

ANCHOR-LOK™ INSTALLATION INSTRUCTIONS



Figure 1

DESCRIPTION

The ANCHOR-LOK Lining System is designed to protect concrete against corrosion and abrasion as well as protect process liquids from contamination. 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). ANCHOR-LOK sheets and components are installed by attaching them to the concrete forms for subsequent pouring of concrete. The ANCHOR-LOK floor is installed by laying sheets in a wet grout bed and weighted down during the cure. The unique anchoring studs on the back of the ANCHOR-LOK sheet become embedded in the concrete, thus locking the lining in place (Figure 1). ANCHOR-LOK may also be pre-fabricated in order to minimize or eliminate field welding. ANCHOR-LOK is equally appropriate for protecting new or existing concrete tanks, sumps, dikes, trenches, manholes and other structures.

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

The success of the system is predicated on the skills of the designer through to the thermoplastic technicians who weld and spark test finished joints to ensure an installation of integrity.

RELATED INFORMATION

The following ATLAS literature further describes ANCHOR-LOK as a protective lining system:

- ANCHOR-LOK Lining System (Bulletin P.04)
- "Specification for ANCHOR-LOK Lining System" (Data Sheet 4-5000PS)

ATLAS can provide shop drawings and other engineering details pertinent to a particular installation.

PREPARING TO INSTALL ANCHOR-LOK TOOLS, EQUIPMENT, MATERIALS

Tools for cutting, fitting and installing ANCHOR-LOK on concrete formwork are ordinary wood working tools. ANCHOR-LOK may be cut with hand or power saws. Recommended tools and equipment are:

Hand Saw: Crosscut saw with 8 or 10 teeth to the inch.

Saber Saw: Orbital blade, cutting on the upstroke only, with 6 or 7 teeth per inch for Polyethylene and Polypropylene ANCHOR-LOK. Either a saber saw cutting on the up and down strokes or upstroke only may be used for ANCHOR-LOK Polyvinyl Chloride. ANCHOR-LOK Polyvinyl Chloride requires blades with more than 10 teeth to the inch.

Circular Saw: Carbide tipped fine tooth paneling blades, such as a 40 tooth, 7-1/4" (18 cm) circular saw blade, are recommended for all types of ANCHOR-LOK.

Router: For chamfering sheet edges and other grinding to prepare ANCHOR-LOK for welding, utilizing carbide bits. A circular sander or grinder with a 36 grit abrasive can also be used.

Nails: Provide finishing nails long enough to penetrate 1/4" beyond the combined thicknesses of the ANCHOR-LOK and the forms. After the concrete has

set, and during form removal, all nails are pulled through the forms. **Note:** Nailing to be done only at locations as indicated under "Sheet and Mounting Strips".

Tie Wire: Approximately 16 gauge tie wire may be used to wrap around the ANCHOR-LOK sheet anchoring studs to tie the sheets together or to the forms.

General Tools: Straight edges, squares, levels, rules, rasps, wood chisels, and other wood working tools are to be used to install the ANCHOR-LOK.

Concrete:

The concrete design shall be established by the owner/specifier. Once established, the design cannot be changed without prior written consent of the party responsible for the design.

The ANCHOR-LOK Lining System has no effect on the mix design, reinforcing or form requirements.

Concrete Forms:

Form design for concrete structures to be lined with ANCHOR-LOK should utilize outside bracing as much as possible while being sufficiently rigid in order to minimize form ties that penetrate the forms and the ANCHOR-LOK. Form rigidity is also required to prevent form bulging or movement that could create ANCHOR-LOK misalignment. Form release agents are not recommended as it will leave a film on the ANCHOR-LOK which will be detrimental to the welding process.

Setting Bed:

ANCHOR-LOK floors are installed utilizing a sand/cement setting bed. The ANCHOR-LOK sheet is set in the same manner as a tile setter sets tile. The setting bed mix is seven bags (94 lb. each) of portland cement per cubic yard of masonry sand. The water / cement ratio should give you a 4" to 5" slump.

Mixer:

A conventional mason's mortar mixer can be used to mix the setting bed on site. Batch mixing from a ready mix plant is also acceptable, but should be delivered to site with the minimum amount of water added. the mix will be adjusted at site with additional water to ensure the proper consistency.

Wood Panels:

During the installation of ANCHOR-LOK floors, sheets of plywood or particle board 3/4" (75 mm) thick are used to distribute weight when the ballast is applied and to protect the ANCHOR-LOK, during tamping.

Weight / Ballast:

Partially filled 5-gallon pails or bags of sand (20 to 25 lb. ea.), concrete block, or equivalent are to be applied 18 lb. per square foot of panel. The weights or ballast are required to hold the ANCHOR-LOK sheets in the sand/cement bed until the bed attains a firm set.

Foundations:

The ANCHOR-LOK Lining System is sufficiently versatile so as to accommodate a variety of typical standard construction practices. On properly graded, tamped and filled excavation, pour a reinforced

concrete slab with a coarse finish as obtained by a broom or wood float. The top elevation of the base slab should be 2-1/2" to 6" (63 mm to 150 mm) below the final elevation of the finished ANCHOR-LOK floor. In areas where potential for hydraulic pressure is contemplated, top elevation of the base slab should be 3-1/2" to 6" (89 mm to 150 mm) below the finished ANCHOR-LOK floor to accommodate increased setting bed thickness and mechanical anchors required for tying the setting bed to the base slab. The mechanical anchors must be integral with the base slab.

Cleaning: Use sponges and/or rags with potable water to clean ANCHOR-LOK. DO NOT use solvents as they can leave a residue.

INSTALLATION - NEW CONSTRUCTION

The placing of ANCHOR-LOK sheets on the forms is critical to achieving leak-free joints. Sheets must be secured to insure that the spacing between the sheets, after pouring and stripping of the concrete forms, falls within the dimensions outlined in ATLAS' welding details (Figure 6, 8 and 9).

The cost of field welding joints is estimated for either a three rod welded joint or a one pass extruded joint. If the dimensional spacing of the joint between the sheets is greater than those indicated on the construction detail sheets, additional welding will be required.

It is also critical that the sheets be on the same plane to avoid misalignment which could create restrictions on the flow of materials in the tank or trench system. Misalignment will also require additional field welding costs over and above what is estimated for projects.

MOUNTING ANCHOR-LOK ON FORMS

When placing ANCHOR-LOK, ambient temperatures must be above freezing.

ACI 305R describes hot weather placement of concrete at temperatures of 75-100°F (24-38°C).

ACI 306R describes cold weather placement of concrete at temperatures below 50°F (10°C).

These practices are appropriate when pouring concrete in ANCHOR-LOK lined forms at temperatures of 32-90°F (0-32°C). Consult ATLAS' Technical Service Representative for assistance if temperatures are outside this range.

SHEET AND MOUNTING STRIPS

ANCHOR-LOK standard sheet sizes are 4'-11" x 9'-10" x 3/16" thick (1.5 m x 3 m x 5 mm). Polyethylene ANCHOR-LOK 1/8" (3 mm) thick is available in rolls measuring 4'-11" x 32'-9" (1.5 m x 10 m). Standard sheets can also be factory welded to provide larger sizes predicated on field capabilities to handle and place the sheets on the forms. Sheets are placed on forms utilizing H-Zip Strip for joining the sheets. H-Zip Strip has an H-profile with a slot width to accommodate the standard thickness of the ANCHOR-LOK sheets.

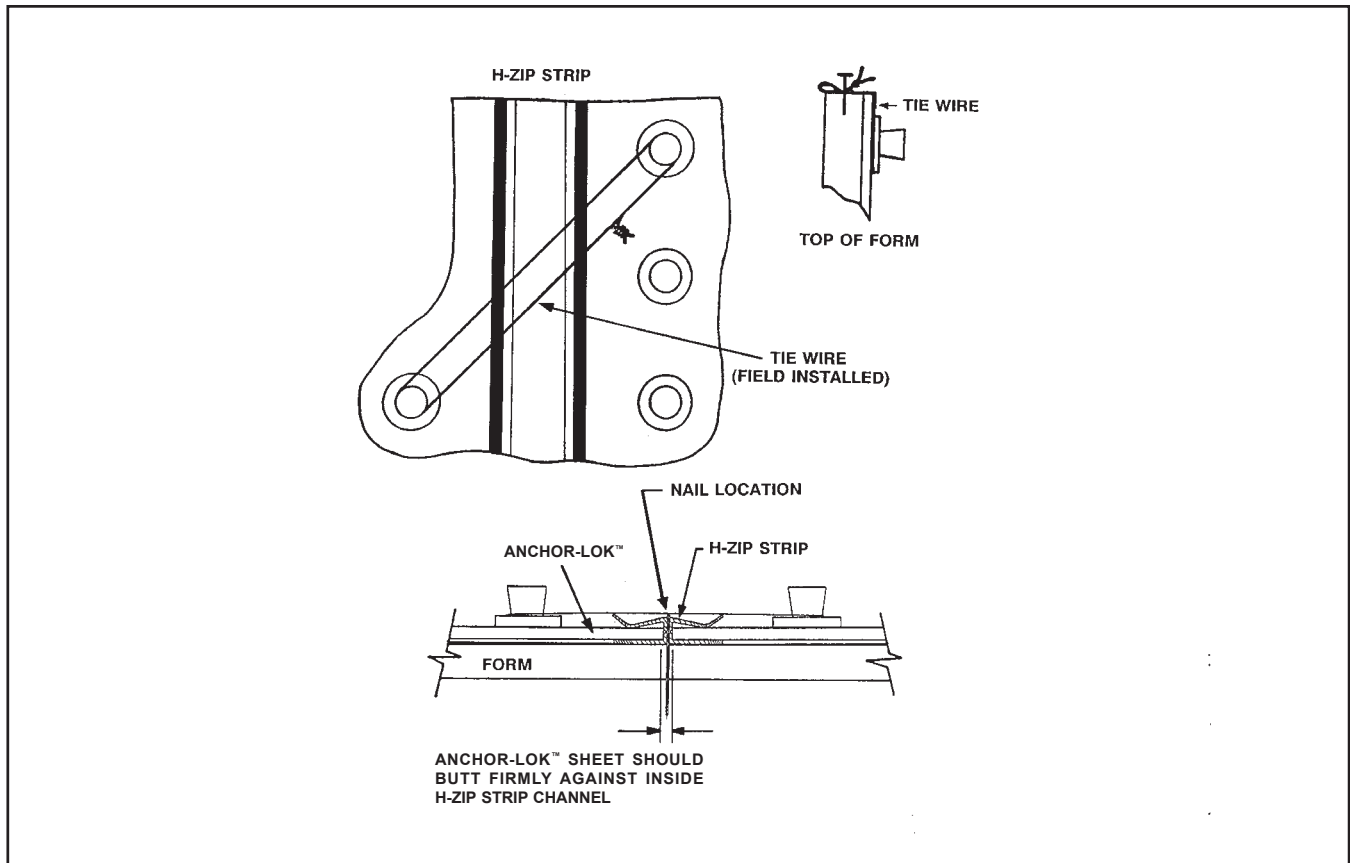


Figure 2

Factory applied lap strips are used for horizontal joints with the H-Zip Strips being used for vertical joints. H-Zip Strips also provide a conductive path to accommodate spark testing of all joints. If lap joints are used, a conductive foil must be applied to the back of the sheet joint to facilitate spark testing. Secure ANCHOR-LOK sheets to the forms using tie wire (Figure 2). At the top edge of each sheet, the wire is securely wrapped and twisted around every fifth to seventh anchor stud and then wrapped around a nail driven into the top of the form. If metal forms are used, holes in the stiffeners may be used to secure the tie wire.

When using H-Zip Strip, sheet should “bottom out” in the slot since the face of the H-Zip Strip will ultimately be totally removed for joint welding.

Use tie wire around anchor studs on the vertical edges of adjacent sheets to hold sheets together. Wire is wrapped around an anchor stud at the edge of the sheet, pulled tightly across the jointing strips in an alternating diagonal pattern and wrapped around an anchor stud at the edge of the adjacent sheet. (Figure 2) Repeat procedure at six (6) stud intervals or closer as job conditions dictate. Never wire concrete reinforcing steel to the anchor studs.

When necessary, to keep the sheet tight to the form, the H-Zip strip may be nailed to the form by first drilling a pilot hole through the center web (Figure 3).

Drive a finishing nail through each pilot hole. The area of ANCHOR-LOK sheet below the finished ANCHOR-LOK floor elevation can also be nailed to

the form. The nail must be long enough to extend through the form at least 1/4" (6 mm) and slightly bent outside the form. Each nail will ultimately be removed by pulling it through the ANCHOR-LOK, after the concrete has hardened and before removing the forms. NO NAILS ARE PERMITTED IN THE MAIN FIELD OF THE ANCHOR-LOK SHEET. When welding, the joint between the H-Zip Strip, all nail holes will be covered. After the interior wall forms have been erected, complete the placing of the reinforcing steel and the exterior wall forms. If form ties are required, drill holes through the forms and ANCHOR-LOK sheet to

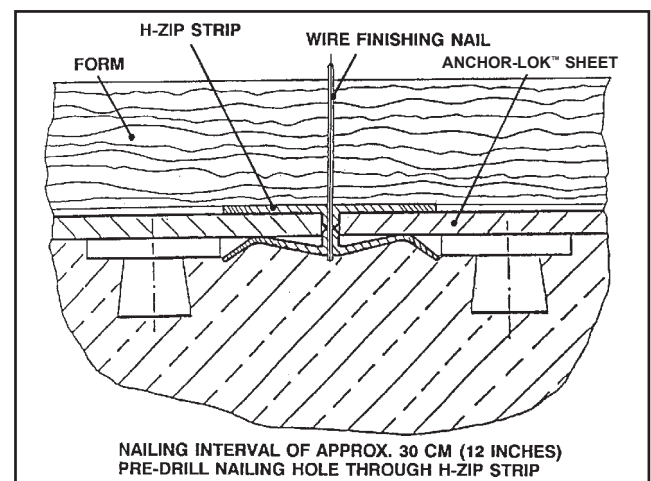


Figure 3

accommodate the wall ties. The holes in the ANCHOR-LOK will be covered after the forms are stripped using a plastic disc of the same material as the ANCHOR-LOK.

OUTLETS

Pipe, sleeves and drains that pass through the wall may be fitted to the ANCHOR-LOK sheets as they are mounted. Alternatively, the form may be blocked out to permit installation of such appurtenances after the concrete is poured. Pre-fabricated outlets can be supplied by ATLAS. All outlets should incorporate keeper rings or blocks on the exterior for anchoring into the concrete.

When placing pipe at the time sheet is hung on the forms, locate the hole for the pipe on the back of the ANCHOR-LOK Sheet. Scribe the hole size to fit the outside diameter of the pipe. Use a drill or jigsaw to cut a hole through the form and ANCHOR-LOK so that the pipe fits snugly. Press pipe through the hole so as to extend into the structure about 1/2" more than the specified dimension (Figure 4). Scrape all loose cuttings from the sheet and weld the pipe in place on the back of the ANCHOR-LOK sheet. Place conductive material for spark testing over the back of the joint. If this option is selected, care must be exercised to ensure that the pipe is not disturbed or damaged. This could occur when erecting the forms, placing reinforcement, or pouring and vibrating the concrete. When outlets are placed after the concrete is poured, no holes are cut in the sheet when mounting ANCHOR-LOK. Block out a space within the formwork using foam block. After the forms are stripped, cut a hole in the ANCHOR-LOK so the pipe fits snugly. Remove the foam block and insert the pipe through the wall. Place a copper wire in the bottom of the joint to be welded. Weld the pipe to the ANCHOR-LOK lining, and from the outside of the wall, grout the annular space around the pipe. Do not disturb the pipe during the grouting and curing process.

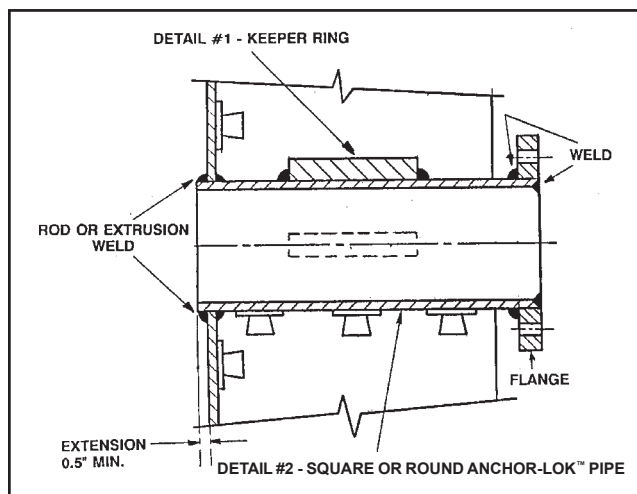


Figure 4

INSTALLATION - EXISTING CONSTRUCTION

The placing of ANCHOR-LOK sheets on the forms is critical to achieving leak-free joints. Sheets must be secured to insure that the spacing between the sheets falls within the dimensions outlined in ATLAS' welding details.

The cost of field welding seams is estimated for either a three rod welded joint or a one pass extruded joint. If the dimensional spacing of the joint between the sheets is greater than those indicated on ATLAS' welding details, additional welding will be required (Figure 6, 8 and 9).

It is also critical that the sheets be on the same plane to avoid misalignment which could create restrictions on the flow of materials in the tank or trench system. Misalignment will also require additional field welding costs over and above what is estimated for projects. Compliance to the following partial list of requirements is paramount to the success of a ANCHOR-LOK lining on existing concrete.

1. Structural integrity has not been compromised and is acceptable for anticipated loads.
2. Concrete is clean and free of any chemical contamination.
3. Area in which lining is to be installed is completely accessible for all materials required, i.e., concrete ready mix, sand and cement for bed, reinforcing steel, ANCHOR-LOK, tools and equipment.
4. When placing ANCHOR-LOK, ambient temperatures must be above freezing.
5. Concrete, anchoring system, reinforcing, forms and concrete mix must be designed by experienced engineers skilled in these disciplines. Rule of thumb is a 6" x 6" x 1/8" (150 mm x 150 mm x 3 mm) welded wire mesh anchored to the existing concrete to tie to the new concrete. To ensure a uniform distance between the old and new walls, the formwork may require the use of spacer bolts anchored into the existing wall. Approximate spacing is four bolts per 22 square feet (2 m²). After erecting the forms, drive an H-Zip Strip down from the top edge of the sheet to join the adjacent sheets.

PLACING CONCRETE NEW OR EXISTING CONSTRUCTION

Place concrete so as not to exceed the rate of pour for which the forms were designed. Vibrate concrete in accordance with good concrete construction practices.

Care must be taken not to disturb outlets or other appurtenances within the formwork. Concrete must rise around outlets and not be poured directly onto the outlets.

CURING CONCRETE

The ANCHOR-LOK Lining has no effect on the cure rate of the concrete. Cure the concrete in accordance

with recommended industry practice. Precast concrete production line items such as pipe and related components are generally steam cured in order to accelerate their removal from the forms. **DO NOT STEAM CURE ANCHOR-LOK lined concrete pipe, related components or structures.**

FORM REMOVAL

Remove forms when the concrete has cured sufficiently making sure not to disturb the concrete and ANCHOR-LOK. Care should be taken to ensure removal of all nails that have penetrated the ANCHOR-LOK.

CLEANING ANCHOR-LOK

After removing the concrete forms, scrape clean all joints to be welded in the ANCHOR-LOK Linings. Rags and sponges dampened with potable water may be used for certain cleaning operations. Water must be kept to a minimum. All joints must be clean and dry for welding.

FLOOR SCREED GUIDES

Establish finished elevation of floor and strike a line on the walls. Weld or mechanically fasten a plastic screed strip with minimum dimensions of 1/2" x 1/2" (13 mm x 13 mm) at 3/16" (5 mm) below the final floor elevation (Figure 5). When mechanically fastening, drill pilot holes in the plastic screed strip before attempting to nail or screw strip to the wall. Alternatively, a perimeter screed guide may be used by embedding a strip of ANCHOR-LOK approximately 3/4" (19 mm) wide, containing a single row of anchor studs into a sand / cement setting bed to accommodate the ANCHOR-LOK strip. The setting bed with screed strip must fit tight to the wall.

INSTALLING ANCHOR-LOK FLOOR

ANCHOR-LOK floors can be installed in pits, tanks, containment dikes and buildings. Regardless of the location, the method of installation is the same. The method of installation utilizes a sand/cement setting bed into which the ANCHOR-LOK is placed.

SETTING BED

The design of the sand/cement setting bed consists of masonry sand, portland cement and water. The bed must be of a 2-1/2" (63 mm) minimum thickness. A typical mix is:

- 658 lb (298 kg) - Type I Portland Cement (7 x 94 lb. bags)
- 1 cu yd (0.8 m³) - Masonry sand
- Sufficient water to obtain a 4" to 5" slump

On site mixing is three (3) parts sand, one (1) part portland cement, by volume.

The amount of water in the mix may vary to obtain the required slump.

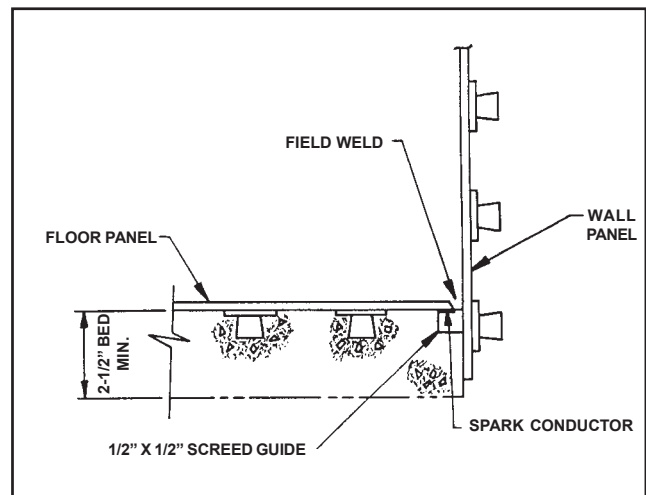


Figure 5

ANCHOR-LOK SHEETS

Sheets being used for floors can be supplied with a lap strip on one edge to accommodate cross joints (Figure 6).

PLACING SCREEDS AND SETTING BED

Thoroughly clean and moisten the reinforced concrete slab and apply a neat portland cement slurry or a suitable concrete tie cement where screed strips will be required. Form the required screeds, using the sand/cement setting bed mix. Press into the screed mix a strip of ANCHOR-LOK containing a single row of anchor studs. (Figure 7). The shape of the screed strip bed is critical as to not interfere with knobs on the sheet (see Figure 7 for dimensions). Allow to cure before placing floor sheet. Alternately, a solid strip of plastic (same as ANCHOR-LOK being used) can be utilized as a screed. A strip of plastic 1" wide x depth of setting bed is to be used, anchored to the base slab using metal angle or straps and concrete anchors.

The balance of the sand/cement setting bed is then placed in the same manner as the screeds, and compacted to elevation of screeds. The completed setting bed is finished with a trowel. The ANCHOR-LOK sheets are then placed onto the bed. Cover the ANCHOR-LOK sheet with 3/4" exterior grade particle (wafer) board or plywood sized to leave approximately 1/8" of the perimeter edge of the ANCHOR-LOK sheet exposed. This will allow laying of adjacent ANCHOR-LOK sheet without interference and allow a visual inspection of the imbedment of adjacent sheet. The ANCHOR-LOK sheets are tamped gently into place to ensure complete encapsulation of the anchor studs in the setting bed. Place sand filled pails or equivalent on a sheet, 18 lb. per square feet, retamp to ensure that the entire sheet is uniformly imbedded. Proceed to place additional bedding mix and apply sheets to complete the floor. Avoid excessive tamping when placing sheet. Allow the floor to cure undisturbed. Cure time should be a minimum of 3 days before removing weights and protective wooden barriers.

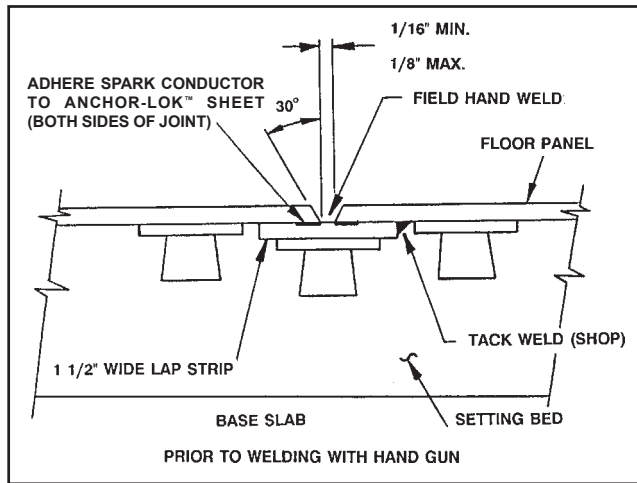


Figure 6

WELDING

Proceed to weld the joints when the concrete has sufficiently cured, usually within 3 to 7 days or when moisture content is sufficiently low to permit quality welding.

All sheet edges must be chamfered 30° preparatory to welding. A conductive material must be placed behind all sheet edges for spark testing finished weld joints except where zip-strip has been utilized.

PLACING PRE-FABRICATED STRUCTURES

Concrete formwork should be placed inside of the pre-fabricated ANCHOR-LOK structures prior to installation. A reinforced concrete pad is poured in accordance with the specified concrete design. The elevation of the fresh concrete is held slightly higher than the final elevation of the bottom of the structure. The ANCHOR-LOK structure is then placed on the fresh concrete and lightly tamped into place. The pre-fabricated structures are then braced to secure them. After the concrete base slab has set, the remainder of the concrete is placed, being careful not to exceed the rate of pour for which the forms are designed. Pouring concrete faster than the design rate or vibrating improperly may cause the forms to bulge and distort the ANCHOR-LOK structure. Strip the forms and visually inspect the ANCHOR-LOK Lining. Proceed to weld connecting outlets, trench ends and other appurtenances. At completion of welding, a final spark test is performed on all welds. A conductive tape, coating or copper wire has been applied at the factory to facilitate spark testing of the structure.

WELDING OF ANCHOR-LOK

All welding of ANCHOR-LOK must be performed by an ATLAS Plastic Technician or a Factory Certified ANCHOR-LOK applicator. The following temperature ranges must be maintained when placing ANCHOR-LOK on forms and during the final welding of all joints and appurtenances.

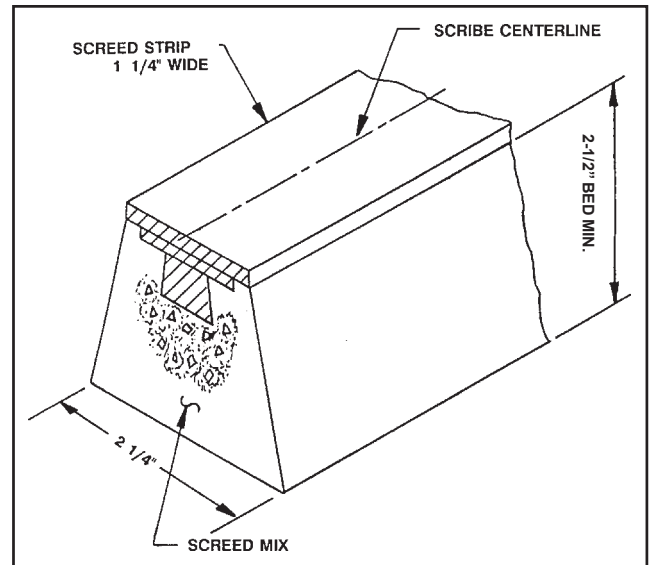


Figure 7

MINIMUM TEMPERATURES (When Welding)

ANCHOR-LOK	Air	Sheet
All Grades	55°F (13°C)	55-95°F (13-35°C)

During the welding process, the lining must be protected from drafts and direct sunlight impingement. Environmental controls are the responsibility of the installing contractor or owner.

SPARK TESTING

All spark testing of ANCHOR-LOK welded joints must be performed by an ATLAS Plastic Technician or a Factory Certified ANCHOR-LOK applicator.

CAUTION: When inspecting ANCHOR-LOK lined vessels, trenches or sumps, it is necessary to thoroughly clean and dry all joints to be spark tested of any dampness or conductive contaminants which could give false readings. Spark Testing must not be done prior to insuring safe conditions.

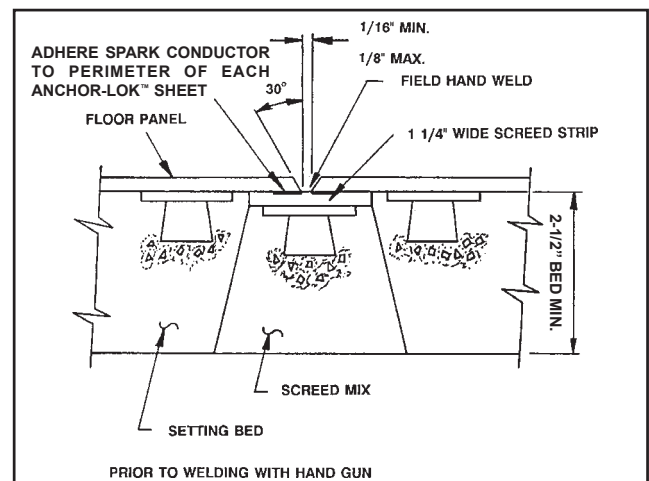


Figure 8

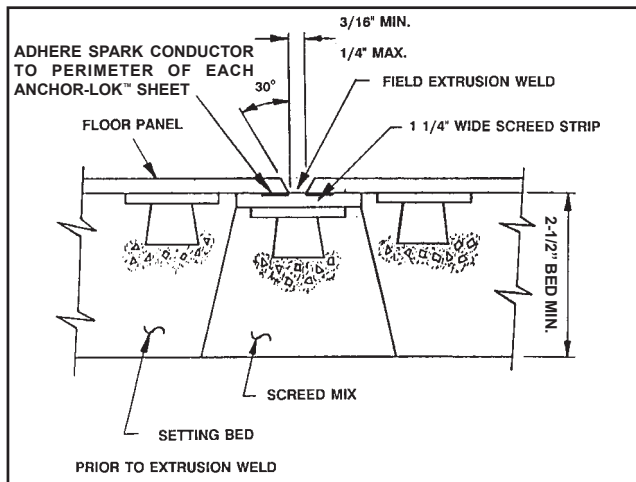


Figure 9

STORAGE

ANCHOR-LOK sheet, accessories and pre-fabricated structures must be stored at temperatures above freezing, under cover, and out of direct sunlight. Protect prefabrications from being filled with water.

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 ATLAS' Technical Service Department consulted for assistance.

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.**