445 | 533 | 711 | 800 | 911 | 1,112 | 1,330 | 1,690 |
| Elongation (%) | D4632 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Tear (N) | D4533 | 178 | 200 | 222 | 267 | 333 | 356 | 444 | 511 | 623 |
| CBR Punc (N) | D6241 | 1110 | 1110 | 1380 | 1820 | 2000 | 2220 | 3114 | 3510 | 4560 |
| AOS (microns) | D4751 | 250 | 212 | 212 | 212 | 212 | 180 | 150 | 150 | 150 |
| Permittivity (sec-1) | D4491 | 2.0 | 2.0 | 1.7 | 1.5 | 1.4 | 1.4 | 0.8[3] | 0.8[3] | 0.7 |
| Water Flow ($l/min/m^2$) | D4491 | 5,900 | 5,689 | 4,885 | 4,480 | 4,074 | 3,870 | 3,056 | 2,650 | 2,035 |
| UV (500 hrs) | D4355 | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% |
| Roll Size (m) | | 4.57 x 110 | 4.57 x 110 | 4.57 x 110 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 45.7 |
| Roll Weight[1,4](kg) | | 73 | 78 | 86 | 92 | 99 | 113 | 140 | 181 | 112 |

# TE-4
## 4oz CIVIL NONWOVEN GEOTEXTILE

Titan has provided the containment and erosions control industries with the highest quality geotextiles available. Our nonwoven needle punched geotextiles are manufactured using polypropylene fibers, which are formed into a dimensionally stable network which allows the fibers to maintain their relative position. These products resist ultraviolet deterioration, rotting, biological degradation, and are inert to commonly encountered soil chemicals.

| TESTED PROPERTY | TEST METHOD | UNIT ENGLISH (METRIC) | VALUE ENGLISH (METRIC) |
|---|---|---|---|
| | | | |
| Tensile Strength (Grab) | ASTM D 4632 | lbs (N) | 100 (445) |
| Elongation | ASTM D 4632 | % | 50 |
| CBR Puncture | ASTM D 6241 | lbs (N) | 310 (1380) |
| Trapezoid Tear | ASTM D 4533 | lbs (N) | 45 (200) |
| U.V. Resistance | ASTM D 4355 | %/hrs | 70/500 |
| Apparent Opening Size (AOS)* | ASTM D 4751 | U.S. Sieve (mm) | 70 (0.212) |
| Permittivity | ASTM D 4491 | $sec^{-1}$ | 2.0 |
| Water Flow | ASTM D 4491 | $gpm/ft^2$ ($l/min/m^2$) | 140 (5704) |
| TYPICAL ROLL DIMENSIONS | | | |
| Roll Dimensions | | ft | 12.5 x 360<br>15 x 360 |
| Roll Area | | $yd^2$ | 500/600 |
| Estimated Roll Weight | | lbs | 146 |

NOTES:
*Maximum average roll value.
Mullen Burst ASTM D 3768 has been removed. It is not recognized by ASTM D 35 on Geosynthetics.
Puncture ASTM D 4833 has been removed. It is not recognized by AASHTO M288 and has been replaced with CBR Puncture ASTM D 6241.

# TE-8

## 8oz CIVIL NONWOVEN GEOTEXTILE

**TITAN ENVIRONMENTAL CONTAINMENT**

Titan has provided the containment and erosions control industries with the highest quality geotextiles available. Our nonwoven needle punched geotextiles are manufactured using polypropylene fibers, which are formed into a dimensionally stable network which allows the fibers to maintain their relative position. These products resist ultraviolet deterioration, rotting, biological degradation, and are inert to commonly encountered soil chemicals.

| TESTED PROPERTY | TEST METHOD | UNIT ENGLISH (METRIC) | VALUE ENGLISH (METRIC) |
|---|---|---|---|
| | | | |
| Weight | ASTM D 5261 | oz/yd$^2$ (g/m$^2$) | 8.0 (271) |
| Tensile Strength (Grab) | ASTM D 4632 | lbs (N) | 205 (911) |
| Elongation | ASTM D 4632 | % | 50 |
| CBR Puncture | ASTM D 6241 | lbs (N) | 500 (2224) |
| Trapezoid Tear | ASTM D 4355 | lbs (N) | 80 (356) |
| U.V. Resistance | ASTM D 4355 | %/hrs | 70/500 |
| Apparent Opening Size (AOS)* | ASTM D 4751 | U.S. Sieve (mm) | 80 (0.180) |
| Permittivity | ASTM D 4491 | sec$^{-1}$ | 1.4 |
| Water Flow | ASTM D 4491 | gpm/ft$^2$ (l/min/m$^2$) | 95 (3870) |
| TYPICAL ROLL DIMENSIONS | | | |
| Roll Dimensions | | ft | 12.5 x 360<br>15 x 300 |
| Roll Area | | yd$^2$ | 500 |
| Estimated Roll Weight | | lbs | 250 |

NOTES:
*Maximum average roll value.
Mullen Burst ASTM D 3768 has been removed. It is not recognized by ASTM D 35 on Geosynthetics.
Puncture ASTM D 4833 has been removed. It is not recognized by AASHTO M288 and has been replaced with CBR Puncture ASTM D 6241.

Titan Environmental warrants that the geotextile furnished hereunder shall conform to the specification stated herein. Any other warranty including merchantability and fitness for a particular purpose are hereby excluded. If the geotextile does not meet the specification on this page and is notified prior to installation Titan Environmental will replace the geotextile at no additional cost to the customer. The geotextile specified herein has not been tested, calibrated or validated in relation to any design methodology for either unpaved roads or flexible pavements. Titan Environmental is not responsible for any loss or damage incurred during transit and storage after leaving the manufacturing site. This product specification supersedes all prior specifications for the product described above and is not applicable to any products shipped prior to November 14, 2019.

## 1. Product Description

Needle-punched nonwoven geotextiles are made from polypropylene fibres that are tangled together in a needle-punching process. The fibres may be made in continuous or short lengths and achieve their strength by interlocking. Needle-punched nonwoven geotextiles have excellent water flow rates and are used for filtration of soil fines. Needle-punched nonwoven geotextiles have been used in drainage applications, including trench drains (also known as french drains). It can also be used for wrapping a perforated pipe, erosion protection, separation of a road sub-base and base course, and combined with three-dimensional structures to create prefabricated drains. They are also commonly used with geomembranes to provide a protective cushion. Needle-punched nonwoven primary functions: filtration; separation; protection; drainage.

Looking for something else? We've got you covered.

Looking for a more economical solution for soil separation?

Show me more geotextile products

Reach out to one of our experts

## 2. Technical Data

Materials information is on page 2.

## 3. Installation

General Installation: Place the roll of needle-punched nonwoven geotextile at the top of the slope/grade and roll down grade, over lap successive and adjacent rolls by 450mm minimum. Do not allow vehicles to drive directly on the geotextile. Geotextile should be stored such that it is protected from rain and direct sunlight. Geotextile Filtration for Trench Drain (French Drain): Cut the geotextile to width and install such that there is sufficient material to wrap around the drain system with a overlap at the top the width of the trench. Other Uses: Please contact your local Layfield Representative for installation instructions for all other uses.


## 4. Availability and Cost

Available from Layfield or distributors. Call
425-254-1075 Pacific time
780-453-6731 Mountain time, or
905-761-9123 Eastern time

## 5. Manufactured For

Layfield USA Corp.
Layfield Canada Ltd.

## 6. Warranty

Products sold will meet Layfield's published specifications at time of sale. Full warranty details are available from Layfield.

## 7. Maintenance

Once geotextiles and geogrids are installed and carefully backfilled they do not require ongoing maintenance.

## 8. Filing Systems

**9.**

| 13 July 2022 | Non-Woven Needle-Punched Geotextiles - US Values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ASTM | **LP3.5** | **LP4** | **LP4.5** | **LP6** | **LP7** | **LP8** | **LP10** | **LP12** | **LP16** |
| Grab Tensile (lbs) | D4632 | 90 | 100 | 120 | 160 | 180 | 205 | 250 | 300 | 380 |
| Elongation (%) | D4632 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Tear (lbs) | D4533 | 40 | 45 | 50 | 60 | 75 | 80 | 100 | 115 | 140 |
| CBR Punc (lbs) | D6241 | 250 | 250 | 310 | 410 | 450 | 500 | 700 | 800 | 1025 |
| AOS (sieve) | D4751 | 50 | 70 | 70 | 70 | 70 | 80 | 100 | 100 | 100 |
| Permittivity (sec-1) | D4491 | 2.0 | 2.0 | 1.7 | 1.5 | 1.4 | 1.4 | 0.8[3] | 0.8[3] | 0.7 |
| Water Flow ($gpm/ft^2$) | D4491 | 145 | 140 | 120 | 110 | 100 | 95 | 75 | 65 | 50 |
| UV (500 hrs) | D4355 | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% |
| Roll Size (ft) | | 15 x 360 | 15 x 360 | 15 x 360 | 15 x 300[2] | 15 x 300[2] | 15 x 300[2] | 15 x 300 | 15 x 300 | 15 x 150 |
| Roll Weight[1,4] (lbs) | | 160 | 167 | 190 | 202 | 220 | 250 | 308 | 400 | 250 |

Note[1]: Typical values. All other values are minimum average roll values (MARV).

Note[2]: LP6, LP7, and LP8 may be 15 x 360 ft depending on inventory.

Note[3]: LP10 also available in 1.2 and LP12 in 1.0

Note[4]: This is average shipping roll weight - it's not to be used to calculate grams/m2 weight of the actual material.

**10.**

| 13 July 2022 | Non-Woven Needle-Punched Geotextiles - Metric Values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ASTM | **LP3.5** | **LP4** | **LP4.5** | **LP6** | **LP7** | **LP8** | **LP10** | **LP12** | **LP16** |
| Grab Tensile (N) | D4632 | 401 | 445 | 533 | 711 | 800 | 911 | 1,112 | 1,330 | 1,690 |
| Elongation (%) | D4632 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Tear (N) | D4533 | 178 | 200 | 222 | 267 | 333 | 356 | 444 | 511 | 623 |
| CBR Punc (N) | D6241 | 1110 | 1110 | 1380 | 1820 | 2000 | 2220 | 3114 | 3510 | 4560 |
| AOS (microns) | D4751 | 250 | 212 | 212 | 212 | 212 | 180 | 150 | 150 | 150 |
| Permittivity (sec-1) | D4491 | 2.0 | 2.0 | 1.7 | 1.5 | 1.4 | 1.4 | 0.8[3] | 0.8[3] | 0.7 |
| Water Flow ($l/min/m^2$) | D4491 | 5,900 | 5,689 | 4,885 | 4,480 | 4,074 | 3,870 | 3,056 | 2,650 | 2,035 |
| UV (500 hrs) | D4355 | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% |
| Roll Size (m) | | 4.57 x 110 | 4.57 x 110 | 4.57 x 110 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 91.4 | 4.57 x 45.7 |
| Roll Weight[1,4](kg) | | 73 | 78 | 86 | 92 | 99 | 113 | 140 | 181 | 112 |

Seaman Corporation Material Specification

# 8130 XR-FR

## Flexible Reinforced Geomembrane Material with Fire Resistance

| Physical Property | Test Method | Imperial | Metric |
|---|---|---|---|
| Base Fabric | type | Polyester | |
| Base Fabric Weight | nominal | 6.5 oz/yd$^2$<br>±2 oz/yd$^2$ | 220.4 g/m$^2$<br>±68 g/m$^2$ |
| Thickness | ASTM D751 | 30 mil (minimum) | 0.76 mm (minimum) |
| Weight | ASTM D751 | 30.0 oz/yd$^2$<br>±2 oz/yd$^2$ | 1017 g/m$^2$<br>±68 g/m$^2$ |
| Trapezoid Tear | ASTM D4533 | warp: 40 lb<br>fill: 55 lb | warp: 178 N<br>fill: 245 N |
| Grab Tensile | ASTM D751 | warp: 550 lb<br>fill: 550 lb | warp: 2448 N<br>fill: 2448 N |
| Dead Load | ASTM D751<br>2-in (50mm) seam, 4 hours,<br>1-in (25mm) strip | 240 lb @ 70˚ F<br>120 lb @ 160˚ F | 1068 N @ 21˚ C<br>534 N @ 71˚ C |
| Adhesion | ASTM D751<br>Dielectric Weld | 40 lb/ 2 in | 35 daN/ 5 cm |
| Bursting Strength | ASTM D751<br>Ball Tip | 700 lb | 3115 N |
| Bonded Seam Strength | ASTM D751 | 550 lb | 2448 N |
| Low Temperature | ASTM D2136 | Pass @ -50˚ F | Pass @ -46˚ C |
| Hydrostatic Resistance | ASTM D751 | 800 psi | 5.5 mPa |
| Abrasion Resistance | ASTM D3389<br>H-18 Wheel | 2000 cycles before fabric exposure<br>50mg/100 cycles maximum weight loss | |
| Flame Resistance | NFPA 701<br>Method 2 | Pass | |

This material meets the requirements of ULC S668

Preliminary Specification | Revised June 2022



Seaman Corporation
1000 Venture Blvd. | Wooster, Ohio 44691
Phone: 330.262.1111 | US/Canada toll-free: 800.927.8578 | Fax: 330.263.6950 | www.SeamanCorp.com