ATTACHMENT 17

LTWP Preliminary Design Report – Appendix H – Liner Material Technical Memo

DRAFT Memo

ARCADIS

SUBJECT
Geosynthetic Liner selection - City of Iqaluit Long Term Water

TO
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CC
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DATE
2023-10-20

PROJECT NUMBER
30192375

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Background

This technical memorandum provides a comparative evaluation of alternative geosynthetic liner materials for use as the low permeability component of the water retention dam core to be constructed as a part of the City of Iqaluit Long Term Water Supply Project (hereafter called the Project). The primary function of the liner is to restrict seepage loss through the dam. Based on this evaluation, a recommendation is made regarding the preferred liner type for the Project.

Assessment of Liner Types

A combination of a literature review, review of product specifications and case studies, discussions with manufacturers, and Arcadis' experience with liner materials were used to select a preferred liner type for the site. Ten liner types were reviewed:

1. high-density polyethylene (HDPE),
2. linear low-density polyethylene (LLDPE),
3. bituminous geomembrane (BGM),
4. geosynthetic clay liner (GCL),
5. flexible polypropylene (fPP),
6. polyvinyl chloride (PVC),
7. ethylene propylene diene monomer (EPDM),
8. polyurea spray,
9. concrete canvas, and
10. chlorosulfonated polyethylene (CSPE).

Initial Screening

An initial review of the alternatives identified limitations in six (6) liner types, which are briefly described below. The limitations identified are specific to the water retention dams at the Project site. They shall not be used as a basis for liner evaluation in other related infrastructure within the scope of the Project or elsewhere.

- CSPE (#10) was not considered due to its limitations of 12-month shelf life while still in roll stock form before it cures to a point where welding is difficult. Concrete canvas (#9), a flexible cloth that has been impregnated with cement that hardens on wetting, and polyurea spray (#8), a two-component system that is typically sprayed on a nonwoven geotextile to produce a chemically resistant and seamless geomembrane, were not given any further considerations due to the lack of precedents on similar applications. All those liner materials are likely cost prohibitive as well.
- EPDM (#7) and PVC (#6) are highly flexible materials with a specific gravity higher than water and are commonly used in waterproofing applications including large hydraulic structures. PVC geomembranes

have longevity issues due to the potential for plasticizer loss by leaching, thereby causing the geomembrane to shrink, become progressively brittle, and ultimately crack. PVC geomembranes containing high molecular weight and branched plasticizers are relatively stable but cost significantly more than more common HDPE and LLDPE geomembranes. Further, PVC geomembranes are manufactured in narrower rolls (~2 m wide), adding material handling and installation time. EPDM lacks precedents on similar projects and can also be cost prohibitive.

- fPP (#5) has no significant advantage over LLDPE and has a less extensive history and acceptance by the industry. Therefore, it was excluded from final consideration. A thicker fPP (> 1 mm thick) may also become cost prohibitive.

These six (6) liners were not included in the detailed comparison presented in **Appendix A**.

The relative merits of each remaining four (4) liner types were compared against each other in the following categories:

- constructability,
- service life,
- material cost, and
- regulatory acceptance/approval.

Assumptions

The following site-specific assumptions are adopted to help with material selection, as the same geosynthetic liner can have different consequences based on the application, project location, service life, and operating conditions.

1. The selected geosynthetic liner will be a part of the dam core as the only very low permeability component of the core.
2. The geosynthetic liner will be deployed directly on top of a prepared subgrade layer that is firm, rolled smooth, and free of sharp objects, angular stones, stones protruding from the surface, debris, desiccation cracks, frozen areas, and standing water.
3. The geosynthetic liner cover material will also meet the gradation criteria of the foundation and will be filter compatible with the subgrade material to prevent piping failure if a hole or crack develops on the liner.
4. The cover thickness will be adequate to maintain a safe distance between the expected extent of the frost depth to the liner. If the liner is to be installed within the frost depth, measures will be taken to protect the liner from exposure to cyclic freezing and thawing.
5. The average mean temperatures at the project location range from an average daily maximum of about +12°C in July to an average daily minimum of approximately -31°C in February (Environmental Canada 2023, see Appendix B). As such, cold temperature installation and performance are taken into consideration when comparing liners.
6. Liner installation and repair will be performed during the summer months (June to September, inclusive), where the ambient temperature is generally expected to stay above subzero levels.
7. The expected service life of the geosynthetic liner is >50 years.

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2023-10-20

Summary of Key Risks and Opportunity

Table 1 Summary of Risks and Opportunities Associated with each Liner Type

	High-Density Polyethylene (HDPE)	Linear-Low Density Polyethylene (LLDPE)	Geosynthetic Clay Liner (GCL)	Bituminous Geomembrane (BGM)
Risks	▪ Product must be dry during seaming. Tents and physical drying of seams could be utilized during light rain. ▪ Requires a level foundation with a sand bedding and likely a nonwoven geotextile. ▪ Wrinkles and folds in the liner should be dealt with during backfilling to prevent long-term stress cracking. ▪ Potential for failure of the liner due to stress cracking over long service life.	▪ Product must be dry during seaming. Tents and physical drying of seams could be utilized during light rain. ▪ Requires a level foundation with a sand bedding and likely a nonwoven geotextile.	▪ To achieve the lowest permeability, the liner should be buried (≥ 30 cm/1 ft of cover) before hydrating so that the bentonite swells under a confining stress. Premature hydration can increase the permeability of the lining system. ▪ Requires a smooth foundation free of oversize particles. ▪ Cannot sustain large multi-axial strains which may arise from voids or localized settlement in the foundation.	▪ Product must be dry during welding. Tents and physical drying of seams could be utilized during light rain. ▪ Cost is higher than alternatives. ▪ Less well known to regulators than HDPE/LLDPE products which have more precedents.
Opportunities	▪ Well recognized by permitting bodies. ▪ Extensively used for containment of liquids. ▪ Very good chemical and UV durability. ▪ NSF/ANSI/CAN Standard 61 compliant products are available.	▪ Well recognized by permitting bodies. ▪ Extensively used for containment of liquids. ▪ Very good flexibility. Will allow for larger differential settlement relative to HDPE. ▪ NSF/ANSI/CAN Standard 61 compliant products are available.	▪ Does not require any welding equipment or specialized training to “seam”. ▪ Can self-heal minor defects and punctures. ▪ Mineral bentonite is not susceptible to chemical degradation with time unless cation exchange is occurring. ▪ Can be installed by general labor with formal training. ▪ NSF/ANSI/CAN Standard 61 compliant products may be available.	▪ Very good chemical and UV durability. ▪ Ease of installation due to low thermal expansion, less wind ballasting and propane torch welds. ▪ Irregularities in the subgrade and oversized particles may be acceptable and a geotextile may not be required. ▪ Can be installed by general labor with formal training. ▪ NSF/ANSI/CAN Standard 61 compliant products are available.

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Recommended Liner Type

If liner installation can be restricted to the summer months (e.g., June to September inclusive), then the advantages of GCL and BGM with respect to installation at freezing temperatures are not important, and HDPE and LLDPE are preferred. LLDPE is better suited than HDPE due to its greater flexibility and ability to conform to any differential settlement with time. LLDPE would, however require the foundation and cover material to be a finer-grained material or a cushioning/protection nonwoven geotextile with a minimum mass per unit area of 400 g/m^2. If construction of the liner is required through winter, then GCL or BGM liner may be the preferred options. BGM should be selected over GCL due to its ability to be installed on a coarser subgrade and its ability to handle larger differential settlement.

Based on the technical assessment and material cost comparison between the liners, it is recommended that liner construction be restricted to the summer months (i.e., June through September, inclusive) and that LLDPE (2-mm-thick) be selected as the preferred line type.

References

Scheirs, John. *A Guide to Polymeric Geomembranes: A Practical Approach.* John Wiley and Sons Ltd, 2009.

International Association of Geosynthetic Installers (IAGI). *Guidelines for installation of: HDPE and LLDPE Geomembrane Installation Specification*. IAGI, 2015.

Geosynthetics Research Institute (GRI). *GRI Test Method GM9 – Standard Practice for Cold Weather Seaming of Geomembranes*. GRI, 2013.

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2023-10-20

Appendix A

Table 1 Summary of Technical Assessment of Liner Alternatives

Category	Attribute	High-Density Polyethylene (HDPE)	Linear-Low Density Polyethylene (LLDPE)	Geosynthetic Clay Liner (GCL)	Bituminous Geomembrane (BGM)
Constructability	Ease of Installation	▪ Stiff material cannot be folded and therefore cannot be prefabricated into larger panels; field welds required. ▪ Seams are welded using the hot wedge method which can be impacted in cold weathers (0ºC/32ºF or lower). ▪ Practical minimum ambient temperature for deployment and seaming -15ºC. ▪ Potential deployment rate – 4,000 to 6,000 m^2 per day. Temperature, slope, and access dependent. ▪ Seams must be clean and dry to ensure good welds. Cannot be welded when it is snowing, sleeting, or hailing on the area to be seamed. ▪ Expands/contracts with changes in ambient temperature which leads to wrinkling and "waviness". Wrinkles must be flattened before the liner is backfilled to prevent long-term stress cracking. ▪ Must be ballasted in high wind conditions. ▪ Has several examples of use in arctic environment.	▪ Due to its flexibility, large panels several roll widths wide, can be prefabricated up to 40 mil (~1 mm) thick and shipped to site which reduces the number of field welds required. ▪ Welding and seaming requirements are the same as HDPE. Seams must be clean and dry to ensure good welds. ▪ Due to its similar weight, ballasting requirements are the same as HDPE. ▪ Has several examples of use in arctic environment.	▪ Cannot be prefabricated into panels; field seams required. ▪ No welding is required. The edges of the GCL rolls are overlapped, and supplemental bentonite is placed at the overlap. Does not expand or contract with changes in temperature, however, prone to shrinking if subjected to wetting and drying cycles. The later could be significantly reduced if geomembrane laminated or polymer coated GCLs are selected. ▪ Practical minimum ambient temperature for deployment and seaming -25ºC. ▪ Potential deployment rate – 1,500 to 6,000 m^2 per day. Temperature, slope and access dependent. ▪ Bentonite should not be hydrated until covered by at least 30 cm (1 ft) of soil layer. Free hydration can increase the hydraulic conductivity of the liner by one order of magnitude or more. ▪ Due to its weight, it is less susceptible to wind uplift.	▪ Thick material (thicker than HDPE/LLDPE) cannot be folded, therefore cannot be prefabricated into panels; field welds required. Seams must be clean and dry to ensure good welds. ▪ Seams are welded using portable propane torches. Field QA test methods for seam integrity and continuity are not standardized and are very subjective. ▪ Product is reported to become 'stiff' in cold weather, but this can be managed using propane torch and does not halt operations. ▪ Practical minimum ambient temperature for deployment and seaming -25ºC. ▪ Potential deployment rate – 1,500 to 6,000 m^2 per day. Temperature, slope and access dependent. ▪ Thermal wrinkles are rare due to having two orders of magnitude lower coefficient of thermal expansion/contraction compared to polyethylene. ▪ Due to its weight (3.5 times heavier compared to polyethylene), it is less susceptible to wind uplift. ▪ Has several examples of use in arctic environment.
	Bedding Requirements	▪ Requires a smooth, level foundation. ▪ Foundation soils should ideally be comprised of sand sized particles or finer. ▪ Typically placed over a nonwoven geotextile to prevent construction or long-term damage due to the presence of angular particles on the subgrade.	▪ Same requirements as HDPE.	▪ Requires a smooth, level foundation. ▪ Foundation soils should ideally be comprised of sand sized particles or finer.	▪ Can accept variable foundation soils due to its thickness, flexibility, and significantly higher puncture resistance. ▪ Manufacturer recommends a smooth surface of max. 2 inch minus rock. Case studies of good liner performance are documented when placed over crushed rock as large as 8-inch minus. ▪ Manufacturer has indicated that material could be placed over a well graded fill from the site

Category	Attribute	High-Density Polyethylene (HDPE)	Linear-Low Density Polyethylene (LLDPE)	Geosynthetic Clay Liner (GCL)	Bituminous Geomembrane (BGM)
					without requiring a geotextile or bedding layer as buffer.
	Pipe Penetrations	▪ A boot/sleeve can be welded to the parent material and mechanically fastened to the pipe.	▪ Same as HDPE.	▪ Difficult to achieve good seal around the pipe penetrations.	▪ Same as HDPE.
	Defect Identification and Repairs	▪ Well established QA/QC methods relating to material manufacturing, transport/handling, and installation. ▪ Holes are patched using extrusion welding (specialized equipment and crew required).	▪ Same procedures as HDPE.	▪ Difficult to identify manufacturing defects such as even distribution of bentonite and needle punching. ▪ Defects are patched by placing a piece of GCL over the defect with additional supplemental bentonite. No specialized crew/trainings required.	▪ Defects are patched by welding a piece of BGM overtop of puncture with a propane torch (site crew can be trained to perform).
Service Life	Stress/Strain	▪ Stiffest of the geomembranes reviewed. ▪ Susceptible to “stress cracking” (brittle fracturing that occurs under constant stress less than the yield or break stress of the material). ▪ Multi-axial strain at break (from multi-axial burst test) ~ 25%; however maximum strength achieved at ~12% strain. ▪ Suggested maximum allowable multi-axial strain for design ranges from 4% to 8% (dependent on texturing and resin used).	▪ Not susceptible to stress cracking unless heavily oxidized. ▪ Does not display a pronounced yield stress. ▪ Multi-axial strain at break (from multi- axial burst test) >75%. ▪ Suggested maximum allowable multi- axial strain for design ranges from 8% to 12% (dependent on texturing and material density).	▪ Behavior is a function of the geotextile or geomembrane/lamination used. ▪ Displays a distinct “peak strength” at relatively low strains due to failure of the woven geotextile component if present. ▪ Multi-axial strain tolerance/strain at break comparable to that of HDPE.	▪ Displays two distinct elastic moduli; material becomes less stiff when strained past ~4% which is the strain at which the glass fleece breaks, and the polyester film separates from the bitumen compound. ▪ Loses water tightness at higher strains before breaking. ▪ No data available on multi-axial strain at break or recommended design strain values.
	Chemical/UV Durability	▪ Very good chemical and UV durability. ▪ NSF/ANSI/CAN Standard 61 compliant. ▪ Excellent performance can be expected in water dams.	▪ Less chemically and UV resistant than HDPE. ▪ Can be oxidized by metal ions (Fe, Cu, Mn) in solution which reduces flexibility. ▪ NSF/ANSI/CAN Standard 61 compliant. ▪ Excellent performance can be expected in water dams.	▪ Poor UV durability due to the large, exposed surface area of the nonwoven geotextile. ▪ Cation exchange of sodium for other cations with higher valency (i.e., Ca^{2+}, Mg^{2+} etc.) over time can increase the hydraulic conductivity of the bentonite by several orders of magnitude. ▪ Likely NSF/ANSI/CAN Standard 61 compliant. ▪ Excellent performance can be expected in water dams.	▪ Comparable to HDPE, however very little research has been done on the material. ▪ NSF/ANSI/CAN Standard 61 compliant with proper installation procedure. ▪ Excellent performance can be expected in water dams.

Category	Attribute	High-Density Polyethylene (HDPE)	Linear-Low Density Polyethylene (LLDPE)	Geosynthetic Clay Liner (GCL)	Bituminous Geomembrane (BGM)
	Physical Durability	▪ Good tear resistance. ▪ Poor large-scale puncture resistance due to stiffness, therefore thicker material often specified.	▪ Tear resistance similar to HDPE. ▪ Excellent large-scale puncture resistance compared to HDPE.	▪ Tear resistance similar to HDPE. ▪ Typically has low puncture resistance but bentonite can self-heal minor defects, holes or cracks with maximum gap of ~ 1 cm. ▪ Stress concentration caused by wrinkles or protruding particles may cause local thinning of the bentonite layer which may increase permeability locally.	▪ Tear resistance higher than HDPE and LLDPE. ▪ Puncture resistance comparable to thinner LLDPE.
	Longevity	▪ Expected service life > 300 years.	▪ Expected service life comparable to HDPE.	▪ Mineral bentonite is not susceptible to chemical breakdown with time unless cation exchange occurs. ▪ Expected service life of the geosynthetics component if covered immediately after deployment, are comparable to HDPE.	▪ Expected service life reported as 100s of years, however very little research has been done on the material.
Liner Supply per m^2 (Shipped to Port of Montreal)	-	▪ $10 (2-mm-thick HDPE double sided textured)	▪ $10.5 (2-mm-thick LLDPE double sided textured)	▪ $15 (Estimated for Terrafix Bentofix-CSRNWL)	▪ $25 (4-mm-thick Coletanche ES2)
Regulatory Approval	-	▪ Well accepted in the industry and known by regulators. ▪ Used on many projects worldwide.	▪ Well accepted in industry. ▪ Used on many projects worldwide.	▪ Well accepted in industry. ▪ Used on many projects worldwide.	▪ Becoming well accepted, but newer product.

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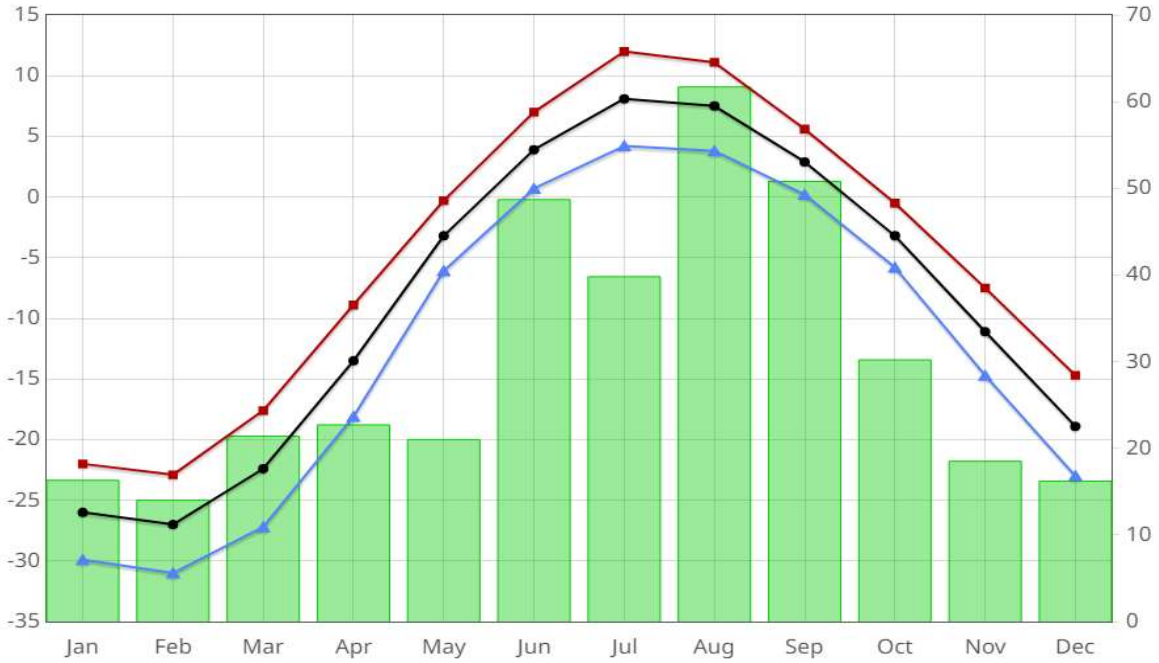
Appendix B

Canadian Climate Normals 1991-2020 Data

Temperature and Precipitation Graph | Normals Data | Element Analytics | Composite Metadata / Threads

Temperature and Precipitation Graph for 1991 to 2020 Canadian Climate Normals IQALUIT



■	Daily Maximum Temperature (°C)
●	Daily Average Temperature (°C)
▲	Daily Minimum Temperature (°C)
▮	Precipitation (mm)

Data accessed on 2023-10-19:
https://climate.weather.gc.ca/climate_normals/results_1991_2020_e.html?searchType=stnName_1991&txtStationName_1991=iqaluit&searchMethod=contains&txtCentralLatMin=0&txtCentralLatSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=383000000&dispBack=1

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2023-10-20

Appendix C

Rue Joseph Coste
59552 Courchelettes
France
www.coletanche.com

Update
08/09/2021
Cancel and replace
24/02/2020
Code
1876M01
Origin
Courchelettes (FR)
Technical Ref.
FT COLETANCHE ASTM

Product data sheet

COLETANCHE ES2

Description

Coletanche ES2 is an elastomeric modified bituminous geomembrane.

Use

Moderate level of mechanical constraints, exposed or covered (allow hot asphalt mixes). For example:
- Landfill and waste capping, biogas barriers,
- Methanisation units, industrial platforms,
- Hydraulic, mining and industrial ponds,
- Canals.

The product use must be validated by consultation.

Application method

By torch welding or other similar process.

Storage

Rolls must not be stored directly on the ground. Provide suitable supports (blocks, slides, wooden planks) with a minimum height of 35 cm to be placed under the ends of the mandrel.

Composition (indicative)

Reinforcement:	Geotextile	250 g/m²
Reinforcement:	Glass fleece	50 g/m²
Binder:	Elastomeric bitumen	4300 g/m²
Surface finish:	Sand	250 g/m²
Underside finish:	Silicone coated film	15 g/m²

Characteristics

		Standards	Units	**Average**	***Minimum***
Dimensions	Length	-	m	80	*79*
	Width		m	5.10	*5.01*
Thickness (on finished product)		ASTM D5199	mm	4.00	*3.60*
Surface mass		ASTM D5261	kg/m²	4.85	*4.30*
Tear resistance	Longitudinal direction	ASTM D4073	N	825	*619*
	Cross direction			700	*525*
Tensile properties: Strength	Longitudinal direction	ASTM D7275	kN/m	27	*20.3*
	Cross direction			24	*15*
Tensile properties: Elongation	Longitudinal direction		%	60	*45*
	Cross direction			60	*45*
Static puncture		ASTM D4833	N	530	*477*
Flexibility at low temperature	Longitudinal direction	ASTM D5147	°C	-20	*-15*
	Cross direction			-20	*-15*
Water permeability		ASTM E96	m/s	6.10^{-14}	<
Gas permeability		ASTM D1434-82	m³/(m².d.atm)	2.10^{-4}	<

The manufacturer reserves the right to modify, at any time, the characteristics of its products.

BENTOFIX® CSRNWL

Geofilm Scrim-Reinforced GCL

Thermal Lock® Geosynthetic Clay Liners

Bentofix Thermal Lock® CSRNWL Series Geosynthetic Clay Liner (GCL) is a needlepunched, thermally reinforced composite comprised of a core of natural Wyoming sodium bentonite clay between two durable geotextile layers to form a low permeability hydraulic barrier. The top layer is a thick staple fiber nonwoven (NW) geotextile while the bottom layer is a scrim reinforced nonwoven (SRNW) geotextile with a polypropylene geofilm applied to it. The product is intended for steep slopes and high load applications where increased internal shear strength is required and/or where conditions are rough in nature, prevent shrinkage below geomembranes, and/or where hydraulic head conditions may apply and/or where the product requires excellent hydraulic conductivity properties. Overall, this product has a high peel strength while having a very low permeability in the range of a geomembrane.

Property	ASTM Test Method	Frequency	Value Imperial Units	Value Metric Units
Typical Geotextile Properties				
• Top / Cap Nonwoven	D 5261	200,000 sq ft	6.0 oz./yd^2 MARV	200 g / m^2 MARV(1)
• Scrim Reinforced Nonwoven Bottom Fabric	D 5261	(20,000 m^2)	6.0 oz./yd^2 MARV	200 g / m^2 MARV
• Mass per unit area of flexible geofilm liner[5]	D5993	200,000 sq ft	8.85 oz./yd^2 MARV	300 g/m^2 MARV
Bentonite Properties				
• Swell Index	D 5890	100,000 lbs.	24 ml/ 2 g min	24 ml/ 2 g min
• Moisture Content	D 4643	(50,000 kg)	12 % max	12 % max
• Fluid Loss	D 5891	100,000 lbs.	18 ml max	18 ml max
Finished GCL Properties				
• Bentonite Mass/Unit Area[2]	D 5993	40,000 ft^2 (4,000 m^2)	0.75 lbs/ft^2 MARV	3.66 kg/m^2 MARV
• Tensile Strength	D 6768	40,000 ft^2 (4,000 m^2)	50 lb/in MARV	8.8 kN/m MARV
• Peel Strength	D 6496	40,000 ft^2 (4,000 m^2)	4.5 lbs/in min	785 N/m min
• Permeability[3]	D 5887	Weekly	5 x 10^{-10} cm/s max	5 x 10^{-10} cm/s max 5 x 10^{-13}/cm/s E96
• Index Flux[3]	D 5887	Weekly	1 x 10^{-9} m^3/m^2/s max	1 x 10^{-9} m^3/m^2/s max
• Internal Shear Strength[4]	D 6243	Periodic	500 psf Typical	24 kPa Typical

(1) Minimim Average Roll Value.
(2) Oven-dried measurement. Equates to 0.84 lb/sqft (4.1 kg/sqm) when indexed to 12% moisture content.
(3) Deaired, deionized water @ 5 psi (34.5 kPa) maximum effective confining stress and 2 psi (13.8 kPa) head pressure.
(4) Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf (9.6 kPa) normal stress.
(5) Reflected in GCL Mass per Unit Area via D5993.Rolls will be labelled as CNW.
Rolls will be labelled as CNW.

The information contained herein has been compiled by TAG Ltd. and is, to the best of our knowledge, true and accurate. This information is offered without warranty. Final determination of suitability for use contemplated is the sole responsibility of the user. This information is subject to change without notice. TAG is a division of Terrafix Geosynthetics Inc. 01- 2022.

TECHNICAL DATA SHEET

HDPE 80 mils / 2.00 mm Black Textured

PROPERTY(1)	TEST METHOD	FREQUENCY	UNIT Metric	1036786
SPECIFICATIONS				
Nominal Thickness		-	mm	2.00
Thickness (min. avg.)	ASTM D5994	Every roll	mm	1.90
Lowest individual (8 values/10)			mm	1.80
Lowest individual (10 values/10)			mm	1.70
Asperity Height (min. avg.)	ASTM D7466	Every roll	mm	0.40
Resin Density	ASTM D1505	One per batch	g/cc	> 0.932
Melt Index - 190°C/2.16 kg (max.)	ASTM D1238	One per batch	g/10 min	1.0
Density	ASTM D792	Every 10 rolls	g/cm^3	≥ 0.940
Carbon Black Content	ASTM D4218	Every 2 rolls	%	2.0 - 3.0
Carbon Black Dispersion	ASTM D5596	Every 10 rolls	Category	Cat. 1 / Cat. 2
OIT - Standard (min. avg.)	ASTM D8117	One per batch	min	100
Tensile Properties (min. avg) (2)	ASTM D6693	Every 2 rolls		
Strength at Yield			kN/m	31
Elongation at Yield			%	13
Strength at Break			kN/m	31
Elongation at Break			%	150
Tear Resistance (min. avg.)	ASTM D1004	Every 5 rolls	N	265
Puncture Resistance (min. avg.)	ASTM D4833	Every 5 rolls	N	675
Dimensional Stability	ASTM D1204	Certified	%	± 2
Stress Crack Resistance (SP-NCTL)	ASTM D5397	One per batch	hr	500
Oven Aging - % retained after 90 days	ASTM D5721	Per formulation		
HP-OIT (min. avg.)	ASTM D5885		%	80
UV Resistance - % retained after 1,600 hr	ASTM D7238	Per formulation		
HP-OIT (min. avg.)	ASTM D5885		%	50
Low Temperature Brittleness	ASTM D746	Certified	°C	- 77
SUPPLY SPECIFICATIONS(Roll dimensions may vary ±1%)				
Roll Dimension - Width	-		m	6.80
Roll Dimension - Length	-		m	128.0
Area (Surface/Roll)	-		m^2	870.40

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.

* All values are nominal test results, except when specified as minimum or maximum.
* The information contained herein is provided for reference purposes only and is not intended as a warranty or guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.

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SOLMAX.COM

Revision date 31-May-2018

TECHNICAL DATA SHEET

LLDPE 2.00 mm Black Textured

PROPERTY(1)	TEST METHOD	FREQUENCY	UNIT Metric	1011709
SPECIFICATIONS				
Nominal Thickness		-	mm	2.00
Thickness (min. avg.)	ASTM D5994	Every roll	mm	1.90
Lowest individual (8 values/10)			mm	1.80
Lowest individual (10 values/10)			mm	1.70
Asperity Height (min. avg.)	ASTM D7466	Every roll	mm	0.40
Resin Density	ASTM D1505	1/Batch	g/cc	< 0.926
Melt Index - 190°C/2.16 kg (max.)	ASTM D1238	1/Batch	g/10 min	1.0
Density	ASTM D792	Every 10 rolls	g/cm^3	≤ 0.939
Carbon Black Content	ASTM D4218	Every 2 rolls	%	2.0 - 3.0
Carbon Black Dispersion	ASTM D5596	Every 10 rolls	Category	Cat. 1 / Cat. 2
OIT - Standard (min. avg.)	ASTM D8117	1/Batch	min	100
Tensile Properties (min. avg) (2)	ASTM D6693	Every 2 rolls		
Strength at Break			kN/m	31
Elongation at Break			%	400
2% Modulus (max.)	ASTM D5323	Per formulation	kN/m	840
Tear Resistance (min. avg.)	ASTM D1004	Every 5 rolls	N	220
Puncture Resistance (min. avg.)	ASTM D4833	Every 5 rolls	N	500
Dimensional Stability	ASTM D1204	Certified	%	± 2
Multi-Axial Tensile (min.)	ASTM D5617	Per formulation	%	30
Oven Aging - % retained after 90 days	ASTM D5721	Per formulation		
STD-OIT (min. avg.)	ASTM D8117		%	35
HP-OIT (min. avg.)	ASTM D5885		%	60
UV Resistance - % retained after 1,600 hr	ASTM D7238	Per formulation		
HP-OIT (min. avg.)	ASTM D5885		%	35
Low Temperature Brittleness	ASTM D746	Certified	°C	- 77
SUPPLY SPECIFICATIONS(Roll dimensions may vary ±1%)				
Roll Dimension - Width	-		m	6.80
Roll Dimension - Length	-		m	128.0
Area (Surface/Roll)	-		m^2	870.40

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.

* All values are nominal test results, except when specified as minimum or maximum.
* The information contained herein is provided for reference purposes only and is not intended as a warranty or guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.

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SOLMAX.COM

Revision date 31-May-2018

LAYFIELD GEOSYNTHETICS

TECHNICAL SPECIFICATIONS

HIGH DENSITY POLYETHYLENE (HDPE)

High Density Polyethylene (HDPE) is a versatile material that is used widely across many applications. One of the primary uses of HDPE is as a liner at the base of landfills, where its chemical resistance is put to use. HDPE applications also include pond linings and water containment projects.

April 2023

High Density Polyethylene (HDPE), Black

Typical Properties

Style	ASTM	**HDPE 40** Smooth	**HDPE 60** Smooth	**HDPE 80** Smooth	**HDPE 40** Textured	**HDPE 60** Textured	**HDPE 80** Textured
Nominal Thickness	D5199	40 mil 1.0 mm	60 mil 1.5 mm	80 mil 2.0 mm	38 mil 0.96 mm	57 mil 1.45 mm	76 mil 1.90 mm
Asperity Height	D7466				16 mil 0.4 mm	16 mil 0.4 mm	16 mil 0.4 mm
Density	D792	≥ 0.94 mg/l	≥ 0.94 mg/l	≥ 0.94 mg/l	≥ 0.94 mg/l	≥ 0.94 mg/l	≥ 0.94 mg/l
Tensile Strength Type IV Die	D6693 Yield Strength	84 ppi 15 kN/m	126 ppi 22 kN/m	168 ppi 29 kN/m	84 ppi 15 kN/m	126 ppi 22 kN/m	168 ppi 29 kN/m
	Break Strength	152 ppi 27 kN/m	228 ppi 40 kN/m	304 ppi 53 kN/m	60 ppi 10 kN/m	90 ppi 16 kN/m	120 ppi 21 kN/m
	Yield Elongation 33 mm Gauge Length	12%	12%	12%	12%	12%	12%
	Break Elongation 50 mm Gauge Length	700%	700%	700%	100%	100%	100%
Tear Resistance	D1004	28 lbs 125 N	42 lbs 187 N	56 lbs 249 N	28 lbs 125 N	42 lbs 187 N	56 lbs 249 N

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HIGH DENSITY POLYETHYLENE (HDPE)

	Stress Cracking	D5397	500 Hours	500 Hours	500 Hours	500 Hours	500 Hours	500 Hours
	Puncture Resistance	D4833	72 lbs 320 N	108 lbs 480 N	144 lbs 640 N	60 lbs 267 N	90 lbs 400 N	120 lbs 534 N
	Carbon Black Content	D6370	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %
	Carbon Black Dispersion	D5596	Cat 1 or 2	Cat 1 or 2	Cat 1 or 2	Cat 1 or 2	Cat 1 or 2	Cat 1 or 2
	HPOIT	D5885	400 mins	400 mins	400 mins	400 mins	400 mins	400 mins
	Oven aging at 85º C HPOIT - % retained after 90 days	D5721 D5885	80%	80%	80%	80%	80%	80%
	UV Resistance High Pressure OIT (min. ave.)- % retained after 90 days	D7238 D5885	50%	50%	50%	50%	50%	50%
	Maximum Continuous use Temperature[1]		60°C	60°C	60°C	60°C	60°C	60°C

[1] Please contact Layfield Technical Services for more information

April 2023

HDPE Minimum Field Seam Strengths

Style	ASTM D6392	**HDPE 40** Smooth	**HDPE 60** Smooth	**HDPE 80** Smooth	**HDPE 40** Textured	**HDPE 60** Textured	**HDPE 80** Textured
Bonded Seam Strength Test Temp 23°C, 73°F	25 mm (1") Strip	80 ppi 14 N/mm	120 ppi 21 N/mm	160 ppi 28 N/mm	120 ppi 21 N/mm	120 ppi 21 N/mm	160 ppi 28 N/mm
Peel Adhesion Strength (Extrusion Welds)	25 mm (1") Strip	52 ppi 9 N/mm	78 ppi 14 N/mm	104 ppi 18 N/mm	78 ppi 14 N/mm	78 ppi 14 N/mm	104 ppi 18 N/mm

WeProtect
Our People. Our Communities. Our Environment

LAYFIELD GEOSYNTHETICS

TECHNICAL SPECIFICATIONS

ENVIRO LINER® 6000 – TEXTURED GEOMEMBRANE

With its exceptional flexibility and endurance properties, Layfield's Enviro Liner® (EL) brand of geomembranes has been a trusted performer in our portfolio for many years. Available in four unique formulations, this series of geomembranes offers solutions for a wide range of containment applications.

The flagship Enviro Liner® 6000 incorporates the latest ultraviolet/anti-oxidant (UV/AO) stabilization technology, providing a new level of UV resistance and endurance properties. It is designed for long-term exposed applications and has excellent chemical resistance, making it one of the most durable geomembranes on the market. Textured Enviro Liner® 6000 geomembrane is available with texturing on one or both sides to provide excellent interface friction properties in combination with outstanding longevity.

April 2023

Enviro Liner® 6000 Textured

Material Properties

Style	ASTM	Enviro Liner® 6030	Enviro Liner® 6140/6240	Enviro Liner® 6150/6250	Enviro Liner® 6160/6260	Enviro Liner® 6180/6280
Thickness Minimum Average Value	D5994	28.5 mil 0.72 mm	38 mil .96 mm	47.5 mil 1.21 mm	57 mil 1.45 mm	76 mil 1.9 mm
Thickness Lowest individual for 8 out of 10 values	D5994	27 mil 0.68 mm	36 mil 0.91 mm	45 mil 1.14 mm	54 mil 1.37 mm	72 mil 1.83 mm
Thickness Lowest individual for any of the 10 values	D5994	25.5 mil 0.65 mm	34 mil 0.86 mm	42.5 mil 1.08 mm	51.0 mil 1.30 mm	68.0 mil 1.73 mm
Asperity Height	D7466	10 mil 0.25 mm	16 mil 0.40 mm	16 mil 0.40 mm	16 mil 0.40 mm	16 mil 0.40 mm
Density (Maximum)	D1505	≤0.939 g/cc	≤0.939 g/cc	≤0.939 g/cc	≤0.939 g/cc	≤0.939 g/cc
Tensile Strength at Break	D5514	57 ppi 10 N/mm	76 ppi 13 N/mm	95 ppi 17 N/mm	114 ppi 20 N/mm	120 ppi 21 N/mm
Elongation at Break Tested using 50 mm (2") Gauge Length	D6693	350%	350%	350%	350%	250%
Tear Resistance	D6693	16 lbs 71 N	22 lbs 98 N	27 lbs 120 N	33 lbs 147 N	44 lbs 200 N
Puncture Resistance	D1004	40 lbs 178 N	53 lbs 236 N	66 lbs 294 N	80 lbs 355 N	88 lbs 400 N
Axi-Symmetric Strain	D4833	30%	50%	50%	50%	50%
Carbon Black Content	D5617	2-3%	2-3%	2-3%	2-3%	2-3%

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For up-to-date technical information, be sure to visit us online at www.LayfieldGroup.com

Carbon Black Dispersion	D5596	CAT 1 or 2	CAT 1 or 2	CAT 1 or 2	CAT 1 or 2	CAT 1 or 2
Oxidative Induction Time (OIT)	D3895	200 Minutes				
High Pressure Oxidative Induction Time (HPOIT)	D5885	2,000 Minutes				
UV Resistance 30,000 hrs Strength Retained[1]	D4329	90% (Black)				
Notes: [1]UV testing performed on EL6030 smooth black specimen						

April 2023

Enviro Liner® 6000 Minimum Shop Seam Strengths

Style	ASTM D6392	**Enviro Liner® 6130**	**Enviro Liner® 6140/6240**	**Enviro Liner® 6150/6250**	**Enviro Liner® 6160/6260**	**Enviro Liner® 6180/6280**
Heat Bonded Seam Strength	25.4 mm (1") Strip	45 ppi 7.8 N/mm	60 ppi 10.5 N/mm	75 ppi 13.1 N/mm	Not Shop Fabricated	Not Shop Fabricated
Peel Adhesion Strength (Wedge Welded	25.4 mm (1") Strip	38 ppi 6.7 N/mm	50 ppi 8.8 N/mm	63 ppi 11.0 N/mm	Not Shop Fabricated	Not Shop Fabricated

April 2023

Enviro Liner® 6000 Minimum Field Seam Strengths

Style	ASTM D6392	**Enviro Liner® 6030**	**Enviro Liner® 6140/6240**	**Enviro Liner® 6150/6250**	**Enviro Liner® 6160/6260**	**Enviro Liner® 6180/6280**
Heat Bonded Seam Strength *Test Temp 23°C, 73°F*	25.4 mm (1") Strip	45 ppi 7.8 N/mm	60 ppi 10.5 N/mm	75 ppi 13.1 N/mm	90 ppi 15.7 N/mm	120 ppi 21.0 N/mm
Peel Adhesion Strength (Wedge Welded	25.4 mm (1") Strip	34 ppi 6.0 N/mm	44 ppi 7.7 N/mm	57 ppi 10.0 N/mm	66 ppi 11.5 N/mm	88 ppi 15.4 N/mm

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INSTALLATION

Layfield's Enviro Liner® 6000 textured geomembrane is normally supplied in prefabricated panels when the thickness is 50 mil (1.25 mm) or thinner. These fabricated panels are deployed onsite, often covering a small project in a single piece. The installation of textured geomembranes follows the same procedures and techniques as for the corresponding smooth material. Panels are deployed and then welded together using normal wedge welding and extrusion welding techniques. The welding edges of our textured geomembranes feature a reduction in the texturing height to make welding easier. When fabricated panels of textured materials are supplied, they will be marked to show how they unroll/unfold in the containment area. When wide rolls of materials are supplied, the white textured surface (if supplied) will be wound onto the inside of the roll. Installation guide specifications for textured Enviro Liner® 6000 materials are available on our web site.

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The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Thursday, October 19, 2023** at 12:15 a.m. Eastern Time. Please contact NSF to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:
http://info.nsf.org/Certified/PwsChemicals/Listings.asp?Company=01780&Standard=060&

NSF/ANSI/CAN 60
Drinking Water Treatment Chemicals - Health Effects

CETCO

(http://www.cetco.com)

Colloid Environmental Technologies Co.
2870 Forbs Avenue
Hoffman Estates, IL 60192
United States
800-527-9948
847-851-1824
Visit this company's website (http://www.cetco.com)

Facility : # 1 USA

Bentonite[1]

Trade Designation	*Product Function*	*Max Use*
CEDP03062020	Well Drilling Aid Drilling Fluid	NA
CEDP09062023	Well Drilling Aid Drilling Fluid	NA
CIVIL PRO™ 125	Drilling Fluid Well Drilling Aid	NA
HYDRAUL-EZ®	Drilling Fluid Well Drilling Aid	NA
PREMIUM GEL®	Drilling Fluid Well Drilling Aid	NA

SUPER GEL-X®	Drilling Fluid Well Drilling Aid	NA
VELOXITY-PRO	Drilling Fluid Well Drilling Aid	NA
XTRA GEL™	Drilling Fluid Well Drilling Aid	NA

[1] This product is designed to be used off-line following manufacturer's use instructions. The well is to be flushed until the turbidity of the water is < 1 NTU before the system may be used for drinking water.

Miscellaneous Water Supply Products

Trade Designation	*Product Function*	*Max Use*
C/S GRANULAR™[1]	Well Sealant Drilling Fluid	NA
CETCO® C-GROUT[1]	Well Sealant	NA
CETCO®/VOLCLAY® CHIPS[1]	Well Sealant Drilling Fluid	NA
CETCO®/VOLCLAY® CRUMBLES[1] [2]	Well Sealant	NA
CETCO®/VOLCLAY® CRUMBLES #8[1] [2]	Well Sealant	NA
CETCO®/VOLCLAY® GRANULAR GROUT[1] [2]	Well Sealant	NA
CETCO®/VOLCLAY® GROUT[1] [2]	Well Sealant	NA
CETCO®/VOLCLAY® TABLETS[1]	Well Sealant Drilling Fluid	NA
CETCO®/VOLCLAY®/PUREGOLD® CHIPS[1] [3]	Well Sealant	NA
CETCO®/VOLCLAY®/PUREGOLD® COARSE CHIPS[1] [3]	Well Sealant	NA
CETCO®/VOLCLAY®/PUREGOLD® MEDIUM CHIPS[1] [3]	Well Sealant	NA
GEOTHERMAL GROUT™[1]	Well Sealant	NA
HIGH TC GEOTHERMAL GROUT™[1]	Well Sealant	NA
PUREGOLD® GEL[1]	Well Sealant Drilling Fluid	NA
PUREGOLD® GROUT[1]	Well Sealant	NA
REL-PAC® XTRA-LOW	Well Drilling Aid Drilling Fluid	NA

[1] This product is designed to be used off-line following manufacturer's use instructions. The well is to be flushed until the turbidity of the water is < 1 NTU before the system may be used for drinking water.
[2] This product can be shipped with either the Cetco® or Volclay® prefix.
[3] This product can be shipped with either the Cetco®, Volclay®, or Puregold® prefix.

Sodium Carbonate[4]

Trade Designation	*Product Function*	*Max Use*
SODA ASH	Well Drilling Aid	NA
SODA ASH DENSE	Well Drilling Aid	NA
SODIUM CARBONATE	Well Drilling Aid	NA

[4] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 2 USA

Bentonite

Trade Designation	*Product Function*	*Max Use*
ACCOFLOC® 350	Coagulation & Flocculation	200mg/L
ACCOFLOC® 361	Coagulation & Flocculation	200mg/L

Miscellaneous Water Supply Products[1]

Trade Designation	*Product Function*	*Max Use*
BELLE CRUMBLES	Well Sealant	NA

CETCO®/VOLCLAY® CRUMBLES	Well Sealant	NA

[1] This product is designed to be flushed out until the turbidity of the water is < 1 NTU. Flushing is required before the system may be used for drinking water.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 3 USA

Bentonite[WL]

Trade Designation	*Product Function*	*Max Use*
ACCO-FLOW	Coagulation & Flocculation Filtration Aid	200mg/L
ACCOFLOC® 350	Coagulation & Flocculation	200 mg/L
ACCOFLOC® 361	Coagulation & Flocculation	200 mg/L
ACCOFLOC® SDG	Coagulation & Flocculation	200 mg/L

[WL] These products are designed to be flushed out prior to using the system for drinking water. The well shall be properly flushed and drained before being placed in service.

Miscellaneous Water Supply Products

Trade Designation	*Product Function*	*Max Use*
BELLE CRUMBLES[1] [2]	Well Sealant	NA
CETCO®/VOLCLAY® CRUMBLES[1] [2]	Well Sealant	NA

[1] These products are designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
[2] The well is to be properly flushed and drained until the turbidity of the water is <1 NTU.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 4 USA

Miscellaneous Water Supply Products

Trade Designation	*Product Function*	*Max Use*
CETCO® COATED TABLETS 1/4"[1]	Well Sealant	NA
CETCO® COATED TABLETS 3/8"[1]	Well Sealant	NA

[1] The well is to be properly flushed and drained until the turbidity of the water is <1 NTU.

Facility : # 5 USA

Miscellaneous Water Supply Products [WL]

Trade Designation	*Product Function*	*Max Use*
BMR (Bentonite Mud Remover)[1]	Well Cleaning Aid	NA
DPA (Dry Penatrating Agent)[2]	Well Cleaning Aid	59 g/L
LBA[3]	Corrosion & Scale Control	5%

[1] These products are designed to be flushed out prior to using the system for drinking water. The well is to be properly flushed and drained until the turbidity of the water is <1 NTU.
[2] Follow manufacturer's use instructions.
[3] A 5% solution of LBA is to be added to the well in accordance with the dosage table (e.g., for a 2" well, a 5% solution is to be added at 0.01 gallon per foot of standing water). The well should then be flushed as outlined in the use instructions.
[WL] These products are designed to be flushed out prior to using the system for drinking water. The well shall be properly flushed and drained before being placed in service.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 6 USA

Miscellaneous Water Supply Products

Trade Designation	*Product Function*	*Max Use*
BMR (Bentonite Mud Remover)[1]	Well Cleaning Aid	NA
DPA (Dry Penetrating Acid)[2] [3] [4]	Well Cleaning Aid	NA
LBA[2] [3] [4] [5]	Well Cleaning Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. The well is to be properly flushed and drained until the turbidity of the water is <1 NTU.
[2] This product is designed to be flushed out prior to using the system for drinking water. This product must be used according to the manufacturer's use instructions.
[3] The equipment must be disconnected from the system prior to treatment. The well must be purged until the pH reaches that of the original water.
[4] The well shall be properly flushed and drained before being placed in service.
[5] A 5% solution of LBA is to be added to the well in accordance with the dosage table (e.g., for a 2 inch well, a 5% solution is to be added at 0.01 gallon per foot of standing water).

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 7 China

Miscellaneous Water Supply Products[1]

Trade Designation	*Product Function*	*Max Use*
CETCO® GRAPHITE112016	Well Sealant	NA
CETCO® TC BOOSTER	Well Sealant	NA

[1] Certified for use as a well sealant additive only when used in conjunction with a well sealant grout. The Sealant is to be mixed at a ratio of not greater than 18 pounds of product to 50 pounds of grout.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 8 USA

Polyacrylamide[1] [2] [PC]

Trade Designation	*Product Function*	*Max Use*
ACCU-VIS™	Well Drilling Aid	NA
INSTA-PAC®	Well Drilling Aid	NA
INSTA-VIS™ PLUS	Coagulation & Flocculation	3mg/L

INSTA-VIS™ PLUS	Well Drilling Aid	NA
INSTA-VIS™ PLUS	Coagulation & Flocculation	3mg/L
SHORE PAC® LIQUID	Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

[2] This product is designed to be flushed out prior to using the system for drinking water. The well is to be properly flushed and drained before being placed into service. This product is to be used according to the manufacturer's use instructions.

[PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

Sodium Polyacrylate[1] [2]

Trade Designation	*Product Function*	*Max Use*
SUPER THIN™	Well Cleaning Aid Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length

(20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

[2] This product is designed to be flushed out prior to using the system for drinking water. The well is to be properly flushed and drained before being placed into service. This product is to be used according to the manufacturer's use instructions.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 16 USA

Polyacrylamide [PC]

Trade Designation	*Product Function*	*Max Use*
SHORE PAC®[1]	Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer’s use instructions. Certification of these products is based on the well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer’s recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

[PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

Polymer Blends[PC] [PY]

Trade Designation	*Product Function*	*Max Use*
INSTA-VIS™ LOW VISCOSITY	Well Drilling Aid	NA

[PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.
[PY] Polyamines Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

Sodium Carbonate[1]

Trade Designation	*Product Function*	*Max Use*
SODA ASH	Well Drilling Aid	NA
SODA ASH DENSE	Well Drilling Aid	NA
SODIUM CARBONATE	Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 17 USA

Bentonite[1] [2]

Trade Designation	*Product Function*	*Max Use*
PREMIUM GEL®	Drilling Fluid Well Drilling Aid	NA
SUPER GEL-X®	Drilling Fluid Well Drilling Aid	NA

[1] This product is designed to be used off-line and flushed out prior to using the system for drinking water, following manufacturer's use instructions.
[2] This product is designed to be flushed out until the turbidity of the water is < 1 NTU. Flushing is required before the system may be used for drinking water.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Facility : # 18 USA

Miscellaneous Water Supply Products[1]

Trade Designation	*Product Function*	*Max Use*
QUAD POWER™ POWER-TERGE™	Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

Polyacrylamide[1] [PC]

Trade Designation	*Product Function*	*Max Use*
QUAD POWER™ POWER-BASE™	Well Drilling Aid	NA

[1] These products are designed to be flushed out prior to using the system for drinking water. Before being placed into service, the well is to be properly flushed according to the manufacturer's use instructions. Certification of these products is based on the well drilling model with the following assumptions:
- The amount of well drilling fluid used is 3780 L (1000 U.S. gallons) to which the drilling fluid has been added at the manufacturer's recommended level.
- The aquifer contains 3.1 million liters of water (815,000 gallons) based on a 0.5 acre aquifer of 6.1 meter depth (20 ft.) and 25% porosity.
- The bore hole is 61 meters in total depth (200 ft.), the screen is 6.1 meters in length (20 ft.), and the bore hole is 25.4 cm. in diameter (10 in.).
- The amount of well drilling fluid removed from the well during construction is equal to the combined volumes of the casing and the screen, plus an additional amount removed through the well disinfection and development (90% removed).
- This product should not be used in constructing wells in highly porous formations, such as cavernous limestone.

[PC] Polyacrylamide Products Certified by NSF International comply with 40 CFR 141.111 requirements for percent monomer and dose.

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Number of matching Manufacturers is 1

Number of matching Products is 63

Processing time was 0 seconds

The Public Health and Safety Organization

NSF Product and Service Listings

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http://info.nsf.org/Certified/PwsComponents/Listings.asp?Company=1X990&Standard=061&

NSF/ANSI/CAN 61
Drinking Water System Components - Health Effects

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing. Click here for a list of Abbreviations used in these Listings. Click here for the definitions of Water Contact Temperatures denoted in these Listings. Products certified to NSF/ANSI/CAN 61 comply with the health effects criteria in NSF/ANSI/CAN 600.

Layfield Group Ltd.
11120 Silversmith Place
Richmond, BC V7A 5E4
Canada
800-840-2884
780-451-7227

Facility : Richmond, British Columbia, Canada

Protective (Barrier) Materials

Trade Designation	Water Contact Size Restriction	Water Contact Temp	Water Contact Material
Liners[1]			
EL 6008	>= 2000 gal.	CLD 23	PE
EL 6008 TUBING B/W [A]x[B];[C]	>= 2,000 gal.	CLD 23	PE

EL 6008 W	>= 2000 gal.	CLD 23	PE
EL 6010 TUBING [A]x[B];[C]	>= 2,000 gal.	CLD 23	PE
EL 6010 TUBING [A]x[B];[C] BLACK/WHITE	>= 2,000 gal.	CLD 23	PE
EL 6010 W	>= 2000 gal.	CLD 23	PE
EL 6012 B/W TUBING B/W	>= 2,000 gal.	CLD 23	PE
EL 6012 TUBING [A]x[B];[C]	>= 2,000 gal.	CLD 23	PE
EL 6012 TUBING [A]x[B];[C] BLACK/WHITE	>= 2000 gal.	CLD 23	PE
EL 6015	>= 2000 gal.	CLD 23	PE
EL 6015 TUBING B/W [A]x[B];[C]	>= 2,000 gal.	CLD 23	PE
EL 6015 W	>= 2000 gal.	CLD 23	PE
EL 6020 W	>= 2,000 gal.	CLD 23	PE
EL 6020 [A];[C]	>= 2,000 gal.	CLD 23	PE
EL 6020HD [A];[C] B/W	>= 2,000 gal.	CLD 23	PE
EL 6020X W	>= 2000 gal.	CLD 23	PE
EL 6020X [A];[C] B/W	>= 2,000 gal.	CLD 23	PE
EL 6030 W	>= 2000 gal.	CLD 23	PE
EL 6030 [A];[C]	>= 2,000 gal.	CLD 23	PE
EL 6030 [A];[C]	>= 2,000 gal.	CLD 23	PE
EL 6030 [A];[C] B/W	>= 2000 gal.	CLD 23	PE
EL 6030X W	>= 2000 gal.	CLD 23	PE
EL 6040 B/W [A];[C]	>= 2000 gal.	CLD 23	PE
EL 6040 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 6040 [A];[C] WB	>= 2000 gal.	CLD 23	PE
EL 6040 [A];[C] WHITE	>= 2000 gal.	CLD 23	PE
EL 6040X W	>= 2000 gal.	CLD 23	PE
EL 6050 W	>= 2000 gal.	CLD 23	PE
EL 6050 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 6050 [A];[C] WB	>= 2000 gal.	CLD 23	PE
EL 6050X B/W	>= 2000 gal.	CLD 23	PE
EL 6050X W	>= 2000 gal.	CLD 23	PE
EL 6060 W	>= 2000 gal.	CLD 23	PE
EL 6060 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 6060 [A];[C] B/W	>= 2000 gal.	CLD 23	PE
EL 6060 [A];[C] WB	>= 2000 gal.	CLD 23	PE
EL 6060X W	>= 2000 gal.	CLD 23	PE
EL 6080 W	>= 2000 gal.	CLD 23	PE
EL 6080 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 6080X B/W	>= 2000 gal.	CLD 23	PE
EL 6130X [A], [C] SE TEX-1	>= 2000 gal.	CLD 23	PE
EL 6130X [A], [C] SE TEX-1 BW	>= 2000 gal.	CLD 23	PE
EL 6130X [A], [C] SE TEX-1 WB	>= 2000 gal.	CLD 23	PE
EL 6140X [A], [C] SE TEX-1	>= 2000 gal.	CLD 23	PE
EL 6140X [A], [C] SE TEX-1 BW	>= 2000 gal.	CLD 23	PE
EL 6140X [A], [C] SE TEX-1 WB	>= 2000 gal.	CLD 23	PE
EL 6160X [A], [C] SE TEX-1	>= 2000 gal.	CLD 23	PE

EL 6160X [A], [C] SE TEX-1 BW	>= 2000 gal.	CLD 23	PE
EL 6160X [A], [C] SE TEX-1 WB	>= 2000 gal.	CLD 23	PE
EL 6180X [A], [C] SE TEX-1	>= 2000 gal.	CLD 23	PE
EL 6180X [A], [C] SE TEX-1 BW	>= 2000 gal.	CLD 23	PE
EL 6180X [A], [C] SE TEX-1 WB	>= 2000 gal.	CLD 23	PE
EL 6230X [A], [C] SE TEX-2	>= 2000 gal.	CLD 23	PE
EL 6230X [A], [C] SE TEX-2 BW	>= 2000 gal.	CLD 23	PE
EL 6230X [A], [C] SE TEX-2 WB	>= 2000 gal.	CLD 23	PE
EL 6240X [A], [C] SE TEX-2	>= 2000 gal.	CLD 23	PE
EL 6240X [A], [C] SE TEX-2 BW	>= 2000 gal.	CLD 23	PE
EL 6240X [A], [C] SE TEX-2 WB	>= 2000 gal.	CLD 23	PE
EL 6260X [A], [C] SE TEX-2	>= 2000 gal.	CLD 23	PE
EL 6260X [A], [C] SE TEX-2 BW	>= 2000 gal.	CLD 23	PE
EL 6260X [A], [C] SE TEX-2 WB	>= 2000 gal.	CLD 23	PE
EL 6280X [A], [C] SE TEX-2	>= 2000 gal.	CLD 23	PE
EL 6280X [A], [C] SE TEX-2 BW	>= 2000 gal.	CLD 23	PE
EL 6280X [A], [C] SE TEX-2 WB	>= 2000 gal.	CLD 23	PE
EL 7020 B/W [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7020 W	>= 2000 gal.	CLD 23	PE
EL 7020 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7030 B/W [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7030 W	>= 2000 gal.	CLD 23	PE
EL 7030 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7040 B/W [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7040 W	>= 2000 gal.	CLD 23	PE
EL 7040 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7050 B/W [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7050 W	>= 2000 gal.	CLD 23	PE
EL 7050 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7060 B/W [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7060 W	>= 2000 gal.	CLD 23	PE
EL 7060 [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7080 B/W [A];[C]	>= 2000 gal.	CLD 23	PE
EL 7080 W	>= 2000 gal.	CLD 23	PE
EL 7080 [A];[C]	>= 2000 gal.	CLD 23	PE
El 6020X [A];[C]	>= 2,000 gal.	CLD 23	PE
El 6030X [A];[C]	>= 2000 gal.	CLD 23	PE
El 6030X [A];[C] B/W	>= 2000 gal.	CLD 23	PE
El 6040X B/W [A];[C]	>= 2000 gal.	CLD 23	PE
El 6040X [A];[C]	>= 2000 gal.	CLD 23	PE
El 6050X [A];[C]	>= 2000 gal.	CLD 23	PE
El 6060X [A];[C]	>= 2000 gal.	CLD 23	PE
El 6060X [A];[C] B/W	>= 2000 gal.	CLD 23	PE
El 6060X [A];[C] WB	>= 2000 gal.	CLD 23	PE
El 6080 [A];[C] WB	>= 2000 gal.	CLD 23	PE

El 6080HD [A];[C] B/W	>= 2000 gal.	CLD 23	PE
El 6080X [A];[C]	>= 2000 gal.	CLD 23	PE
El 6080X [A];[C] B/W	>= 2000 gal.	CLD 23	PE
El 6080X [A];[C] WB	>= 2000 gal.	CLD 23	PE
GEOFLEX-20 [A], [C]	>= 2000 gal.	CLD 23	PE
GEOFLEX-20 [A], [C] WB	>= 2000 gal.	CLD 23	PE
GEOFLEX-30 [A], [C]	>= 2000 gal.	CLD 23	PE
GEOFLEX-30 [A], [C] WB	>= 2000 gal.	CLD 23	PE
GEOFLEX-40 [A], [C]	>= 2000 gal.	CLD 23	PE
GEOFLEX-40 [A], [C] WB	>= 2000 gal.	CLD 23	PE
GEOFLEX-50 [A], [C]	>= 2000 gal.	CLD 23	PE
GEOFLEX-50 [A], [C] WB	>= 2000 gal.	CLD 23	PE
GEOFLEX-60 [A], [C]	>= 2000 gal.	CLD 23	PE
GEOFLEX-60 [A], [C] WB	>= 2000 gal.	CLD 23	PE
HDPE 100 EX [A], [B] CONDUCTIVE	>= 2000 gal.	CLD 23	PE
HDPE 100 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 100 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE
HDPE 100 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 100EX [A], [B] CONDUCT WB	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A], [B] CONDUCTIVE	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A], [B] SE TEX-1	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A], [B] SE TEX-1 BW	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A], [B] SE TEX-1 WB	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A], [B] SE TEX-2	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A], [B] SE TEX-2 WB	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE
HDPE 40 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 40EX [A], [B] CONDUCT WB	>= 2000 gal.	CLD 23	PE
HDPE 50 EX [A], [B] CONDUCTIVE	>= 2000 gal.	CLD 23	PE
HDPE 50 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 50 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE
HDPE 50 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 50EX [A], [B] CONDUCT WB	>= 2000 gal.	CLD 23	PE
HDPE 55 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 55 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE
HDPE 55 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A], [B] CONDUCTIVE	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A], [B] SE TEX-1	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A], [B] SE TEX-1 BW	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A], [B] SE TEX-1 WB	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A], [B] SE TEX-2	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A], [B] SE TEX-2 WB	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 60 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE

HDPE 60 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 60EX [A], [B] CONDUCT WB	>= 2000 gal.	CLD 23	PE
HDPE 70 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 70 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE
HDPE 70 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 80 EX [A], [B] CONDUCTIVE	>= 2000 gal.	CLD 23	PE
HDPE 80 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 80 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE
HDPE 80 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 80EX [A], [B] CONDUCT WB	>= 2000 gal.	CLD 23	PE
HDPE 80EX [A], [B] SE TEX-1	>= 2000 gal.	CLD 23	PE
HDPE 80EX [A], [B] SE TEX-1 BW	>= 2000 gal.	CLD 23	PE
HDPE 80EX [A], [B] SE TEX-1 WB	>= 2000 gal.	CLD 23	PE
HDPE 80EX [A], [B] SE TEX-2	>= 2000 gal.	CLD 23	PE
HDPE 80EX [A], [B] SE TEX-2 WB	>= 2000 gal.	CLD 23	PE
HDPE 90 EX [A], [B] CONDUCTIVE	>= 2000 gal.	CLD 23	PE
HDPE 90 EX [A],[B];[C]	>= 2000 gal.	CLD 23	PE
HDPE 90 EX [A],[B];[C] B/W	>= 2000 gal.	CLD 23	PE
HDPE 90 EX [A],[B];[C] W	>= 2000 gal.	CLD 23	PE
HDPE 90EX [A], [B] CONDUCT WB	>= 2000 gal.	CLD 23	PE
HeatGard 100 [A],[B]	>= 2000 gal.	CLD 23	PE
HeatGard 100 [A],[B] PW	>= 2000 gal.	CLD 23	PE
HeatGard 30 [A],[B]	>= 2000 gal.	CLD 23	PE
HeatGard 30 [A],[B] PW	>= 2000 gal.	CLD 23	PE
HeatGard 40	>= 2000 gal.	CLD 23	PE
HeatGard 40 [A],[B]	>= 2000 gal.	CLD 23	PE
HeatGard 40 [A],[B] PW	>= 2000 gal.	CLD 23	PE
HeatGard 45 [A],[B]	>= 2000 gal.	CLD 23	PE
HeatGard 45 [A],[B] PW	>= 2000 gal.	CLD 23	PE
HeatGard 50 [A],[B]	>= 2000 gal.	CLD 23	PE
HeatGard 50 [A],[B] PW	>= 2000 gal.	CLD 23	PE
HeatGard 60 [A],[B]	>= 2000 gal.	CLD 23	PE
HeatGard 60 [A],[B] PW	>= 2000 gal.	CLD 23	PE
HeatGard 80 [A],[B]	>= 2000 gal.	CLD 23	PE

[1] Certified for black liner with white printing or no printing, white liner with green printing or no printing, and black and white co-extruded liner with white or green printing or no printing. Liner can be smooth, textured on one side, or textured on both sides.

[A] - Width in feet or inches

[B] - Length in feet

[C] - Thickness in mils

Number of matching Manufacturers is 1

Number of matching Products is 171

Processing time was 0 seconds

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NSF Product and Service Listings

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NSF/ANSI/CAN 61
Drinking Water System Components - Health Effects

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing. Click here for a list of Abbreviations used in these Listings. Click here for the definitions of Water Contact Temperatures denoted in these Listings. Products certified to NSF/ANSI/CAN 61 comply with the health effects criteria in NSF/ANSI/CAN 600.

Solmax Geosynthetics, LLC
19103 Gundle Road
Houston, TX 77073
United States
800-435-2008
281-443-8564

Facility : # 2 Houston, TX

Protective (Barrier) Materials

	Water Contact	Water Contact	Water Contact

Trade Designation	Size Restriction	Temp	Material
Liners			
HDPE Series Black, Smooth, Non-Conductive[1]	>= 75 gal.	D. HOT	PE

[1] Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Number of matching Manufacturers is 1

Number of matching Products is 1

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This is the Official Listing recorded on June 5, 2020.

Axter Coletanche, Inc.
1500 Du College
#205
Saint-Laurent, Québec H4L 5G6
Canada
514-903-1912

Facility: Courchelettes, France

Trade Designation	Protective (Barrier) Materials Water Contact Size Restriction	Water Contact Temp	Water Contact Material
Liners[1]			
Coletanche ES1	>=75,000 gal.	CLD 23	ASPH
Coletanche ES2	>=75,000 gal.	CLD 23	ASPH
Coletanche ES3	>=75,000 gal.	CLD 23	ASPH
Coletanche ES4	>=75,000 gal.	CLD 23	ASPH
Coletanche XP1	>=75,000 gal.	CLD 23	ASPH
Coletanche XP2	>=75,000 gal.	CLD 23	ASPH
Coletanche XP3	>=75,000 gal.	CLD 23	ASPH
Coletanche XP4	>=75,000 gal.	CLD 23	ASPH
Coletanche XPC	>=75,000 gal.	CLD 23	ASPH

[1] Certified for liner installed with sand side as the water contact layer.

Note: Additions shall not be made to this document without prior evaluation and acceptance by NSF International.

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