



Atlas Minerals & Chemicals, Inc.



# DATA SHEET

4-5000PS (9-05<sup>2</sup>)

Supersedes 4-5000PS (7-05)

## ANCHOR-LOK™ LINING SYSTEM

### DESCRIPTION

ANCHOR-LOK is a unique, chemical and abrasion resistant thermoplastic lining system for the protection of poured-in-place or pre-cast concrete. ANCHOR-LOK sheet is available in various grades of Polyethylene (PE), Polypropylene (PP), Polyvinyl Chloride (PVC) and Polyvinylidene Fluoride (PVDF). Polypropylene ANCHOR-LOK is available in ultra-violet (UV) resistant grade for outdoor applications. PVC ANCHOR-LOK is not recommended for outdoor applications that can be subjected to temperatures below 40°F (4°C).

Small ANCHOR-LOK structures, such as sumps and trenches, can be shop fabricated. Large structures, of unlimited dimensions, are constructed by attaching ANCHOR-LOK sheets on standard concrete form work. The design of concrete structures and the forms required for placing the concrete are unaffected when using ANCHOR-LOK. After placing concrete, the form work is removed and the joints between the ANCHOR-LOK sheets are rod or extrusion welded, followed by spark testing to complete the installation. Connecting to existing piping, trenches and equipment is easily accomplished with ANCHOR-LOK.

ANCHOR-LOK linings reduce construction time, eliminate extensive surface preparation and can be placed in service in less time than is required for other types of protective lining systems. In most cases, prefabricated ANCHOR-LOK structures do not require field welding and are ready to use after stripping the concrete forms.

ANCHOR-LOK thermoplastic sheets are manufactured with anchor studs on one side of the sheet. The unique engineered anchoring and connecting system of H-Zip strips provide a smooth lining system that is an integral part of the concrete structure. The anchor studs become embedded in the concrete thus locking the lining in place. The ANCHOR-LOK lining will not loosen if moisture penetrates through the concrete from the exterior as can occur when coatings or linings are installed on concrete that is below grade or in areas with a high water table.

ANCHOR-LOK linings are spark tested to ensure lining integrity. Leak detection systems can be provided to detect leaks in the event of lining damage.

### IF LEAK DETECTION SYSTEMS ARE TO BE UTILIZED, THE OUTSIDE OF THE CONCRETE MUST BE WATERPROOFED.

The chemical and thermal resistance of ANCHOR-LOK Thermoplastic Lining Systems meet a variety of requirements for the protection of concrete structures regardless of size and configuration.

### USES

ANCHOR-LOK expands the use of concrete to contain and convey EPA regulated materials such as corrosive, toxic, ignitable and reactive liquids and vapors, as well as abrasive solids and slurries. ANCHOR-LOK has excellent chemical, thermal and abrasion resistance and withstands external hydraulic pressure well in excess of a 100 ft. (30 m.) head. ANCHOR-LOK is available in flame retardant and UV-resistant grades for outdoor applications. Grades meeting USDA and FDA service requirements are also available. ANCHOR-LOK is used to line concrete:

- Trenches and Catch Basins
- Sumps and Pits
- Manholes and Piping
- Flumes and Chute Linings for Wet or Dry Applications
- Underground Storage Vaults and Chests
- Chemical Process, Storage and Waste Treatment Tanks
- Municipal Sewage and Water Treatment Tanks
- Clarifiers and Digesters
- Tank Farm Dikes, Tank and Pump Pads
- Specialty Industrial Flooring
- Concrete Ducts and Stacks
- Offshore and Shore side Concrete Marine Piling and Walls
- Pickling, Plating and Galvanizing Tanks

Most grades of ANCHOR-LOK PE, PP and PVC are available from stock. These grades provide maximum operating temperatures from -40°F (-40°C) up to 275°F (135°C). Special high temperature ANCHOR-LOK PVDF and abrasion resistant high molecular weight (HMW) ANCHOR-LOK PE are manufactured to order.

### DESIGN ENGINEERING

ATLAS' Engineering Department will recommend the proper material when given the full service conditions of chemicals present, temperatures and mechanical impositions. ANCHOR-LOK linings

withstand well in excess of 100 ft. (30 m.) of hydraulic head, therefore, external waterproofing generally will not be required.

### INSTALLATION STANDARDS

ANCHOR-LOK is fabricated in accordance with ASTM C1147 - Standard Practice for Tensile Performance of Hand Welded, Chemical Resistant, Rigid Thermoplastic. The installation of ANCHOR-LOK, including the final quality control procedure of spark testing all joints, is performed by ATLAS personnel or ATLAS certified applicators. When pouring concrete over existing concrete walls and floors, where the potential for hydraulic pressure exists, steel anchors or concrete bonding agents, or both, must be included in the wall and floor design. Concrete overpours are used to install ANCHOR-LOK when rehabilitating existing tanks, sumps or trenches. A mortar bed is always used for installing the floor in both new and rehabilitation work. The concrete behind ANCHOR-LOK must be dry before welding the joints.

### TYPE OF MATERIALS

**ANCHOR-LOK HDPE:** High density polyethylene, black, UV resistant. Meets USDA and FDA mandates.

**\*ANCHOR-LOK PE HMW - 500:** Polyethylene, high molecular weight. Used when joints between sheets need to be welded. Meets USDA and FDA mandates.

### ANCHOR-LOK PP:

Polypropylene, high temperature and chemical resistant. Meets USDA and FDA mandates.

**\*ANCHOR-LOK UVPP:** Polypropylene, black UV resistant, high temperature and chemical resistant.

**ANCHOR-LOK PVC:** Polyvinyl Chloride. Has excellent resistance to sodium hypochlorite.

**\*ANCHOR-LOK PVDF:** Polyvinylidene Fluoride. For extreme chemical and thermal requirements. Meets USDA and FDA mandates.

\*Manufactured to order

### METHODS OF JOINTING

ANCHOR-LOK can be cut, formed and welded into a variety of shapes and sizes. It can be prefabricated for shipment with final installation at the job site. Sheets larger than the standard sizes can be prefabricated and shipped. They are made by welding standard sizes at the factory with electronically controlled butt welding equipment. This enables the contractor to attach ANCHOR-LOK to the full height of the forms thus minimizing field welding. Corners are constructed by thermoforming. Vertical joints are

constructed utilizing an "H" profile zip strip that provides for quick release of the strip face for welding of the joint between sheets. The zip strip provides the conductive path to facilitate spark testing of the completed joint. Horizontal joints can be fabricated with overlap strips with conductive tape behind the joint to facilitate spark testing. The "H" profile zip strips are sometimes used for horizontal joints.

### SHEET SIZES

Standard thickness is 3/16" (5 mm.); HDPE is also available in 1/8" (3 mm.). PVDF is only available in 5/32" (4 mm.). Nominal sheet dimensions are 4' 11" x 9' 10" x 3/16" (1.5 m. x 3 m. x 5 mm thick). ANCHOR-LOK PE 1/8" (3 mm.) thick is available in 4' 11" x 32' 9" (1.5 m. x 10 m.) rolls. All ANCHOR-LOK grades have smooth, easy-to-clean surfaces. ANCHOR-LOK PE, PP and PVDF can be supplied with a fabric laminate to enable bonding and flashing of membranes and flooring materials to the ANCHOR-LOK. Fabric laminating systems can also be provided that bond to ANCHOR-LOK PVC. A sandbasted finish can also be provided for a non-skid surface.

### COLORS

- ANCHOR-LOK PP - Tan
- ANCHOR-LOK PVC - Dark Gray
- ANCHOR-LOK PE and UVPP - Black
- ANCHOR-LOK PE HMW and PVDF - White

### CHEMICAL RESISTANCE

Refer to the chemical resistance chart for specific information.

### STORAGE AND HANDLING

Store ANCHOR-LOK sheets, accessories and prefabricated items in a safe place under cover. When placing ANCHOR-LOK, temperatures must be above freezing. During final welding, finishing and inspection, all areas must be kept clean, dry and protected from drafts and direct sunlight. Refer to ATLAS Data Sheet, 4-5001PI, for welding temperatures.

### METHOD OF CONSTRUCTION

**New Concrete** - A reinforced concrete floor slab is poured in accordance with the required concrete design. Hold the elevation of the base slab 2-1/2" to 6" (63 mm. to 150 mm.) below the finished floor elevation. Place form work for the inside wall and attach ANCHOR-LOK sheet using H-Zip strips for vertical joints onto the forms. Install reinforcing and outside wall forms. Pour and vibrate concrete in the conventional manner. Alternatively, attach ANCHOR-LOK on gang forms before they are erected and weld approximately 1 ft. of the bottom of all vertical joints. Secure 1/2" x 1/2" (13 mm. x 13 mm.) plastic perimeter screed strips to the walls now or immediately prior to installing the floor. The

**PHYSICAL PROPERTIES**

PROPERTY	TEST METHOD	TYPICAL VALUE				
		HDPE	PP	PVC	PE HMW	PVDF
ASTM Specification		D1248	D4101	D1784	D1248	D3222
Density	D792	0.945	0.91	1.33	0.926-0.934	1.78
Water Absorption, %	D570	<0.01	0.02	0.05	<0.01	0.03
Tensile Strength @ Yield, psi.	D638	3,500	4,900	6,000	3,100	7,100
Modulus of Elasticity, psi.	D638	140K	210K	345K	100K	256K
Ultimate Elongation, %	D638	600	200	40	350	30
Notch Impact Strength, ft. lb./in. of notch	D256	3.75 - 6.00	4.2	1.0	30.0	2.3
Hardness, Shore-D		70	75	70	65	75
Heat Distortion, °F (°C) @ 66 psi. (455 kPa)	D648	154 (68)	210 (99)	165 (74)	180 (82)	295 (146)
Heat Distortion, °F (°C) @ 264 psi. (1,820 kPa)	D648	131 (55)	135 (57)	158 (70)	135 (57)	198 (92)
Linear Coefficient of Thermal Expansion, in./in./°F (cm./cm./°C)	D696	6.9 x 10 <sup>-5</sup> (12.4 x 10 <sup>-5</sup> )	5 x 10 <sup>-5</sup> (9 x 10 <sup>-5</sup> )	3.9 x 10 <sup>-5</sup> (7 x 10 <sup>-5</sup> )	11.1 x 10 <sup>-5</sup> (20 x 10 <sup>-5</sup> )	6.7 x 10 <sup>-5</sup> (12 x 10 <sup>-5</sup> )
Flammability	D635	slow	slow	self-extinguishing	slow	self-extinguishing
Approximate Wt., lb./sq. ft. 3/16" (5 mm.) thick 1/8" (3 mm.) thick		1.2 0.8	1.1 --	1.8 --	1.3 --	2.2* --
Service Temp. Range** °F (°C)		-40 to 176 (-40 to 80)	32 to 230 (0 to 110)	32 to 140 (0 to 60)	-436 to 176 (-266 to 80)	-436 to 275 (-266 to 135)

\* 5/32" (4 mm.) / \*\*1/8" (3 mm.) ANCHOR-LOK PE has a maximum service temperature limit of 104°F (40°C)

screed strips are located 2-1/2" to 6" (63 mm. to 150 mm.) above the concrete base to accommodate the mortar bed. When the setting bed is placed, ANCHOR-LOK floor sheets are set in a manner similar to a tilesetter setting tile. After the setting bed is dry (3-7 days), all open joints are welded.

**Existing Concrete** - Wall spacers and ties are mounted onto the existing concrete walls. Wall reinforcing steel is erected in accordance with the required concrete design. ANCHOR-LOK is mounted on a gang form and the forms positioned in place to ensure a space that will provide the required wall thickness. Complete as described for new concrete.  
Pre-fabricated Linings: Concrete forms can be factory or field installed on the walls and bottom of prefabricated structures. Pea gravel concrete for the base slab is placed. Immediately press the prefabricated structure into it. After the base pour has cured, complete the concrete pour to prevent structure from floating. When the concrete has sufficiently hardened, strip forms, visually inspect and spark test the installation. The structure may be placed in service when the concrete has cured.

**MAINTENANCE**

Field repairs or modifications are easily made using thermoplastic welding techniques.

**TECHNICAL SERVICES**

ATLAS maintains a staff of Technical Service Representatives who are available to assist you with the

use of ATLAS products. In the event of difficulties with the application of ATLAS materials, the installation should be stopped immediately and the ATLAS' Technical Service Department consulted for assistance. Plastic technicians weld and spark test the ANCHOR-LOK joints. ATLAS instructors are available to provide on site assistance in placing ANCHOR-LOK.

**WARRANTY**

ATLAS warrants that its products will be free from defects in workmanship and materials under normal use for a period of one (1) year from the date of shipment by ATLAS (provided the products are installed before the expiration of the shelf life). THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR THE PURPOSE FOR THIS PRODUCT WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. ATLAS' LIABILITY FOR ALLEGED BREACH OF THIS WARRANTY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT (BUT NOT INCLUDING REMOVAL OF THE DEFECTIVE PRODUCT OR INSTALLATION OF REPLACEMENT PRODUCTS). ATLAS SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES DURING THE WARRANTY PERIOD OR THEREAFTER. **ATLAS' WARRANTY IS VOIDED IF PAYMENT FOR PRODUCT IS NOT RECEIVED IN FULL.**

**Note:** Atlas makes it a practice to continuously update and enhance our CCM (Corrosion Resistant Construction Materials) products. This may result in slight discrepancies between our printed Data Sheets and the current version. For the most recent version of any Data Sheet, please visit our Web site at [www.atlasmin.com](http://www.atlasmin.com)