FiberTite®
Seaman Corporation

Notebook

A Foreman's Reference to Installing Intelligent Roofing Solutions

Foreman's Manual

"The only restriction is a lack of imagination."

This Notebook is dedicated to those who "make it so."

FiberTite
Seaman Corporation
INTELLIGENT
ROOFING SOLUTIONS

Notebook

NOTE: This notebook has been prepared as a reference guide only. Always refer to the approved project and/or FiberTite specifications for information regarding approved design, installation, systems and components.

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Introduction

Notebook

The fact that you're reading this means you are in the process, are about to start or are contemplating the installation of a FiberTite Roofing System by Seaman Corporation. It also means that you are among the best roofing professionals in the country. We understand that a roofing system is only as good as the craftsmen who install it. Consequently, we seek to align ourselves with only the most experienced roofing contractors to establish partnerships founded on trust and rooted in quality. On behalf of Seaman Corporation, welcome to Team FiberTite.

Even if this is your first FiberTite Roofing System installation you have probably met with or started a relationship with one or more of our Technical Service Representatives. Apart from their quality assurance role, their objective is to be a resource and provide insight, guidance and instructions to assist you in the successful installation of a high quality, high performance FiberTite Roofing System. This Notebook is meant to complement their efforts.

Although there are numerous parameters that could govern any particular installation, membrane roofing can be boiled down to three basics. **Keep it in place. Make it watertight. And if possible, make it look good.** This Notebook is intended to address the basics. The particulars of the project or its design are governed by and can be found in the project specifications. Do not construe this Notebook as a replacement for those specifications but rather a supplement toward fulfilling their requirements.

Every project is unique in its own right. Its success depends upon a true team effort that combines our experience through 65 years of manufacturing high performance membranes and FiberTite's 35 years of unparalleled performance with the experience, innovation and insight of the best Architects, Consultants and Contractors in the roofing profession.

We appreciate hearing from you. If you have an idea or discovered a particular technique that can improve the installation process, give us a call so we can share it with the other members of Team FiberTite.

As a member of Team FiberTite, you also have an open invitation to contact us regarding any questions or assistance you may require in the design and installation of a FiberTite Roofing System.

Yours truly,
FiberTite Technical Department

FiberTite Roofing Systems
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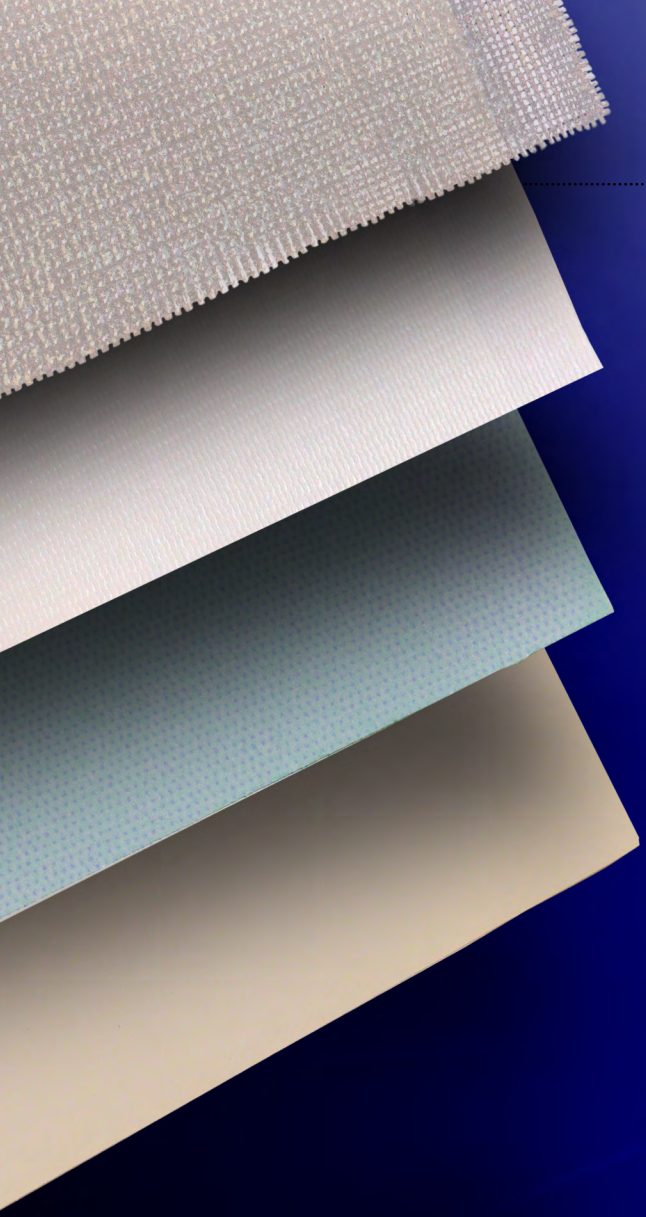

General

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General

1.1 Pre-Job Checklist

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1.1.1 Safety

Before any consideration is given to stepping on a ladder or the roof for that matter, a safety meeting should be convened to discuss the potential hazards associated with the project. It is more likely than not that your company has an extensive written safety policy. But it is up to the workers to put it into daily practice and establish a safety culture that establishes an atmosphere where safety is the primary responsibility of all workers, from the helper to the journeyman and mechanic to the company CEO. The company safety policy is the formal statement by the company that sets forth the attitudes, values and beliefs about safety. However, this policy only provides a preliminary foundation for the development of a culture of safety. It is your responsibility to make safety a habit.

"Seaman Corporation's Safety Way Mission is to provide a sustainable, associate led program where all associates are engaged and empowered to ensure everyone leaves our facilities in the same or better condition than they arrived."

This section of our Notebook is not intended to supplement the company's safety policy. Rather, it is meant to emphasize the importance of safety to the company's most valuable asset: you the worker. Since safety is all our responsibilities, being aware of your surroundings at all times and reporting any unsafe condition to your supervisor is your duty. You should also have a copy of the company safety policy on site and available to all the workers. As previously stated, the goal is to create a culture of safety and quality. The two are not inseparable.

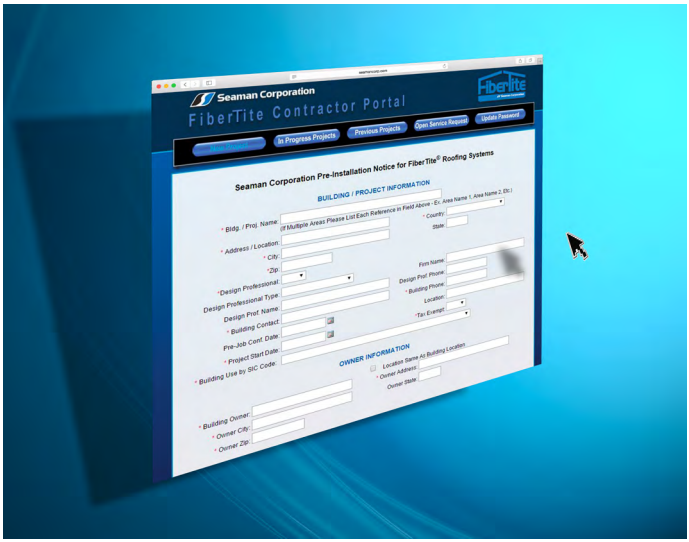
Some of the general items or topics for daily review can include:

- Ladder Safety
- Personal Protective Equipment (this includes proper shoes, hard hats, safety glasses and harnesses when appropriate)
- Fall Protection (never walk backward on a roof; you don't have eyes in the back of your head)
- Emergency procedures
- Chemicals, solvents and adhesives to be used on the project
- First Aid
- Electrical safety (power lines, extension cords, power tools including the hand held welders and automatic welders)
- How to report a hazard

1.1.2 FiberTite Pre-Installation Notice (PIN)

Designing a roof is a dynamic process and can involve a lot of activity on the part of any number of the members involved. The FiberTite Pre-Installation Notice and Warranty Request Form is a tool for the roofing contractor to communicate the summary of that activity to the FiberTite Technical Service Department. Since the FiberTite Technical Service Department bears responsibility for the acceptance of and approval for all warranty projects, their approval of the FiberTite Pre-Installation Notice is prerequisite to the shipment of materials. The Pre-Installation Notice is to be submitted online at www.fibertite.com prior to ordering materials. It will serve as a confirmation of the project particulars, including the specific system(s) to be installed, membrane type(s), adhesives, fasteners, insulation, assembly, additional accessories, installation design parameters and warranty obligation.

Early submission of the Pre-Installation Notice will benefit the contractor by having a technical review prior to material shipment to ensure systems, component and compatibility prior to actually beginning the installation. We want to help you **Do It Right the First Time.**



1.2 Details & Specifications

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1.2.1 Details & Specifications

Familiarize yourself with the project specifications and details, and compare them to Seaman Corporation Guide Specifications and Details for FiberTite Roofing Systems. Any conflicts within the specifications must be brought to the attention of the owner/owner representative and FiberTite Technical Services for resolution prior to proceeding.

In any case where a modification to or deviation from an approved specification, installation method or technique becomes necessary due to unforeseen job conditions, contact the FiberTite Technical Service Department at 800/927-8578 for approval prior to initiating any project modifications or changes. Do not assume that a requested modification or deviation acceptance on one particular project is acceptable for all subsequent projects.

1.3 Tools & Equipment

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1.3.1 Hand and Power Tools

The efficient installation of any roofing system is highly dependent upon having the right tools at hand or on site when needed. Therefore, to prevent delay or interruption during installation, it is important to have all the necessary tools and equipment available on the job site. Depending upon existing conditions, system selection and specific project requirements, certain specialized equipment may be required in addition to the following basic membrane roofing installation tools and equipment.

1.3.1 Hand and Power Tools (cont.)

Material handling equipment:

- This can include customized roll carriers; hand dollies, four wheeled carts and wheelbarrows.

Basic hand tools:

- Measuring tapes, scissors, utility knives with straight and hook blades, chalk lines, hammers, screwdrivers, trowels, rollers for applying adhesives, caulking gun, metal shears, hack saw and lumber crayons for marking the membrane.

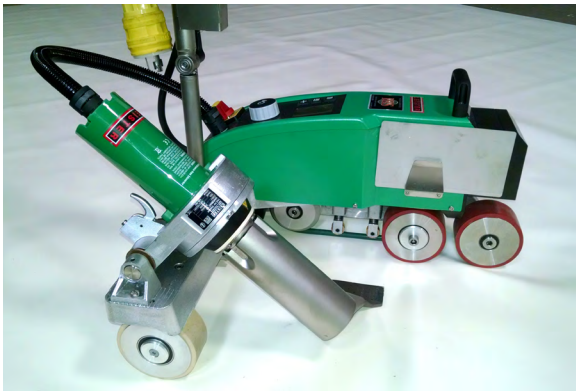
Miscellaneous:

- Nail aprons or pouches.
- #12 wire extension cords.
- Variable speed drills and/or hammer drills.
- Torque adjusting screw guns and/or adapters for pre-assembled fasteners with bits to match fasteners. (Some projects may utilize automated "stand up" fastening equipment.)

- Power saws; circular and/or reciprocating brooms, powered "leaf" blowers.
- Wet vacuum.
- Wire brushes for welder tip cleaning.
- Rubber squeegees; these are especially helpful for removing the morning dew to accelerate drying around flashing areas.
- Clean WHITE COTTON rags.
- Approved cleaners (Acetone or MEK) only.

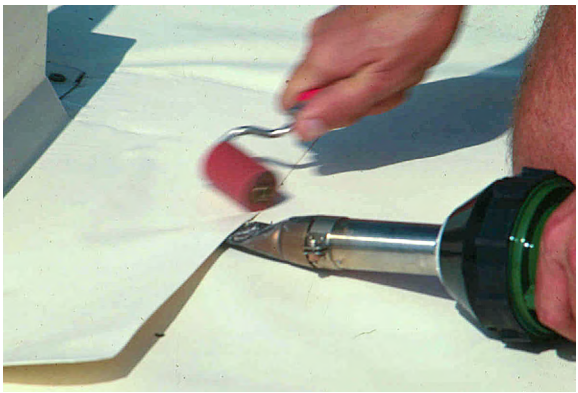
1.3.2 Hot Air Welding Equipment

There are a number of manufacturers producing a variety of models and types of automatic and handheld thermal welding equipment. Most of them will produce a quality weld provided they are maintained properly. Since making the system watertight is one of our basics, your familiarity and skill with the use of your particular equipment is imperative. If you are new to Team FiberTite, contact your regional technical service representative regarding your particular model to ensure its' suitability and/or possible modifications that can improve its effectiveness.



Automatic Thermal Welder

- Power supply: 220 volts, 30 amps, 5,000 watts
- #10 power cord (up to 200 ft.) with 3 prong twist lock plugs
- Extra plugs, male and female
- Wrenches for maintenance and minor adjustments to the equipment
- Wire brushes for cleaning tips
- Lumber crayons for seam marking



Hand Held Thermal Welder

- 2" silicone roller, assorted tips and #12 power cord
- Power supply: 115 volts, 15 amp, 1,500 watts

1.3.3 Generator

A consistent power supply without fluctuation is an absolute necessity to ensure continuity of the welds. Generators should generate a minimum 7,500 watts, 30-amps, 20-volt single phase. This will provide adequate power to run one automatic welder and one hand welder only. The building or project power supply may be adequate for running the handheld welders and other handheld power tools but a generator is invaluable for ensuring consistent power to the automatic welder.

1.4.1 Material Handling, Storage, & Delivery

The most difficult part of any project is getting started. Planning and consideration given to the receipt, staging and storage of all the system's components can go a long way toward promoting a successful project completion.

1.4.1 Material Handling, Storage, & Delivery (cont.)

All materials are to be delivered to the job site and received undamaged, in its original, unopened packaging or containers with legible product labels. Freight claims or credit for damaged material must be acknowledged upon receipt at time of delivery and filed with Seaman Corporation within 24 hrs. Having a camera available during delivery will greatly assist in documenting damaged materials in the unlikely event there are problems with the delivery.

Provisions for the protection of all materials from the weather with tarpaulins, including all insulation and rolls of FiberTite membrane, are required.

Once materials are on the roof, four wheeled carts and dollies are a nice substitute to man-handling the material to its' strategic location. Be aware of and do not exceed structural loads during material transport and storage. Protect existing roofing as well as newly completed roofing systems during material transport.

The following page excerpts additional information and guidelines regarding the delivery, receipt and storage of materials. This, and more detailed information can be found in the Seaman Corporation Guideline Specifications section in this Notebook.

Follow OSHA and/or industry guidelines for the safe lifting, hoisting, loading and transport of heavy or bulky materials.

1.4.1 Material Handling, Storage, & Delivery (cont.)

- Do not stockpile materials in a manner that could jeopardize the structure's live load capacity.
- Store and transport custom rolls of FiberTite paneled rolls to avoid bending the inner cardboard tube.
- All FiberTite membrane and insulation shall be stored elevated above the roof surface on dunnage and covered with breathable tarpaulins. The plastic packaging on the membrane and insulation is not acceptable for outdoor storage.
- Make sure you have a sufficient quantity of materials and accessories to allow for the continuity of work.
- Select and operate material handling equipment to avoid damage to newly installed roofing, existing or adjacent construction.
- Do not accept delivery of damaged materials. Remove damaged materials from the construction site.
- Protect materials from extreme cold or heat. This includes but is not limited to cleaning solvents, adhesive, and sealant.

1.5.1 Substrate Preparation

Seaman Corporation Guideline Specifications provide detailed guidance for the inspection and preparation of typical roofing substrates, including steel, concrete, and wood decking. In new construction projects, the responsibility to provide a suitable substrate lies with the general contractor. Re-roofing, on the other hand, may transfer this responsibility "to provide" to the roofing contractor. Regardless, whatever the condition, once it's been covered, the roofing contractor assumes responsibility for that condition.

1.5.1 Substrate Preparation (cont.)

The following are excerpts from the "general" substrate preparation sections in the Seaman Corporation Guide Specifications:

- The authorized roofing contractor shall be responsible for providing a suitable substrate surface for the proper installation of a FiberTite Roofing System, roof insulation and specified components.
- Application of Seaman/FiberTite materials constitutes an agreement that the authorized roofing contractor has inspected and found the substrate suitable for the installation of the FiberTite Roofing System.
- The authorized roofing contractor shall be responsible for coordinating the installation to ensure that the system remains watertight at the end of each working day.
- The roofing contractor shall be responsible for verifying that the deck condition and/or existing roof construction is suitable for the specified installation of the FiberTite Roofing System.
- Seaman requires fastener withdrawal values (pull out tests) on all mechanically fastened re-roofing projects to verify the suitability of decking for mechanically fastened insulation and/or membrane systems. Examine surfaces for inadequate anchorage, low areas that will not drain properly, foreign material, ice, wet insulation, unevenness or any other defect which would prevent the proper execution and quality application of the FiberTite Roofing System as specified.
- Prepared substrate shall be smooth, dry, and free of debris and/or any other irregularities which would interfere with the proper installation of the FiberTite Roofing System.
- Do not proceed with any part of the application until all defects and preparation work have been corrected and completed.

Products

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Products

2.1 Acronyms & Item Numbers

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2.1.1 Acronyms & Item Numbers

FTR: 8530 (nom. 36 mil) FiberTite
FTR-XT: 8142 (nom. 50 mil) FiberTite
FTR-SM: 8540 (nom. 45 mil) FiberTite
FTR-XTREME: 3357 (min. 60 mil) FiberTite

(Fleece Back versions (FB) with 4-oz yd² polyester felt heat bonded to the backside of the above membranes are also available)

ITEM NUMBERS: Seaman Corporation item numbers are derivatives of the polyester base fabric style and the target weight of the finished product. The first two numbers always represent the polyester base fabric style and the second two are the weight target. For example, our product 8530... utilizes our style 85 knitted polyester fabric and has a finished target weight after coating of 30 ounces per square yard. An 8540 would have a finished target weight of 40 ounces on our style 85 knitted polyester fabric. 8142: Style 81 coated to 42 ounces.

FiberTite (KEE) Membranes

Type	Width	Length	Sq. Feet /Roll	# Rolls /Pallet	Weight /Roll
FTR Nom. 36 mil	74″	100′	617	25	128 lbs
	37″	100′	309	50	64 lbs
with fleece backing:	72″	80′	480	16	120 lbs
FTR Nom. 36mil	100″	100′	834	20	174 lbs
	50″	100′	417	25	87 lbs
FTR-SM Nom. 45 to mil	74″	100′	617	20	171 lbs
	37″	100′	309	40	86 lbs
with fleece backing:	72″	80′	480	16	150 lbs
FTR-SM Nom. 45 mil	100″	100′	834	16	232 lbs
	50″	100′	417	20	116 lbs
FTR-SM Nom. 60 mil	74″	80′	494	10	177 lbs
	37″	80′	247	10	88 lbs
with fleece backing:	72″	80′	480	10	183 lbs
FTR-XT Nom. 50 mil	74″	100′	617	20	180 lbs
	37″	100′	309	40	90 lbs
with fleece backing:	72″	80′	480	16	160 lbs
FTR-SM Nom. 50 mil	100″	100′	834	16	243 lbs
	50″	100′	417	20	122 lbs
FTR-SM Nom. 60 mil	74″	75′	617	16	177 lbs
	37″	75′	463	16	88 lbs
with fleece backing:	72″	80′	232	10	183 lbs
FTR-XTreme Nom. 60 mil	74″	100′	617	10	222 lbs
with fleece backing:	72″	80′	480	10	183 lbs
FiberTite Brite Nom. 45 mil	75″	100′	625	10	182 lbs

2.2.1 100″ Roll Goods

100″ x 100′ = 833 ft² per roll

Rolls are installed with a nominal 5″overlap. Each 100″ x 100′ standard roll requires 108 lf of field welding and 45 ft² of field overlap during installation. This yields a net installed surface area of 788 ft² per roll. (833 ft² - (108′ x 5″) = 788)

A 5″overlap line, a fastener placement line with 6″o.c. markings and manufacturing data is printed along one side of the roll.

The total fasteners required for each roll in a mechanically fastened FiberTite Roofing System are:

Installed		equals
6″ o.c.	=	216 fasteners ea.
12″ o.c.	=	108 fasteners ea.
18″ o.c.	=	72 fasteners ea.

2.2.2 74″ Roll Goods

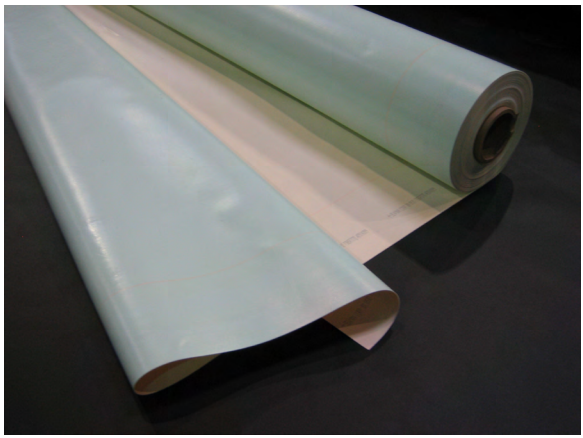
74″ x 100′ = 617 ft² per roll

Rolls are installed with a nominal 5″overlap. Each 74″ x 100′ standard roll requires 106 lf of field welding and 44 ft² of field overlap during installation. This yields a net installed surface area of 573 ft² per roll. (617 ft² - 44 ft² = 573 ft²)

A 5″overlap line and a fastener placement line with 6″o.c. markings and manufacturing data is printed along one side of the roll.

The total fasteners required for each roll in a mechanically fastened FiberTite Roofing System are:

Installed		equals
6″ o.c.	=	200 fasteners ea.
12″ o.c.	=	100 fasteners ea.
18″ o.c.	=	67 fasteners ea.



2.3 Custom Rolls

2.3.1 Understanding "custom" rolls

FiberTite pre-fabricated panel rolls are customized "roll goods." The fabrication process assembles individual segments or "panels" of FiberTite membrane to create a larger roll. The segments are welded together using RF Technology to create 1.5" factory welds. Variable overlaps are used to configure tabs that can be spaced intermittently across either the bottom or the top of the finished roll. Minimum 1.5" overlaps yield large blanket rolls without tabs.

Tabs are distinguished as either open or closed. Generally, tabs across the bottom of the rolls with one parallel weld are open. Those across the top that are finished with an additional parallel field weld are closed.

Refer to the Construction Details section of this Notebook for custom roll assembly configurations.

All custom rolls are wound onto cardboard cores or tubes to facilitate material handling.

Seaman Corporation offers customized rolls for mechanically fastened, adhered, and ballasted FiberTite Roofing Systems.

2.3.2 Custom Rolls with Tabs from 74 in. Wide Membrane

A standard finished custom roll is 20' wide x 75.17' in length for a gross yield of 1,503 sq. ft. The roll is a composite of 13 individual material segments measuring 74" wide and 20' in length. (1,603 ft^2. of material required to fabricate the custom roll). The segments are overlapped 5" and assembled using 12 parallel factory welds totaling 240 linear feet. The total surface area of the overlaps equals 100 sq. ft. (1,603 ft^2. - 100 ft^2. = 1,503 ft^2. of net surface area for the custom roll.)

The actual fastening tabs are 3.5" wide. The tabs are notched 5" at both ends to facilitate overlap with subsequent rolls. The net length of each tab is 230" and is configured at 69" intervals. A fastener placement line with 6"o.c. markings and manufacturing data is printed along the tabs. Tabs are typically assembled in such a manner that the first four are "reversed" in the roll. This facilitates the setting of a tail approximately 28' long to square the roll.

2.3.2 Custom Rolls with Tabs from 74 in. Wide Membrane (cont.)

The total fasteners required for each 20′ long tab in a mechanically fastened FiberTite Roofing System using custom rolls fabricated from 74″ wide material are:

Installed	equals
6″ o.c.	= 38 fasteners ea.
12″ o.c.	= 19 fasteners ea.
18″ o.c.	= 13 fasteners ea.

Installation of the roll will require the attachment of 12 tabs and along one of the (tails) end segment of the roll. Fasteners are not required along the roll side laps. The total fasteners required to install the standard 20′ x 75.17′ roll are:

Installed	equals
6″ o.c.	= 494 fasteners ea.
12″ o.c.	= 247 fasteners ea.
18″ o.c.	= 169 fasteners ea.

Subsequent rolls are installed with a nominal 5″ overlap. Each 20′ x 75.17′ custom roll requires 95 lf. of field welding and 39.6 ft^2 of field overlap during installation. This yields a net installed surface area of 1,463 ft^2 (1,503 ft^2. - 39.6 ft^2 = 1,463 ft^2)

2.3.3 Comparison

The following is a comparison between the installation of ten custom 20′ x 75.17′ custom rolls and the efforts to duplicate that coverage with standard 74″ roll goods.

Custom Rolls:

No. Rolls	Net Roof Coverage	Total Field Welding	Total Field Overlap	Total Mat'l to Purchase	Total Fasteners at 12″ o.c.
10	14,630 ft^2	950 lf.	400 ft^2	15,030 ft^2	2,470 ea.

Standard Rolls:

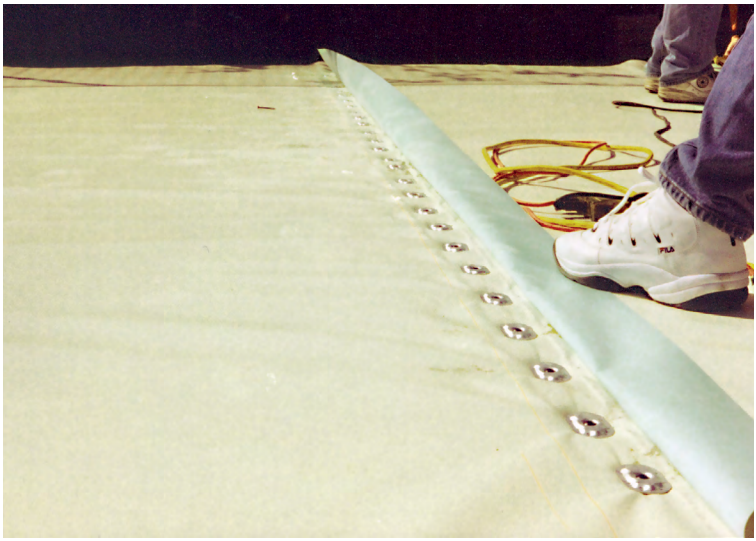
No. Rolls	Net Roof Coverage	Total Field Welding	Total Field Overlap	Total Mat'l to Purchase	Total Fasteners at 12″ o.c.
25.5	14,630 ft^2	2,708 lf.	1,128 ft^2	15,754 ft^2	2,555 ea.

Consequently, a roofing contractor will purchase 5% more material, and will address over 2 and a half times more linear feet of field welds to equal the benefits of ten stock custom rolls.

2.3.4 Custom "Top-Sider" Rolls

Top-Sider Rolls are customized with 4.5" tabs on the top of the roll.
The rolls are engineered for:

1. Congested areas where conventional tabs may be cumbersome.
2. Mechanically fastened concrete applications for reduced and improved drilling.
3. Re-roofing where tear off can be optimized with a speedy dry in.
4. Severe wind environments where "closed" lap assemblies provide enhanced wind resistance.



A Standard Top-Sider Roll for mechanically fastened FiberTite Roofing Systems is 20' wide x 86.7' in length for a gross yield of 1,734 ft².

The roll is a composite of 11 individual material segments measuring 100" wide and 20' in length. (1,833 ft² of material) When assembled in the factory, the segments are overlapped 6" for a total overlap area of 100 ft².

The total fasteners required beneath each "top-side" tab in a mechanically fastened Top-Sider FiberTite Roofing System are:

Installed	equals
6" o.c.	= 38 fasteners ea.
12" o.c.	= 19 fasteners ea.

Installation of the roll will require attachment beneath 10 tabs and a field stripped tail. Fasteners are not required along the roll side laps. The total fasteners required to install the custom 20' x 86.7' Top-Sider Roll are:

Installed	equals
6" o.c.	= 418 fasteners ea.
12" o.c.	= 209 fasteners ea.

2.3 Custom Rolls

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2.3.5 Custom "No-Tab" Rolls

No-Tab Rolls are customized and engineered for ballast and adhered applications. They may also be employed in a modified Top-Sider design. Refer to FTR-DLS series details.

Standard No-Tab Custom Rolls for ballast, adhered and modified Top-Sider FiberTite Roofing Systems are 20′ wide x 98.6′ in length for a gross yield of 1,972 ft^2.

The roll is a composite of 12 individual material segments measuring 100″ wide and 20′ in length. (2,000 ft^2 of material) The segments are overlapped 1.5″ and assembled using 11 parallel welds totaling 220 linear feet. The total surface area of the 1.5″ overlaps equals 27.5 ft^2 Adjacent rolls are overlapped a nominal 3″ that yields a net coverage per roll of (2,000 ft^2 - 30 ft^2 = 1,970 ft^2 of net surface area.)

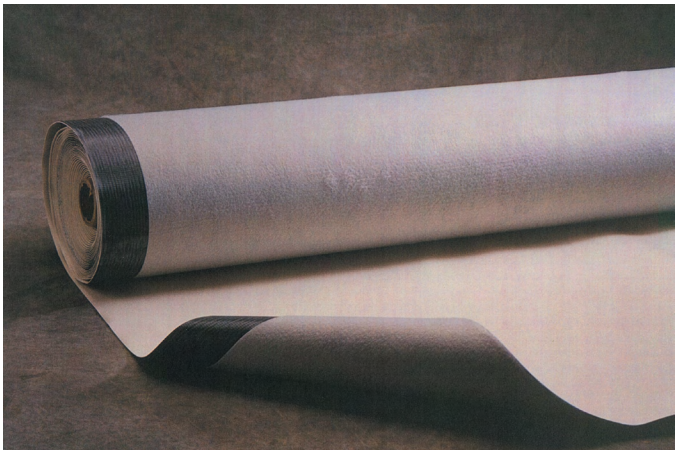
2.4 Fleece Back Membranes

Fiberlite Seaman Corporation Notebook

2.4.1 Fleece Back Membranes

FiberTite-FB membranes are manufactured in conventional rolls, 72″ wide and 80′ long. A four ounce non-woven polyester fabric is heat bonded to the backside of the membrane, allowing for a 3.5″ selvage along one side of the roll.

Each 480 square foot roll has 25 ft^2 of selvage for a net coverage of 455 ft^2 each. Each roll will need 72″ of 6″ stripping to seal the tails and require 92 lf of field welding.



2.5 Mechanical Fasteners

2.5.1 Mechanical Fasteners

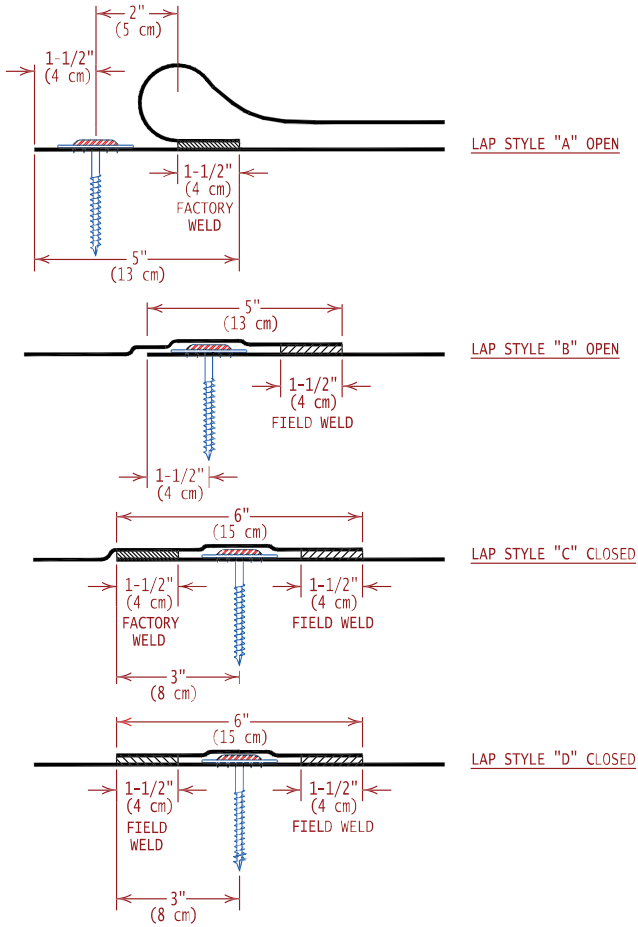
Approved fasteners and stress plates are designed to hold the membrane down in a relaxed, comfortable position. They are not designed to function as tensioning devices.

1. For roof membrane fastening, use magnum plus plates.

2. All stress plates need to set completely on the membrane allowing a minimum of 1/2" in from the edge of the underlying membrane.

3. Also allow at least two inches from the edge of the stress plate to the edge of the overlapping membrane to allow sufficient room to apply the automatic welded field seam.

2.5.1 Mechanical Fasteners (cont.)



Fiberlite Seaman Corporation INTELLIGENT ROOFING SOLUTIONS

GENERAL REFERENCE: "FTR GS 02/13"	FTR MAGNUM PLATES & FASTENERS LAP STYLE AND POSITION		
APPLICABLE SYSTEMS: "FTR MA 02/13"	REVISES DETAIL	ISSUE DATE	DRAWING NUMBER
	ALL PREVIOUS	02-10-14	FTR-DLAP

2.6 Adhesives

2.6.1 Adhesives

FTR 190

FTR 290

FTR 390

FTR 490

FTR 601

CR20

2.7 Rigid Insulation

2.7.1 Rigid Insulation

Roof insulation and cover boards can be mechanically fastened, adhered, or combinations of both depending on deck types and general design goals. For the purpose of this Notebook, insulation and cover board can be used interchangeably.

Install roof insulation in parallel courses with tightly butted and staggered joints. Cut boards accurately to fit neatly around all penetrations. Do not use small scraps or pieces of insulation with any one dimension less than 24 inches.

2.7.1 Rigid Insulation (cont.)

Follow project specifications and/or FiberTite Guide Specifications for fastener density and placement when mechanically fastening insulation and/or cover boards.

Alternatively, follow project specifications and/or FiberTite Guide Specifications for adhesive coverage and application rates when adhering roof insulation and/or cover board. Keep track of the number of containers and or the total volume of material use daily. Divide the volume into the number of applied squares of insulation to ensure adequate amounts of adhesive are being used.
i.e. @1gallon per square/20 square of applied insulation = 20 gallons of adhesive

Install no more insulation than can be covered with completed (secured and sealed) FiberTite Roofing System during the same work day.

2.8.1 Smooth Surface Re-Cover and Existing Bituminous Membrane Flashing

Seaman Corporation Guide Specifications for Installation of FiberTite Roofing Systems recommends the use of a separation or slip sheet when recovering smooth or granulated bituminous roofing systems, existing light weight insulating concrete (LWIC) and/or existing single-ply membrane systems. Roofing fundamentals teach and promote the idea of always divorcing the old from the new. A minimal separation layer made of spun bond polypropylene or conventional geo-textile materials will go a long way toward improving the general field welding and the long term aesthetics of the finished roof system.

It is recommended that vertical flashing with existing bituminous membranes, coatings or cements be removed or divorced from the new flashing using exterior grade plywood or OSB attached with approved fasteners and metal stress plates.
Note: FTR #201Mastic is not compatible with asphaltic materials, however, FTR 190e bonding adhesive may be used on aged, smooth and tight "combination" type flashing. To prevent staining of the new FiberTite flashing membrane, avoid cross contamination and asphaltic bleed through. Use a separate roller for each the membrane and the substrate.

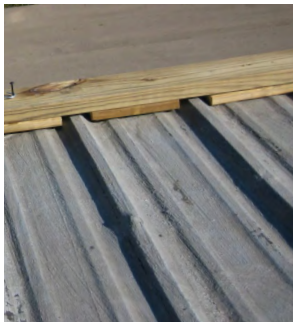
2.9 Wood Blocking

Notebook

2.9.1 Wood Blocking

Perimeter restraint is required at all perimeters, walls and rectangular penetrations as shown in FiberTite Construction Details. Treated wood blocking provides the best mechanism for achieving linear attachment and restraint at these areas. Alternatively, at walls and curb style penetrations, vertical attachment or restraint may be accomplished using aluminum termination bars shown in FiberTite Construction Details.

Treated wood nailers provide the additional benefits of improving the structural integrity of the deck wall/edge interface and can retard the flow of air into roofing envelope if the building is pressurized during high wind events. This is especially true for steel decks where gaps and inconsistent attachment occur along exterior walls.



Install treated lumber at the same heights as the insulation layer. When installing nailers for recover systems, the surface under the wood nailers must be free of all gravel and as even as possible. Where wood nailers are installed directly on the substrate, make sure the area provides a suitable fastening surface.

In all conditions, horizontal and vertical fastening shall provide a minimum linear pullout resistance of 300 lbs. per linear-foot.

2.10 Membrane Layout

Notebook

2.10.1 Bridging

The FiberTite membranes utilize weft inserted, high tenacity yarns for the reinforcement fabric (scrim), which is a major contributor to FiberTite's outstanding physical properties. These yarns have an inherent memory and have limited stretch capabilities.

Roofing across a slope transition at saddles and crickets requires that the membrane be relaxed and laid in place or "fitted" to the transition angle. Bridging the membrane across a transition and then expecting to stretch or force the membrane to lay into angle/gap, is an unreasonable/ impossible expectation.

When crossing over or onto a transition (cricket or saddle) the membrane must be allowed to relax into the transition which results in a change in the plane of the lap. The change of distance is in direct proportion to the slope of the cricket. Adding multiple crickets or slope variations within the same continuation of the roll exacerbates this situation. When installed in a relaxed manner, the membrane will lay down into the transition but may wrinkle. If this happens a triangular cut or patch will be necessary. Stretching the membrane to remove this wrinkle will result in the membrane lifting out of the transition angle.

Execution

3

Execution

3.1 Mechanically Fastened Systems

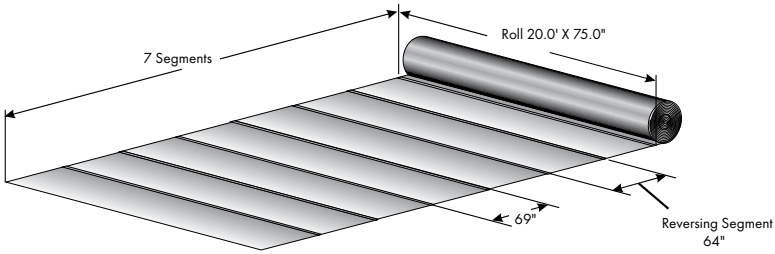
Notebook

We commissioned our membrane "FiberTite" for a very good yet simplistic reason. The "Fiber" was and is the principal factor contributing to the membrane's overall strength. We start with high-denier, high-tenacity yarns and pack them into a very "Tite" pattern that creates the roofing industry's toughest base fabric. It's a far cry from the scrim found in most reinforced thermal plastics. This fabric foundation made FiberTite a natural for the mechanically fastened roofing systems that were soaring in popularity in the late 1970's. Seaman Corporation recognized the contribution that "Fiber" could provide in the overall performance of these systems. To this day, the FiberTite portfolio of membranes is recognized as the toughest family of membranes on the market.

3.1.1 Installation of 20'X 75' Custom Rolls

Position the roll and roll out 7 segments (40'). Square the roll to your line until you achieve a relaxed, flat appearance.

••••• 3.1.1 Drawing #1 ••••••••••••••••••••

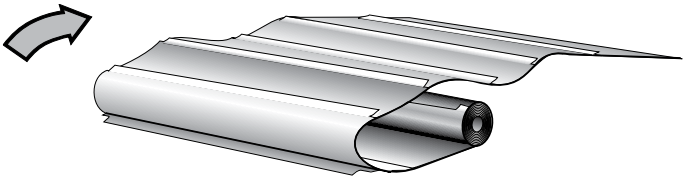


••

3.1.1 Installation of 20'X 75' Custom Rolls (cont.)

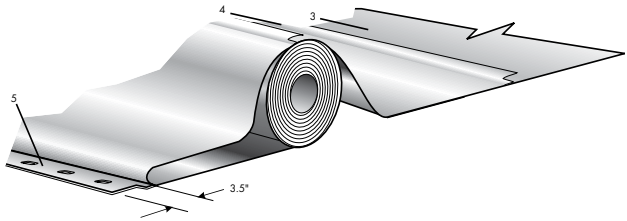
Pull the 40' tail back over the roll core to expose the 5th fastening tab.

3.1.1 Drawing #2



Pull the tab down snug and install fasteners and stress plates per the project specifications.

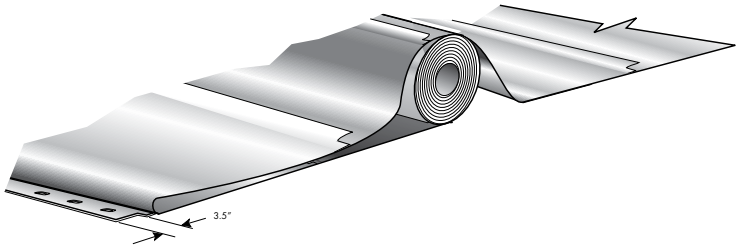
3.1.1 Drawing #3



3.1.1 Installation of 20'X 75' Custom Rolls (cont.)

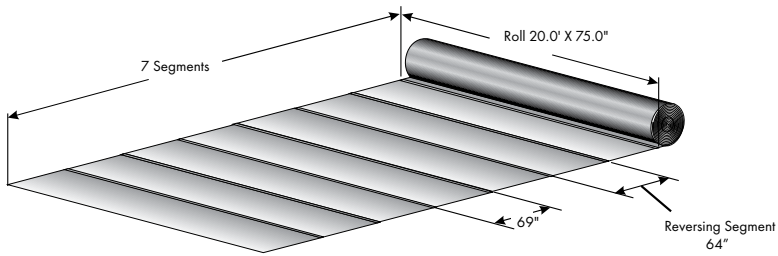
Continue pulling subsequent tabs down snug and attaching in sequence.

3.1.1 Drawing #4



When the first 5 tabs are attached, pick up the remaining core of material and align it behind the first tab that was attached (5th tab in).

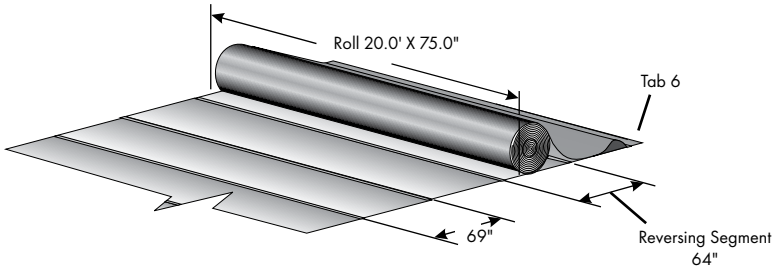
3.1.1 Drawing #5



3.1.1 Installation of 20'X 75' Custom Rolls (cont.)

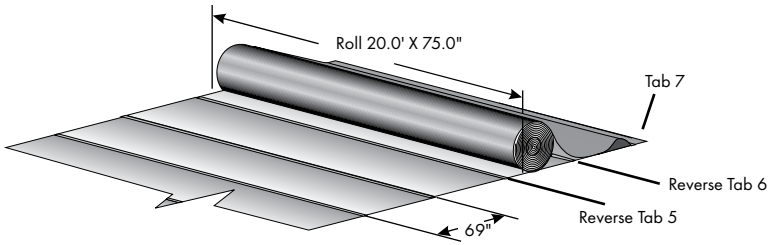
The roll should be positioned to expose the 6th tab of the roll. The materials should fold down naturally to a relaxed state. Pull the 6th tab down snug and install fasteners and stress plates per project specifications.

3.1.1 Drawing #6



When pulling subsequent tabs, keep the core of the roll behind the previously fastened tab. Continue pulling down and attaching tabs in sequence.

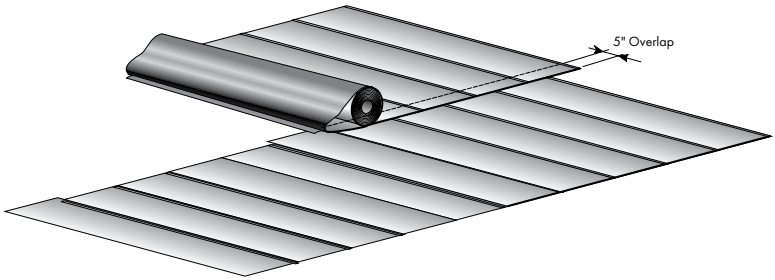
3.1.1 Drawing #7



3.1.1 Installation of 20'X 75' Custom Rolls (cont.)

Position subsequent custom rolls in parallel alignment with factory welds staggered and a nominal 5-inch overlap.

3.1.1 Drawing #8



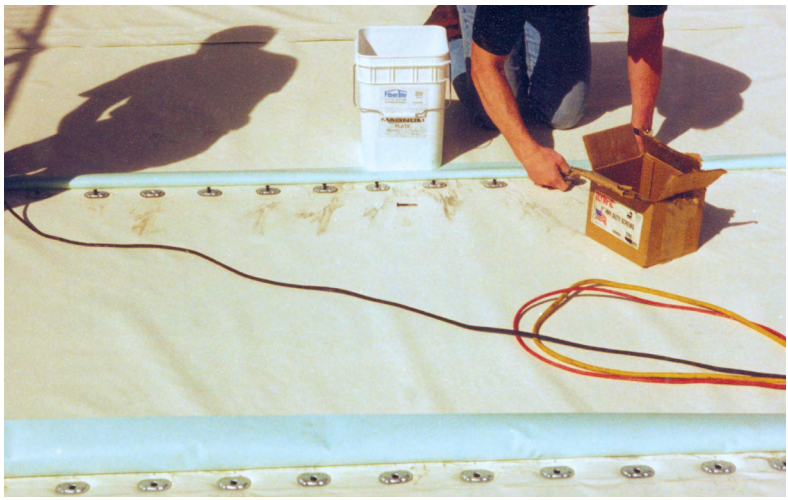
3.1.2 Installation of Standard Rolls

Seaman Corporation offers standard FiberTite "roll goods" for conventional applications. The rolls include a control line for overlap and markings spaced 6 inches on center to help with fastener placement. Rolls are to be installed straight and true. Overlap adjacent rolls 5 inches to the control line on the membrane.

3.1.3 Installation of Top-Sider Rolls

Position the membrane, trimming around obstacles as needed and square the material until it relaxes into a relatively flat appearance. The tabs now function as waterproofing strips.

The 4.5″ tabs are folded up and the roll is fastened beneath the tab area. Installation is completed by welding the tabs down to create a closed lap attachment scenario. The tabs are notched 5″ at both ends to facilitate welding and overlap with subsequent rolls. The net length of each tab is 230″ and is configured at 94″ intervals. Top-Sider panels do not employ a fastener placement line. Fasteners and stress plates are positioned in a straight line against the tab, allowing for a minimum 1.5″ field weld.



Subsequent rolls are installed with a nominal 5″ overlap. Each 20′ x 70.5′ custom roll requires approximately 250 lf. of field welding but only 39 sf. of field overlap during installation.

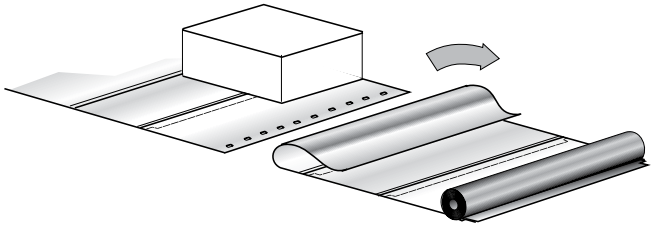
This yields a net installed surface area of 1,371 sf. (1,410 sf. - 39 sf. = 1,371 sf.)

3.1.4 Penetration & Field Reverse

When negotiating obstacles and penetrations, fold the membrane back to expose enough and scribe a mirror image of the obstacles on the bottom of the membrane. Cut out the image and work the tabs in sequence around the objects.

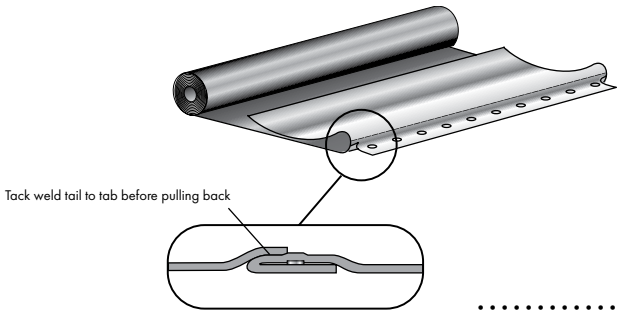
Depending on the size and distance between obstacles, cutting a length of material long enough to get by the obstacle will ease installation. Re-align the remainder of the roll and continue installation.

••••• 3.1.4 Drawing #1: Penetration ••••••••••••••••



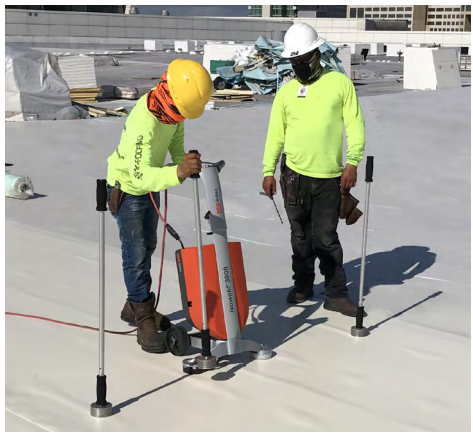
Depending on where the roll is cut, the remaining roll may no longer have any "reversed" tabs. Field reversing a tab is permitted if necessary to assist re-alignment. Align the roll and check the direction of the tabs. If the first tab points away, fold it back under itself and install the fasteners and stress plates according to project specifications. Then, prior to continuing on, tack weld the tab down to itself to eliminate the bulge and promote a flat appearance.

••• 3.1.4 Drawing #2: Field "Reversed" Tab ••••••••••••••••



3.1.5 Induction Welded Systems

FiberTite Roofing Systems offer unique specialized application options across the spectrum of conventional system designs, utilizing induction weld attachment technology. FiberTite's induction welding alternative can be a standalone system or used to augment adhered and ballast roofing systems.



Induction Welded Roofing Systems can also bridge owner concerns about possible membrane flutter and distribute wind loads without the need for adhesives necessary in adhered roofing systems.

With an induction welded system, you have to alter your typical project approach. This is especially true for scheduling and running the job, particularly when compared to a traditional mechanically attached installation and adhered membranes.

FiberTite can provide larger 20' x 100' pre-welded rolls that permit greater initial production. However, caution must be given toward temporary ballast in the event the system is not bonded completely, daily.

The roofing contractor must be well trained to ensure quality and production are not in conflict with one another.

The following Best Practice outlines important guidelines for the successful installation of a FiberTite Induction Welded Roofing System:

- Chalk lines for plate placement will promote efficiency during the bonding process as improved plate alignment improves the "rhythm" of the bonding process as the crew doesn't have to search for plates.
- It is best to install the membrane so the field seams are between and not directly upon the rows of Induction Weld (IW) plates.
- Do not overdrive fasteners as they will be more difficult to locate but also impair weld quality.

3.1.5 Induction Welded Systems (cont.)

The following Best Practice outlines important guidelines for the successful installation of a FiberTite Induction Welded Roofing System:

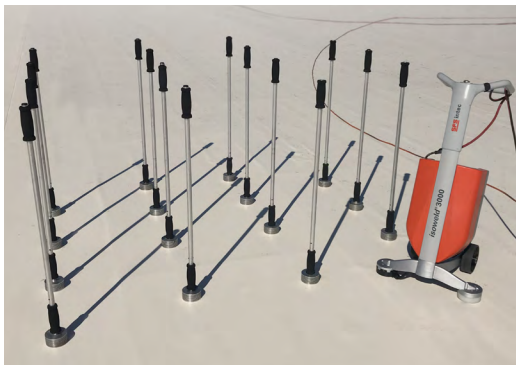
- If there is a radio on the job site you may hear interference or static when the induction welding tool is operating. This is normal. The tool meets FCC transmission requirements for the industrial tools but can cause static interference under certain circumstances.

- Induction welding tools need to run on a dedicated 20A circuit with no more than 100 feet of quality (12 ga. min.) extension cord per tool.
- Generator should be a minimum 5,000 watt with one 20A GFCI circuit per tool. Two tools max per 5,000 watt generator.
- Generator power works better than "house" power because longer extension cords are often required from more permanent sources.
- Two tools are better than one.
- Do not plug the tools into a pigtail.
- Do not plug the tools into a 15A GFCI adapter.

3.1.5 Induction Welded Systems (cont.)

- Always calibrate the tools at least once in the morning and once after lunch or whenever temperature changes more than +/- 15°F.
- Use the magnet to ensure bonding and be sure to allow the test sample to cool completely before separating it to evaluate bond strength.
- Use a marker when calibrating to check alignment.
- For optimum weld quality, the IW plate must be centered under the welding tool.
- It is helpful for each new operator to have a marker and outline the base of the tool on every 10th plate to check the alignment. After several times, the operator will develop the rhythm.
- The operators should make sure the magnet completely covers the plate. Misalignment will impair weld consistency.
- Keep the membrane clean. Any debris on the top of the membrane can be pushed into the surface by the magnet during the bonding process.
- Keep the magnets clean. Shards or other debris can stick to the magnet and brand or otherwise mar the membrane at every weld. »
- Weld in straight lines.
- Operator #1 lines all of the magnets up on the first row. Operator #2 begins work on the adjacent row after the first operator completes the first five welds. This procedure helps make sure that the magnets remain on the plates for at least one full minute. This method also minimizes motion and increases productivity.

A dirty magnet should be cleaned before using.



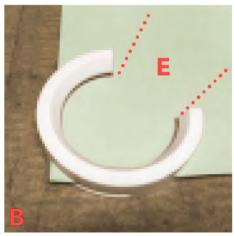
- Cool the magnets periodically in a bucket of water.
- When making test welds make sure to test the plates in the same assembly as is being used for the roof system. For example, do not test the plate directly on concrete if they are being installed over insulation.
- Prior to proceeding with membrane attachment to the installed FTR IW plates, the induction welding tool must be calibrated.

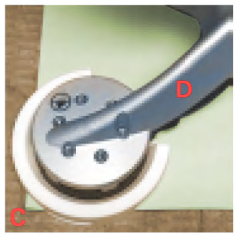
3.1.5 Induction Welded Systems (cont.)

isoweld® Tool Calibration: *Review the isoweld Operating Manual

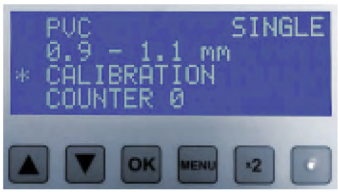
- Prior to proceeding with membrane attachment to the installed FTR IW isoweld plates, the isoweld Tool must be calibrated.
- It is not necessary to use a fastener with the plate during calibration.
- Set the isoweld tool to its PVC membrane setting.
- Use the calibration template and place an FTR-IW isoweld plate into the recess provided (A).
- Push the calibration template on to the corner of the FiberTite membrane (B).

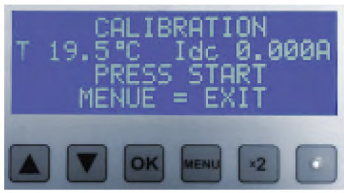
- Place the inductor into the calibration device and ensure that it is positioned correctly (C): the arm (D) to the inductor must be resting in the recess (E) provided.





- Press the "arrow up" or "arrow down" button to move to CALIBRATION.
- Start the calibration function by pressing the "OK" button.
- You are now in the calibration program.
- Press the start button.
- The automatic calibration is completed when there is a beeping sound for 1 second and the display returns to standard view.





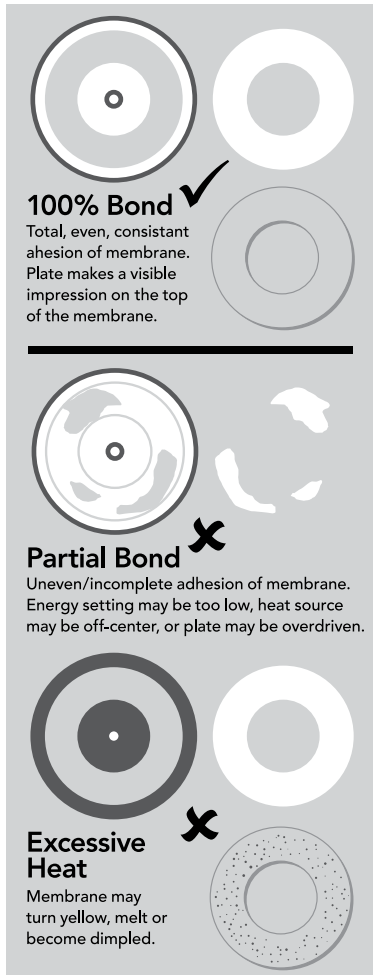
3.1.5 Induction Welded Systems (cont.)

FiberTite Induction Weld (IW) plates are designed to secure roof insulation and roofing membranes in FiberTite Induction Welded Roofing System. Plates are 3" round, specially coated Galvalume Steel, installed with FTR Magnum Fasteners on steel, wood or structural concrete decks. All FTR Induction Weld plates have a recessed center and raised flat bonding surface.

FiberTite IW Roofing Systems are Factory Mutual Approved.

FTR IW isoweld® Plates meet FM 4470 criteria for corrosion resistance and feature a wide welding surface to promote a strong bond to FiberTite Roofing Membranes.

- The induction welding tool's magnet should completely cover the plate. Misalignment will impair weld consistency.
- Keep the membrane clean. Any debris on the top of the membrane can be pushed into the surface by the magnet during the bonding process.
- Keep the magnets clean.



3.2.1 General

Seaman Corporation offers two basic adhered FiberTite Roofing Systems and five different types of adhesives along with hot asphalt. The standard FiberTite portfolio of membranes, FiberTite and FiberTite-XT, require a solvent based "contact" adhesive (FTR-190e). Contact adhesives require adhesive application to the substrate and the back of the membrane. The adhesives are allowed to "flash off" and then the membrane is mated to the substrate.

Alternatively, fleece backed versions of our FiberTite portfolio of membranes utilize single sided or substrate only application of adhesives (FTR-290, FTR-390, FTR-490, FTR-CR20 or hot asphalt). In this process, the adhesive is applied to the prepared substrate and the membrane is rolled into the "wet" adhesive.

Lastly, membranes with SM style back coats (FiberTite-SM and FiberTite-XTreme) can be applied using FTR 490 in a one side, substrate only, application. The adhesive is applied to the substrate and the membrane is rolled into the wet adhesive.

All systems have comparable performance value but the benefits of or the decision to use one versus the other is outside the context of this manual. Regardless of the system chosen, the proper application and oversight of the general application process for the adhesives is imperative to the overall quality and subsequent performance of the adhered roofing system.

3.2.1 General (cont.)

Before we address specific systems and the adhesives in general, there a few items that apply to all adhered applications:

1. The membrane and substrate must be clean.

The term "clean" refers to any form of contaminate on the surface. Contamination, including (but not limited to) dirt, oil, grease, insulation dust or windblown debris can restrict or inhibit adhesion.

2. The membrane and substrate must be dry regardless of the adhesive being used.

Moisture, precipitation, dew and/or condensation that develops on the surface of the adhesive when application temperatures are below 40 degrees, can restrict or inhibit adhesion.

3. Unlike the 30 minute relaxation period required for some roofing materials, it is not necessary to allow FiberTite membranes to "relax" before bonding.

4. All adhesives shall be mixed thoroughly before using to ensure proper viscosity and general viability.

5. All adhesives have a general "shelf life" and should be used prior to their expiration date.

However, roof top storage during periods of extreme temperature can impact the shelf life and/or viability of the adhesives. High temperatures can reduce the shelf life and low temperatures to the point of freezing can permanently damage water based adhesives.

6. DO NOT USE BAD, MARGINAL OR SUSPECT ADHESIVE.

3.2.2 Curing Times

Excessive exposure or "open" time for any of the adhesives can promote poorly bonded or un-adhered portions of the membrane. Alternatively, insufficient open time can lead to blisters and or wrinkling of the membrane due to vapor pressure from trapped solvent or water.

Similarly, excessive use of the adhesive will not only reduce coverage rates but prolong required exposure times, and induce further blistering and wrinkling. More is definitely not better. And on the flip side, inadequate use of adhesive will result in poorly or un-bonded membrane areas.

3.2.3 Environmental Factors

Environmental factors interject additional variables that have to be considered and accounted for when using adhesives. Temperature and humidity affect the drying time for all adhesives. Typically, adhesives tend to dry or set quicker when temperatures are hot or during periods of low humidity. On the other hand, adhesives will dry or set slower when temperatures are cold or humidity is high.

The surface temperature of the substrate and/or wind and/or precipitation or condensation on the surface of the adhesive can impact application rates and drying times therefore expanding or reducing the window of workability for the materials.

In many respects, it's not the adhesive that will determine the success of the installation; It's the method of application and installation combined with the skill and instincts of the installer that have the greater impact on quality and performance.

Of all the possible environmental challenges for adhered roofs, cold weather applications are the most difficult to deal with. The following information MUST be taken into consideration when contemplating cold weather application of adhesives.

All too often and for any number of reasons, roofing projects get delayed, pushed and extended from an original schedule for warm weather application into the fall and winter months. These scenarios require us to modify the construction plan and materials where waterborne adhesives were the original choice. Unfortunately, the water content of these adhesive make them prone to damage from freezing temperatures, before and after application.

3.2.3 Environmental Factors (cont.)

Annually on October 1st, Seaman Corporation moves its FTR 390 and FTR 490 adhesives out of the master warehouse in Ohio for winter storage in the south. Shipment of these waterborne products to or within northern climates will be discontinued until April.

For those contractors that already have these waterborne products on site or find themselves caught between seasons, please pay particular attention to the following recommendation and precautions:

- Review your current project schedules and keep an eye on the long range forecast.
- Communicate the possibility of inclement or adverse conditions to the specifier/owner.
- It is recommended that the project adhesives be changed to either FTR 190e, FTR 290, FTR CR20 or hot asphalt.
- If switching adhesive is not an option; FTR 390 & FTR 490 must be stored inside or in heated containers (65°F) to prevent freezing.
- Application is restricted to daily temperatures that are 40°F and rising, and this also includes the temperature of the substrate.
- Daytime and evening temperatures must remain above freezing for a minimum of 72 hours after application.
- Solvent borne adhesives (FTR 190e, FTR 290) and FTR CR20 also require heated storage during winter weather conditions and adherence to the 40°F and rising limitation.
- It is also prudent to limit use to conditions that will foster temperatures above freezing for at least 8 hours after application.
- Keep adhesive in heated storage at a nominal 65°F, 24 hours prior to use.
- Bring only enough adhesive out of heated storage to support that day's production. This will greatly improve general application and usage rates.
- Low rise polyurethane insulation adhesives (FTR 601) also require heated storage at a nominal 65°F prior to use.

The following are some additional cold weather construction considerations:

- Hot asphalt has become a popular choice for bonding insulation, coverboards and fleece back membranes during cold weather roofing.
- Proper heating and insulated transport from the kettle to the point of application is critical to quality and consistency.
- Gypsum based coverboards are prone to moisture absorption if not properly stored during construction. Cold and damp conditions combined with improper storage can bring about undesirable consequences when these products are subjected to hot asphalt.
- The coverboard manufacturers recommend:
    - Remove the plastic packaging immediately upon receipt of delivery.
    - Failure to remove the plastic packaging may result in entrapment of condensation or moisture.
    - Coverboards stored outside must be stored level and off the ground and protected by a breathable waterproof covering.
    - Provide means for air circulation around and under stored bundles of coverboard.

3.2.4 Application Methods

Paint rollers are the typical method for applying adhesives. Power rollers actually offer the greatest consistency and efficiency. Drum rollers are also viable but it is important to keep the rollers clean and replace them often, otherwise the adhesive will end up being applied in ribbons as the rollers wear out.

Use solvent resistant, medium nap rollers (3/8"nap) for adhesive application. Generally, 3/8" nap is suitable for both solvent and water based adhesives. All rollers shall be kept clean and free from cured adhesive.

The practice of using notched squeegees for adhesive application is not authorized. Although this method appears to speed up the process, it usually results in excessive material usage, increased variability and loss of control in the set up time for the adhesives.

Pouring the adhesive directly from the pails onto the substrate is not permitted. Pouring out of the adhesive and then spreading it around or "slurry" approach usually accompanies the "butterfly" installation method (multiple rolls of fleece back laid out and folded back longitudinally). This process promotes excess absorption of solvent or water by the substrate that the adhesive is poured on. It can promote the use of too much adhesive resulting in an inordinate amount of time required for the adhesive to set up. This process will result in folding the membrane into adhesive that's either too wet or too dry or both.

The most effective application of our FB adhesives is installing the adhesive ahead of the roll where the weight of the roll will control the coverage of the adhesive. If there's too much, it will squeeze out into the laps. The applicator will also have much more control over the timing and subsequent mating of the surfaces.

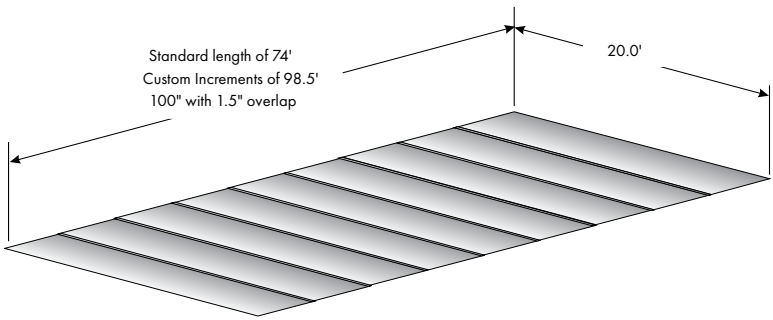
If a contractor's preference is to pre-position the fleece back membrane and fold it open prior to applying the adhesive, power rollers, spray equipment or "drum-style" adhesive applicators should be used to promote better control over adhesive rates and open time.

Solvent based adhesives require the use of a weighted roller after the materials have been mated. Water based materials are more effectively broomed or rolled with a wide, clean paint roller. Weighted rollers tend to displace the water based materials.

3.3.1 Installation of Adhered Custom No-Tab/Blanket Rolls 20'X 74' or greater with FTR-190e bonding adhesive

Unroll the membrane and position it, allowing for 3" to 4" field overlap for adjacent rolls. Square up the segments for a relaxed, relatively flat appearance.

3.3.1 Drawing #1



3.3.1 Installation of Adhered Custom No-Tab/Blanket Rolls 20'X 74' or greater with FTR-190e bonding adhesive (cont.)

Fold the roll in half, parallel to the factory welds to expose the back side of the 20'x 37' section. Square the roll to restore the relaxed, flat appearance. NOTE: The membrane will not fold perpendicular to the factory welds without wrinkling.

Apply a smooth continuous layer of FTR 190e Bonding Adhesive across the 20' width and about 4 - 6 ft. down the length to the bottom of the roll and to a mirrored area on the substrate. Keep adhesive away from overlap areas. If necessary, smooth adhesive drips with a rubber squeegee. Allow the adhesive to set up to a point of being tacky but not stringy to the touch.

Do not let the adhesive dry out. Evenly maneuver the two surfaces together.

Repeat the process until the first half of the roll is installed. Fold the remaining second half of the roll back and finish the process throughout the remainder of the roll.

Use a weighted roller to finish mating the membrane to the substrate.

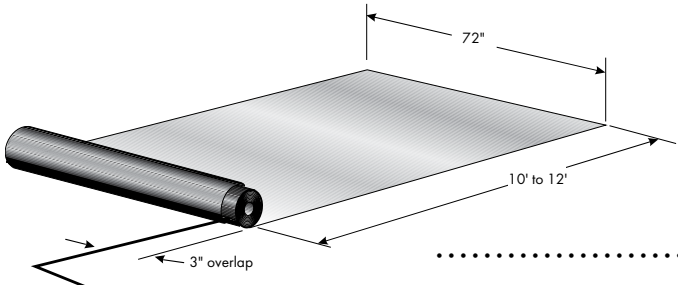
Depending upon the porosity of the substrate, FTR-190e adhesive application will average 1.2 gallons of applied adhesive per 100 square feet of substrate. The back of the membrane will average 0.8 gallons of applied adhesive per 100 square feet of membrane. This equals 2 gallons of applied adhesive for 100 square feet of mated or bonded surface.

Monitor and evaluate adhesive usage by dividing the daily membrane production (in square feet) by the daily adhesive usage (in gallons). Example: 2,500 square feet (25 squares) of finished membrane divided by 50 gallons or ten 5 gallon buckets of adhesive used equals 50 square feet of finished membrane per 1 gallon of adhesive or 5 squares per bucket.

3.3.2 Installation of Adhered Fleece Back Membrane

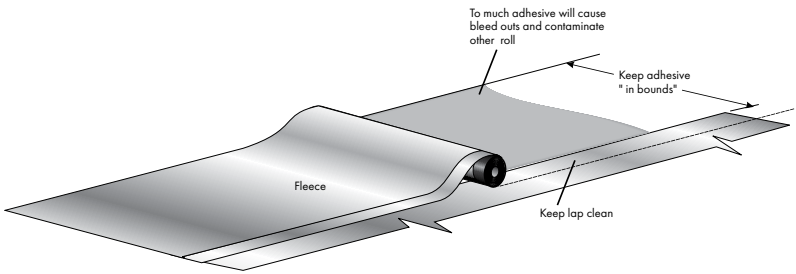
Unroll 10 to 12 feet of material and position the roll square and flat.

3.3.2 Drawing #1



Roll the tail of the roll back to the core. Apply FTR 290; 390 or 490 adhesive to the substrate. Keep adhesive away from overlap areas. Allow the adhesive to set up to a point where it is still wet but sticky and mildly stringy to the touch. Evenly maneuver the membrane into the wet adhesive.

3.3.2 Drawing #2

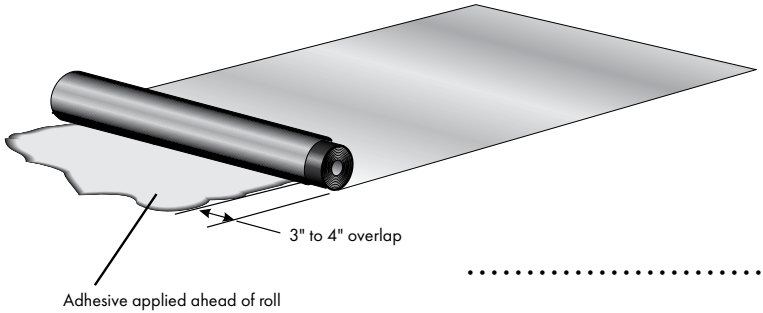


3.3.2 Installation of Adhered Fleece Back Membrane (cont.)

Once the tail is set, switch to the front of the roll. Repeat the adhesive application process ahead of the roll, rolling it into the wet adhesive when ready. Repeat the process for subsequent rolls.

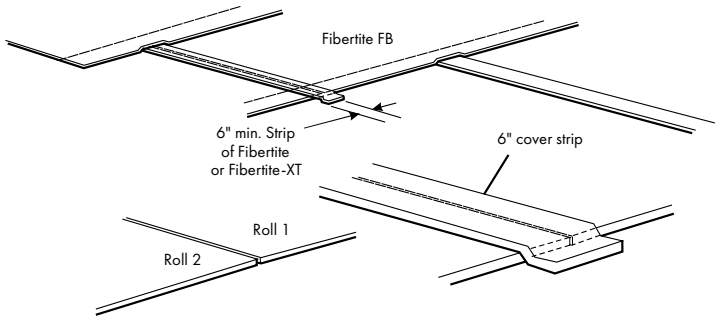
Use a clean, weighted paint roller (for solvent adhesives) or soft bristle boom (for waterborne adhesives) to finish mating the membrane to the substrate.

3.3.2 Drawing No. 3



Roll side laps are sealed with a 1.5" heat weld. Roll ends are butted together and sealed with a welded 6" cover strip of FiberTite membrane.

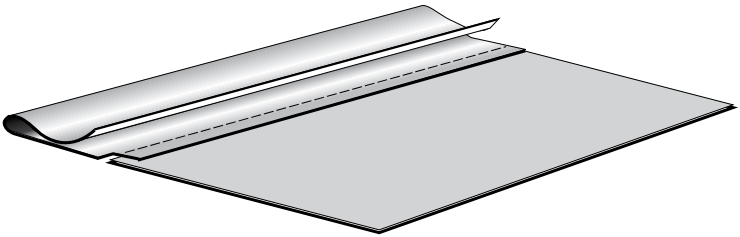
3.3.2 Drawing #4



3.3.2 Installation of Adhered Fleece Back Membrane (cont.)

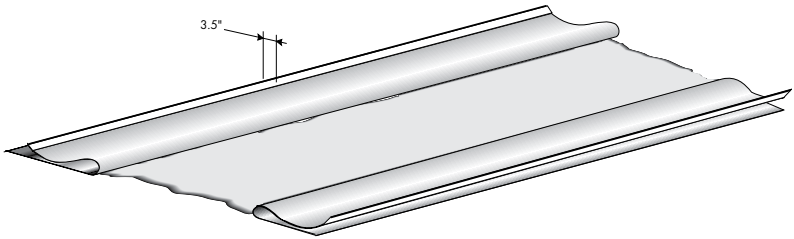
In congested areas, sections of membrane can be cut and positioned loose.

3.3.2 Drawing #5



Now the membrane can folded in half to permit application of the adhesive to the substrate.

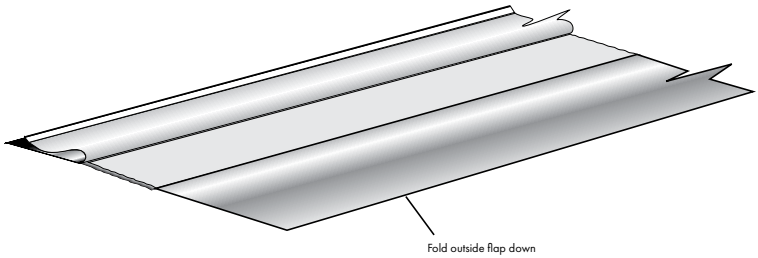
3.3.2 Drawing #6



3.3.2 Installation of Adhered Fleece Back Membrane (cont.)

Fold the portion "making up the bottom" of the overlap into the adhesive first.

3.3.2 Drawing #7



3.3.3 Fleece Back in Hot Asphalt

Introducing hot asphalt into a FiberTite Roofing System requires a special skill set. Hot asphalt is an art form all its own. Safety is of utmost importance when using hot asphalt. See the Hot Asphalt section of the FiberTite Guide Specifications for specific installation and safety guidelines.

The process for installing FiberTite Fleece Back membranes in hot asphalt is similar to installing Fleece Back membranes in any of our adhesives. The principle difference is the adhesive is black

and

HOT!

3.3.3 Fleece Back in Hot Asphalt (cont.)

Hot asphalt needs to be between 425° and 450° F to ensure proper adhesion. A handheld infrared thermometer should be available to monitor application temperatures.

3.3.4 Fleece Back in CR20

Installing fleece back membrane in low rise polyurethane adhesive is not really new. However, with the advent of pressurized canisters of two-part foam adhesive the concept has evolved so that expensive spray rigs are no longer required to install fleece back membranes in low rise foam adhesives. Initial investigations into the possible use of ribbon attached membrane showed uneven stress on the rows of adhesive during wind uplift testing due to the flexibility of the membrane. A fortuitous trial to see what type of patter the pressurized foam would yield, resulted in the "spatter" approach to application.

Equipment:

There are two cylinder tanks per system. The system is comprised of an "A" cylinder that is RED and a "B" cylinder that is BLUE. These two cylinders must have matching fill dates to be used together. The cylinders can only be used in the upright position (Never open the valves unless the cylinders are upright). The lids on the boxes are designed to shield the cylinders from direct sunlight and keep the product from getting too hot. For this reason, the box lid should remain closed during use.

The gun/hose assembly is quite robust in design but it is a "throwaway" piece that has a limited life cycle. The general recommendation is 4 sets/kits per gun. The recommendation of 4 kits per gun is not written in stone, it is a recommendation to promote consistency. This is based on averages and has shown to serve as a reliable recommendation. There are many instances where gun/hose assemblies are used on more than 4 kits without issue. The key is whether or not the installer:

1. Removes the tip and replaces it when spraying stops for more than 1 minute. There are 8 tips included in each "B" box.
2. Purging the gun without a tip to insure there are 2 strong component streams flowing before restarting application.
3. Always leave the gun/hose assembly attached to the cylinders until they are transferred to a new set of chemicals.
4. Treat the gun/hose assembly with a small amount of care and cleaning.

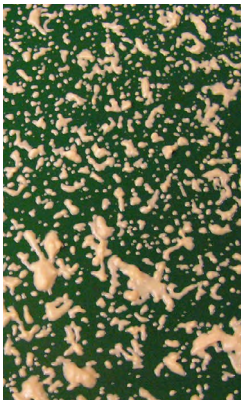
3.3.4 Fleece Back in CR20 (cont.)

Equipment Set Up:

- Using the wrench included in the nozzle pack, connect the RED striped hose to the "A" cylinder. Connect the BLACK striped hose to the "B" cylinder.
- Slowly open the cylinder valves and inspect the connections for any leaks. Tighten if needed. Fully open the valves.
- Activate the trigger, dispensing into a proper waste receptacle, until all the air is released from the hoses and a good stream of both components is visible through the applicator orifices.
- Clean residue from the output tips.
- Attach the mixing nozzle to the applicator. Insert the bottom tab of the nozzle into the bottom slot of the applicator gun. Secure the top latch by pushing towards the back of the applicator until it "snaps" into the locked position.

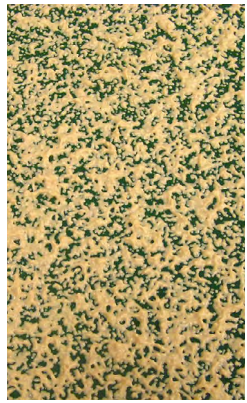
Adhesive Test Spray:

When spraying for the first time, or when starting a new kit, it is recommended to trigger the gun only 1/2 to 3/4 open, until the desired output and spray pattern is achieved. This controllable metering ability is a major advantage of the gun, allowing the user complete control of the flow rate and spray pattern that best fits the application. Apply several test shots on plastic or cardboard before beginning the job.



Too Light Spray Pattern

Ideal Spray Pattern



Too Heavy Spray Pattern

Extremely Important - When spraying is stopped for more than 1 minute, the nozzle should be removed and replaced with a new nozzle. The chemical in the nozzle will begin to cure and will clog the nozzle when spraying has stopped for more than a few minutes. If the trigger is pulled while a clogged nozzle is on the gun, the component from the cylinders (which is under pressure!) will be blocked by the clogged nozzle and will cause a "back-up" of chemical into the hoses, which is called a crossover. The gun will no longer dispense chemicals in the right proportions and the CR-20 adhesive will not function properly. This situation can be easily avoided by simply changing nozzle when spraying is stopped for more than 1 minute.

3.3.4 Fleece Back in CR20 (cont.)

Spatter Application:

The proper technique is to slightly arc the adhesive as it disperses from the application nozzle allowing to land and spatter on the substrate.

A direct downward spray patter creates an uneven application and over use of the adhesive. The proper application will exhibit a substrate that is peppered with adhesive in such a way that it will flatten out when the membrane is applied to yield essentially a full coverage film of adhesive.

Be aware of your surroundings when spattering the foam adhesive. It sticks to practically anything it comes in contact with and is difficult to remove.

On windy days the adhesive can become airborne. Spattering can be controlled by masking areas with insulation boards when necessary.

Open time for the adhesive will vary depending on the temperature and is a maximum 10-minutes but best practice is to embed the fleece back membrane as soon as possible following the application of the foam.

3.3.5 Simulated Metal Roofing

1. Plan layout of the fleece back to coincide with the layout of the SMR-Profiles.

2. On inclines greater than 2:12, it is easier to weld the fleece back membrane "uphill" as this eliminates distortion during the welding process. Start and lap the membrane accordingly to facilitate your automatic welder.

3. The straighter/vertical the fleece back membrane is installed the better your final aesthetics.

4. Use chalk lines with fluorescent orange or green chalk for the fleece back and the profiles; the fluorescent colors are not as messy and fade away sooner.

5. Run test welds for the profiles to ensure proper welder and heat adjustments that exhibit complete weld continuity across the bottom of the profile.

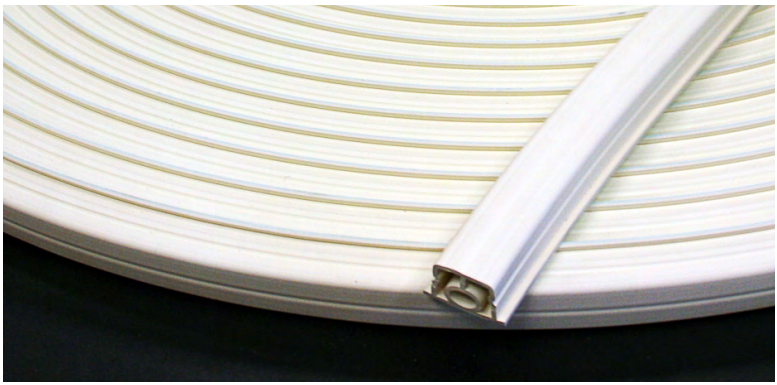
6. The profile is a decoration and its final aesthetics play an important role in the overall success of the project, so do not rush the installation.

7. Install the profiles so they lay/align a nominal ¼" off of your field seams.

8. The profiles installed in between the seams areas are to be equidistant.

9. Hold profiles back from ridges, edges, eves, and valleys by 6-inches.

3.3.5 Simulated Metal Roofing (cont.)



10. If using the "wheel kit" offered by Seaman Corporation to modify your Leister Welder, it is a good idea to have extra drive belts. Modified welding tips are not offerred and extended use can over heat the drive belt.
11. Make sure your welder is in good alignment and the tip is properly adjusted to provide uniform heating and subsequent application of the profile.
12. Roll out the coil of profile along the chalk line.
13. It helps to have one person guide/align the profile behind the welder.
14. Do not stretch the profile during the alignment/welding process.
15. Craftsman "edge cutters" are a handy tool for gutting the profiles to length.
16. Installing the profiles as you go (a few days behind daily production) improves the project's efficiency as it reduces the amount of cleaning that may be required if you wait longer.
17. Mechanically attach the fleece back membrane at valleys and major transitions in plane to avoid bridging of the membrane.
18. Use the hand roller provided in the wheel kit and a hand held hot air welder to finish welding the ends of the profiles.

3.4.1 Storm Strips

All FiberTite adhesives provide excellent adhesion to their corresponding FiberTite membranes and a whole host of substrates when properly applied. However, adhesives in general can be more sensitive to surface conditions, application methods and rates, temperature and moisture as opposed to a conventional mechanically fastened system.

Furthermore, the performance of the "membrane" in an adhered system is dependent upon the performance of the material or substrate it is being adhered to. The bond between the membranes and the substrate/insulation systems are often greater than the bonds between the substrate/insulation systems and the decking.

The history of adhered roofing has taught us that performance issues for adhered roof systems generally surface along the building's perimeter edges and corners. Significant wind events can expose flaws in the securement of edge blocking or metal edge securement and/or induce loosening of the facer materials on insulation and cover-boards in the perimeter and especially, the corners of the building. Once loosened, continued exposure to the wind can eventually "peel" the adhered roof system loose. If this "peeling" is not contained the damage is expanded and places the building at risk to exposure and partial loss of the system.

Under most circumstances, FiberTite adhered roofing systems will not require the inclusion of "storm strips" within the perimeter and corner zones of the roof.

If storm strips are required then the recommended intervals and fasteners spacing shall be based on the "field" uplift values as follows:

1-60: No peel stops
1-90: One row at 3' from all exterior edges; including parapets; 12" o.c.
105-120: Two rows at 3' & 6' from all exterior edges; including parapets; 12" o.c.
135 & up: Three rows at 3', 6' & 9' from all exterior edges; including parapets; 12" o.c.

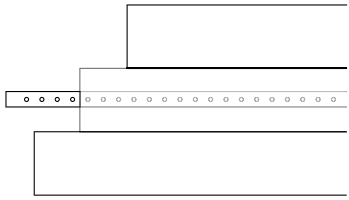
Non-Class-1 decking (i.e. lightweight, wood, gypsum and cementitious wood fiber) would not necessarily default to the above requirements and require fastener evaluation and engineering review.

3.4 Storm Strips

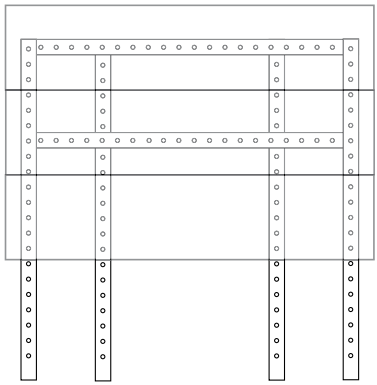
Notebook

3.4.1 **Storm Strips** (cont.)

3.4.1 Drawing #1



3.4.1 Drawing #2



3.5 Welding

Notebook

3.5.1 Make it Watertight

When it comes to making a thermoplastic roofing system watertight, welding two pieces of material together has to be the most critical function a roofing contractor can perform. There is no margin of error. A "good" weld will outlast the roofing system and in the case of FiberTite, that's a very long time. On the other hand, inadequate welds will leak! It doesn't matter how fast you can weld if you're ineffective. If it takes you ten minutes to perform 100' of welding but you have a few imperfections to address and it takes you 12 minutes to do it with no imperfections, the dividend of doing it right the first time far outweighs the cost to repair imperfections.

3.5.1 Make it Watertight (cont.)

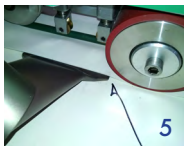
There are three rules to ensuring high quality welding of the FiberTite Roofing System:

1) The material must be dry.
2) The material must be clean.
3) You can't change rules one and two.

FiberTite is uniquely constructed not only to provide confidence in the watertight integrity of the welded area but also, a superior strength to the welded areas of the membrane. Proper welding techniques allow heat to penetrate to the "Fiber" and essentially lock the welds down, providing confidence, strength and no need to employ elaborate measures to seal the cut edges of the FiberTite membrane. Just weld it.

There are a number of automatic and hand welding tools available to the roofing contractor. Each model or type has its own unique set up and welding characteristics. Although they are all capable of welding FiberTite properly, some models seem to work better than others. Regardless, familiarize yourself with your particular model (practice welding) prior to starting any field welding. Our regional technical service representatives are familiar with most models and can offer set up advice and recommendation on welding techniques with regard to your particular tool.

3.5.2 Welder Checklist and Adjustment



Perform the following steps prior to each day of welding; Don't wait until the last moment to run your check list.
Check your equipment early so any problems can be addressed in time to prevent leaving seams un-welded overnight.

1. « Check for proper power supply.
2. Check gears and drive belt.
3. Make sure drive/press wheel is tight.
4. « Check the tracking alignment to ensure that the machine is running straight.
5. « Tip placement 40mm back/locked 1/8" above membrane .
6. « When engaged, the tip should be out approximately 1/8" beyond the overlap and not dragging along the outside edge.
7. « Make test welds each day!
8. Make and/or test welds often!

NOTE: The high temperatures generated by automatic and hand welding can cause injury. Care should be taken to avoid personal contact with the welder tips, generated hot air, and weld sites along the seam until they are cooled.

3.5.3 Welder Basics

1. All field seams exceeding 10′ in length shall be welded with an approved automatic welder.
2. All field seams must be clean and dry prior to initiating any field welding.
3. « Remove dirt, oil and other foreign materials from the seams with Acetone, MEK, or an approved alternative. Use clean cotton cloths and allow approximately five minutes for solvents to dissipate before initiating the automatic welder.
4. All welding should be performed only by qualified personnel to ensure the continuity of the weld.
5. All finished seams shall exhibit a homogeneous bond a minimum of 1.5″ in width.

3.5.4 Automatic Welding Tips

1. Always make test welds to ensure proper tip alignment, heat setting and speed of thermal unit before starting field welding. The roof membrane must be clean and dry to ensure a proper weld.
2. For test welds and welder start up, set the temperature at a nominal 900°F and the speed at 10′ per minute.
3. «Pulling the welded membrane apart immediately and checking the melt flow and symmetry of the weld on both sides of the membrane will help dial in the proper temperature.
4. Adjust the speed accordingly until uniform melt and symmetry are achieved.

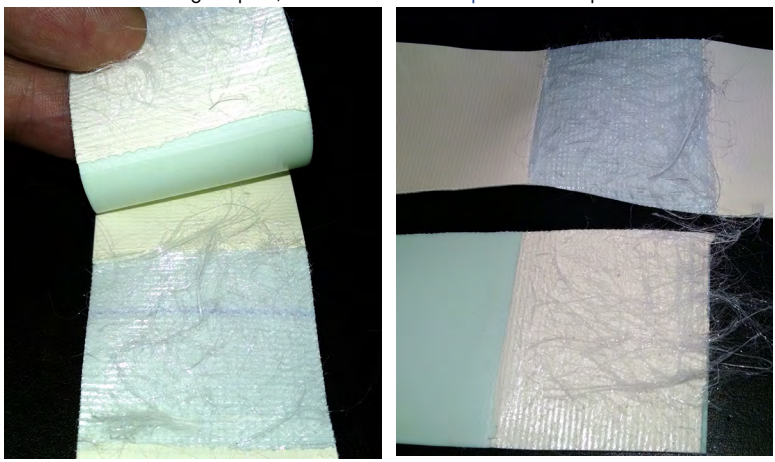
5. If the membrane laps are kept clean during installation, no pre-wipe or cleaning is required.
6. An optimum weld exists when the top sheet will not separate from the bottom sheet without breaking the "fiber" bonds. »
7. Be aware that changes in weather and air temperature may require a change in temperature or speed of the automatic welder.

8. Always watch to make sure a small bead of KEE compound is flowing from the edge of the membrane beneath the press wheel while welding.
9. Align and guide the thermal welder to make sure the press wheel does not drift over the edge of the top membrane and into the KEE flowout.
10. To prevent excessive weld distortion, allow 6″ from the end of the roll to the points where the thermal unit is either started or stopped. Mark these areas with a lumber crayon to be sure they are properly addressed and welded with a hand tool.
11. Each time the welder tip is disengaged be sure to clean the char or residue off with a wire brush.

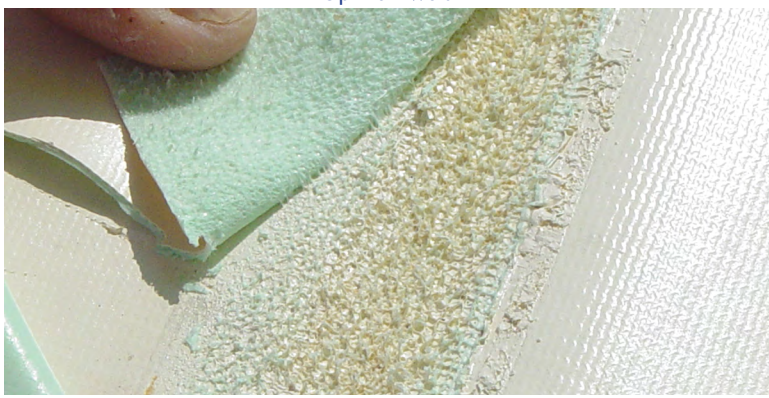
3.5.5 Do It Right the First Time (DIRFT)

Nobody intentionally creates an imperfect weld. However, we have seen that when the process is rushed or the basics ignored, the results are not only problematic, they can get very expensive to correct. It has been our experience that "roofers" are very consistent individuals. Those that do it right the first time usually do so "all" the time. Unfortunately, the opposite also applies.

The optimum weld will exhibit a characteristic unique to FiberTite. When the weld is stripped, the fibers actually shred, breaking the yarn that knits them together opposed to coating separation from the fibers.
Checking actual field welds can be accomplished by removing a nominal 1.5" section of the weld and doing a t-peel, as illustrated in the optimum weld pictures below.



Optimum Weld



Poor or "Velcro" Weld indicates the presence of moisture during the welding process.

Note: The 60-mil FiberTite XTreme membrane is a woven fabric and the yarns will not shred as they do on the knitted products.

3.5.6 Trouble Shooting the Automatic Welder

Scorching and/or Charring
Cause: Excessive heat, voltage fluctuation.
Solution: Decrease temperature or increase speed of unit, check your power source.

Cold or Spotty Weld
Cause: Insufficient heat, bad heating element, and voltage fluctuation.
Solution: Increase temperature or decrease speed, replace element, and check power source.

Scarring along Seam Edge
Cause: Tip dragging or out of alignment.
Solution: Remove welder and realign tip.

Pleating of the Seam
Cause: Membrane not installed snug, machine out of alignment.
Solution: Set alignment, pull slack out of membrane.

KEE Collecting on Weld Wheel
Cause: Tip out of alignment, excessive heat, unit drifting.
Solution: Realign tips, adjust temperature, and hold the unit to steady course.

Unit Pulsating
Cause: Insufficient power, voltage fluctuation, and generator overload.
Solution: Increase power or decrease cord length, and increase size of generator.

Unit Jerking
Cause: Worn drive gears or belt, loose drive wheel.
Solution: Replace worn parts, tighten drive wheel.

Dead Unit
Cause: Loss of power, damaged unit.
Solution: Check all power connections, return unit to manufacturer for servicing.

3.6.1 Making it Look Good

After dealing with all the rigors and challenges associated with "keeping it in place" and "making it watertight," the appearance of the finished roof system will be the Owner's ultimate measurement for the quality of his investment. Clean and straight lines, rounded corners, symmetrical layout and consistent application of flashing and details show not only the skill of the applicator(s), but testify to planning and forethought that have gone into the entire application process.

If your finished project has a "shabby" appearance and a leak develops, in the owner or customer's mind, the leak confirms that the entire application process must have been shabby.

On the other hand, if the finished roof looks clean and symmetrical it will exude quality. Then if a leak should occur sometime down the road, it becomes much easier to address. The flaw is repaired, the roof still looks good and the quality of the investment is maintained.

3.6.2 Wrinkles

FiberTite's tightly knitted, high fiber content membranes exhibit characteristics similar to those of cloth or fabrics. It wants to lay on the roof more like a blanket as opposed to most "scrim" reinforced membranes.

During installation, it should have a relaxed and somewhat loose initial appearance. To some degree it may even appear "wrinkled." This becomes a subjective issue but when one understands the characteristics of the "fabric," a more objective measure can be used to determine whether or not its "wrinkled."

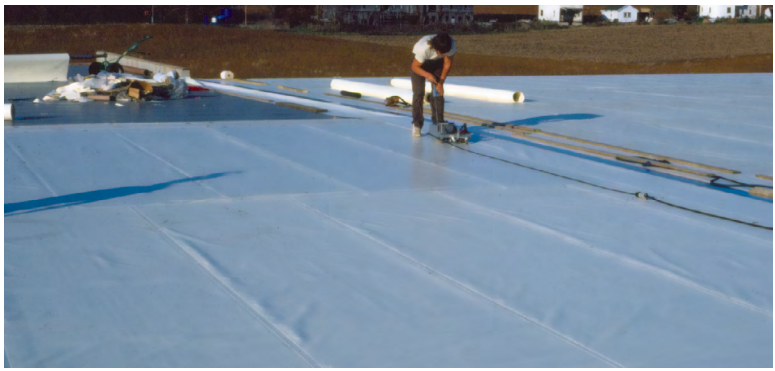
The design of the polyester fabric was engineered for tension structures in the 1960's. Elaborate tensioning devices were employed to stretch the coated fabric membrane over steel frames. The coated fabric actually became the "roof."

Although FiberTite has the innate strength attributes necessary for a tension structure application, the fasteners and stress plates used to "keep it in place" in a mechanically fastened system are not tensioning devices. The membrane system should be installed with a relaxed, lay-flat appearance. Stretching and pulling the membrane "pre-loads" the fasteners with lateral stress and can actually induce wrinkling. The membrane can easily handle the stress but fasteners shouldn't be loaded until the system is subjected to a wind event.

3.6.2 Wrinkles (cont.)

We define a "wrinkle" in the membrane as a pleat, crease, or situation when you can pinch the "loose" membrane together between your fingers as illustrated at right ».

The loose appearance typically described as wrinkles (seen in the picture immediately below) will subside and disappear over time as long as it does not meet our definition of a wrinkle.



Once the membrane and the building go through a few cycles of expansion and contraction through the heating and cooling with the seasons, the fabric will relax and take on a flatter and tighter appearance.

3.7.1 Quality Control

It is the responsibility of the roofing contractor to establish and enforce a Q.C. plan or program to govern all aspects of the installation of the new roof system.

The job foreman or supervisor is responsible for the daily execution of the Q.C. program, including the supervision and/or monitoring of all aspects of the installation.

The final field welding of the membrane deserves particular attention. It is the foreman's responsibility to ensure that all field welds are probed daily at a minimum and preferably, periodically throughout the day's production.

If any inconsistencies in the general quality of the application and/or the field welding are observed, all work should cease until corrective measures are taken to ensure the continuity of the entire installation process.

3.8 Flashing & Details

Fiberlite Seaman Corporation Notebook

Familiarize yourself with approved project specifications and detail drawings. Report and resolve differences between existing conditions and proposed drawings before proceeding with the installation of all flashings. Obviously, tear-offs require the removal of all existing flashing materials but most "re-cover" projects will also require the removal of existing flashing materials. Any loose or incompatible existing flashing materials must be removed.

3.8.1 Flashing Membrane Checklist

1. Clean all vents, pipes, conduits, walls and stacks to create an "as new" condition.

2. Remove and discard all lead, pipe and and drain flashings.
3. Remove all loose cant strips and loose wall flashings.
4. Follow the "approved" details for parapets, coping and metal edges.
5. All penetrations must be properly secured to the roof deck.
6. Flash all penetrations according to "pre-approved" details.
7. All flashing shall be tightly bonded/adhered to approved substrates.
8. Glue or seal all membrane flashings out and over parapet walls and exterior edges to prevent wind intrusion beneath the membrane.
9. The base of all membrane flashing should extend onto the plane of the deck a minimum of 3" beyond the field membrane's attachment point (nailers, plates and termination bars) to a maximum width of 8".
10. Terminate vertical flashing to a nominal 8" above the plane of the deck.

3.8.2 Seaman Corporation Pre-Molded Soil Stacks

3.8.3 WRAPID Flash™

Flashing a small conduit using a typical field wrap detail is labor intense when compared to just dropping a boot over a pipe penetration. It also takes a special talent to properly pattern the base and collar and effectively tie the two together, ensuring the finished detail is watertight and meets the aesthetic expectations of the customer.

With FiberTite's injection molded WRAPID Flash™ pipe flashing, wrapping any cylindrical penetration is simple and consistent. Labor is dramatically reduced, while quality is enhanced and aesthetics are improved.

3.8.2 WRAPID Flash™ (cont.)

Follow these steps for easy installation:

1. Cut the base along the clearly marked cut line. »

2. Trim off the top of the flashing, cutting along the corresponding gradient to match the pipe diameter. »

3. Wrap the flashing around the penetration.

4. Maintain a minimum ½-in overlap and tack weld the top of the conical collar and base in place ensuring symmetrical alignment. »

5. Weld the vertical seam on the collar first, using the penetration as a back stop for compression.

6. The base will flare or funnel up slightly but is easily formed flat when heat is applied.

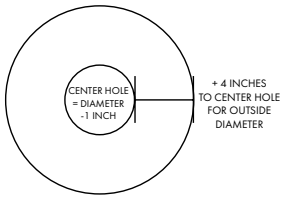
7. Finish welding the perimeter of base.

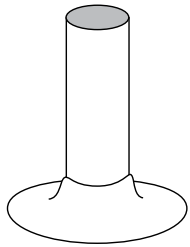
8. And complete the detail using a stainless steel worm gear clamp. Apply and tool a bead of FTR 101 sealant around the top of the clamp. »

3.8.3 Field Fabricated Soil Stacks

Create a target piece using non-reinforced material and the following formula. The center hole should be the diameter of the stack minus 1". The outside diameter should be 4" beyond that.

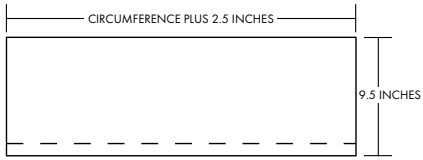
•••• 3.8.3 Drawing #1 ••••••••••••••••••





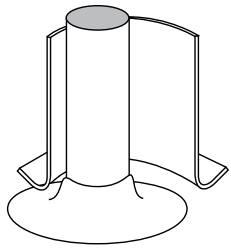
•••• 3.8.3 Drawing #2 ••••••••••••••••••

Create a piece for the collar 9.5" x the Circumference plus 2.5"

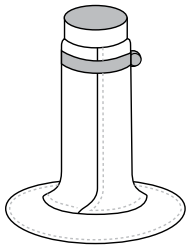


•••• 3.8.3 Drawing #3 ••••••••••••••••••

Fold bottom edge of collar up 1.5" and wrap around stack.



•••• 3.8.3 Drawing #4 ••••••••••



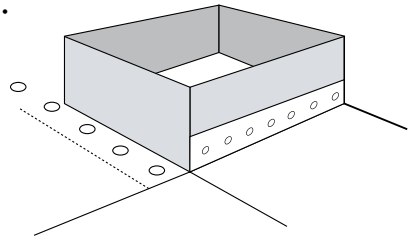
Turn down collar edge and weld all seams. Finish the detail by installing a stainless steel worm-gear clamp and sealant.

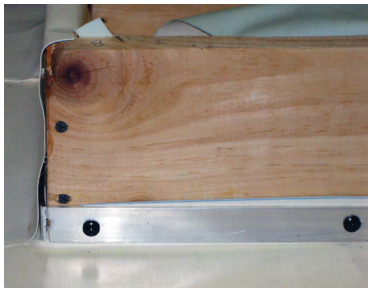
••••••••••••••••••••••••••••

3.8.4 Curbs and Corners

Secure the filed membrane around the curb with either plates and fasteners or vertically attached to the curb with termination bar according to the project specifications.

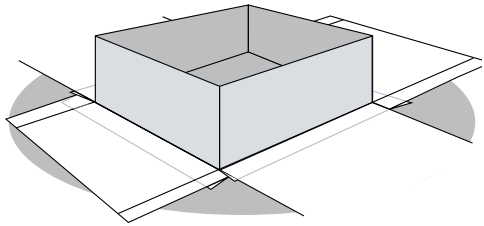
•••• 3.8.4 Drawing #1 ••••••••••••





•••• 3.8.4 Drawing #2 ••••••••••••••••••

Cut and lay out the flashing pieces, and tack weld them in place around the curb.



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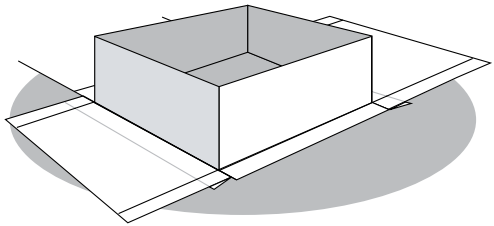
3.8.4 Curbs and Corners (cont.)

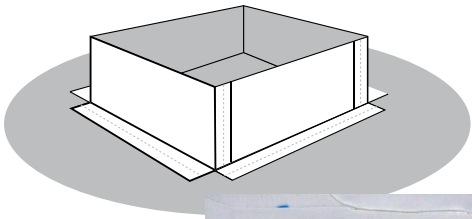
3.8.4 Drawing #3

Apply the adhesive to the vertical surface of the curb and a mirrored area on the flashing. Be neat and keep from contaminating weld area with adhesive. When the adhesive is ready, mate the surfaces one at a time.



3.8.4 Drawing #4

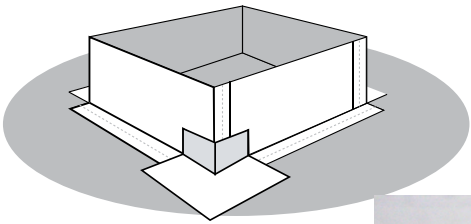
Install all four sides and weld all overlaps and the base of the flashing membrane.

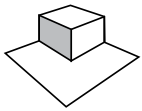


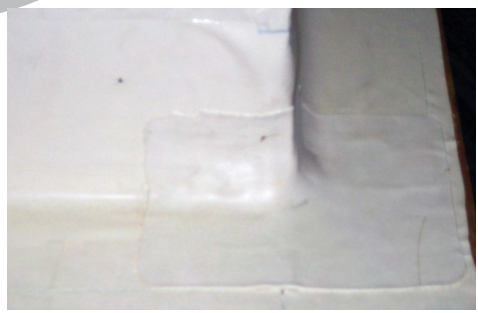
3.8.4 Curbs and Corners (cont.)

3.8.4 Drawing #5

Complete the flashing detail by welding FiberTite pre-molded corners in place.

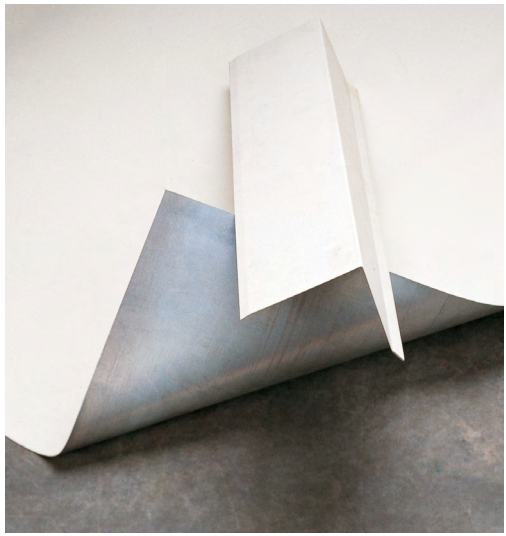






3.8.5 Flashing Metal

1. All perimeter edge details are to be fabricated from "FiberClad" metal or an approved two-piece locking metal facial system.
2. Insure all edge fascia extends 4" lower than the bottom of the wood nailers.
3. Fasten all metal flashing to wood nailers or approved substrates with approved fastener spaced no greater than 6" O.C.
4. Break and install "Fiberclad" metal in strict accordance with approved details, ensuring proper attachment, maintaining 1/2" expansion joints.
5. Flash metal expansion joints with a 5" strip of FiberTite membrane welded to the FiberClad metal. Cover plates are optional, per specifications.



3.8.6 Roof Expansion Joints

1. Flash all expansion joints in accordance with approved details.
2. Fasten all expansion joint material according to project specifications.
3. Ensure the expansion material has sufficient material to expand to the widest point of expansion without causing undue stress on the expansion joint material.

3.8.7 Pitch Pans

At first glance a pitch pan or pitch pocket may seem to be a "simple" way to overcome a flashing challenge to an aberrant penetration. Even at their best, pitch pans are marginally effective. They require periodic if not annual maintenance to ensure their watertight integrity. The building owner will bear the cost of a pitch pan for the life of the roof system. The money saved by not applying effective, albeit sometimes more expensive solution at the time the roof is installed will pale to the cost of future aggravation associated with its existence.

Every effort should be made to eliminate the need for pitch pans, including the removal of existing pans. Contact the FiberTite Technical Department for specific design recommendations.

Alternative to Pitch Pan »

In the event of no viable alternative:

1. Fabricate pitch pans from "FiberClad" metal.
2. Install the pitch pans in strict accordance with FiberTite details insuring proper attachment.
3. Pitch pan sealant shall not exceed the manufacturer's recommended depth or thickness.
4. Maintain a minimum 2" clearance around the penetration.

3.8.8 Roof Expansion Joints

Taper roof insulation to drain sumps using tapered edge strips. If insulation layer is 1 1/2" or less, taper 12" from the drain bowl. If insulation thickness exceeds 1 1/2", taper 18" from the drain bowl.

Mechanically fasten all tapers using a minimum of two fasteners per board. At the end of each workday, provide a watertight cover on all unused insulation to avoid moisture penetration.

1. Flash all roof drains in accordance with project details. Replace any worn drain parts that may cut the roofing membrane or prevent a watertight seal.

2. Replace all drain bolts or clamps holding the clamping to the drain basin. Ensure all drain basins are free of debris prior to leaving the roof after each day.

3. Replace all broken drain domes.

4. All drains must have approved compression rings.

5. Install 4'x 4' sheets of FiberTite non-reinforced material. All drain areas must be attached 12" O.C. above the sump area.

3.8.9 Temporary Seals

At the end of each working day or at the sign of rain, install a temporary watertight seal where the exposed edge of the completed new roofing terminates at the uncovered deck or old, existing roof surface.

Prior to the commencement of work, remove all temporary seals if they will cause a water dam and any exposed roof cement if used.
(DO NOT TRACK ROOF CEMENTS ONTO THE FIBERTITE ROOFING MEMBRANE.)

3.9 Inspection

The following are the areas that will attract the attention of the FiberTite Technical Representative during the warranty final inspection. Checking for proper welds and compliance with the job specifications will be his major concern. In general, he will be examining the roof to ensure that the contractor has executed the workmanship required to ensure the longevity of the system.

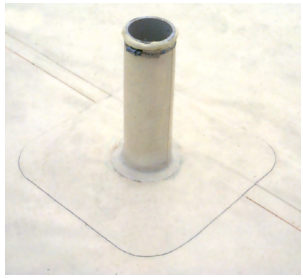
Careful inspection and close supervision during the installation of the FTR system are for the mutual benefits and advantages of the contractor's integrity and reputation, the security of the owner, and Seaman Corporation.

3.9.1 Inspection Flashing Details

Install all flashing in a neat and uniform manner with a "rounding" of all exposed corners. Check to ensure that all flashing details are being installed in compliance with both the written FTR specifications and detailed drawings. If there is any question or doubt on how to approach specific details, ask for clarification. Waiting until job completion is definitely the wrong time to discover the detail has been improperly installed.

3.9.2 Inspection Soil Stacks

Inspect all the hand welds in the same manner as the field seams. Collars and/or prefabricated soil stack "hats" are to be tight fitting. Termination clamps are to be tight and properly caulked.



3.9.3 Inspection Pitch Pans

The key here, which is true for all flashing details, is in the initial installation. Proper attachment to the deck, rounded corners on metal flanges, good welds and sufficient laps are essential elements for performance.

Inspect and probe all the hand welds. When flashing pitch pans, it's a sound practice to weld as much area of the flashing on the pitch pan as possible. Be certain that corners provide adequate coverage and are tightly welded. Voids will most often occur in the recess of the 90-degree angle on both sides of a corner or fillet.

Check for positive adhesion of the sealant to the protrusion and the sides of the pitch pan. Pans are to be topped off with the sealer sloping away from the protrusion to provide a positive water shed.

NOTE: Etching of the pan and the protrusion greatly assist in promoting strong adhesion between the sealants used and the pan.

3.9.4 Inspection Termination Bars, Wall and Curb Flashing

Terminations need to be a minimum of eight inches above the roof deck when possible. Check all the hand welds especially the inside and outside corners. If prefabricated corners are not utilized, be sure that field fabricated detailing are of sufficient size to provide adequate coverage over the corners.

1. At exposed flashing terminations, be sure that a continuous bead of caulking is applied between the wall and the FTR flashing membrane, directly behind the termination bar for a good compression seal.
2. Termination bars are prepunched 8" O.C. with 1/4" space.
3. Use sealants at the top of the termination bars to ensure a positive water shed over the termination.

3.9.5 Inspection Drains & Scuppers

1. All drains are to be tapered at a minimum of 12" on all sides to provide positive drainage.
2. Lead flashings, if used, are to have a 1" lip extending into the drain bowl.
3. Apply a caulking bead of sealant between the drain flange and the FTR membrane and between the FTR membrane and the drain-clamping ring.
4. Install the clamping ring tightly using the proper number of bolts required for the drain.
5. A minimum of one inch of FTR non-reinforced membrane should be visible around the inside perimeter of the clamping ring.
6. A minimum of 12" of FTR non-reinforced membrane should be visible outside of the drain ring.

3.9.6 Inspection Clad Metals and Perimeter Flashings

Make sure that the metal is installed neatly and securely anchored according to specifications. Check all the perimeter welds and be especially critical when inspecting clad welds, as they are the roofing system's first lines of defense against wind uplift. All the metal joints are to be stripped with FiberTite.

3.9.7 Probe All Welds Daily

Contrary to popular belief, it is not the responsibility of the FiberTite Technical Representative to probe all of your welds to find the poor ones. Alternatively, he will "read" all your welds with and perform periodic probing to ensure you were effective in your duties to inspect, probe and repair errors prior to his final inspection.

3.9.8 Repairs

Physical properties of the FiberTite membrane make it possible for it to be repaired by heat welding a patch at any time during its life. The following guidelines will assure a reliable, waterproof repair.

Dirt, oil and other contaminants must be removed with a chemical solvent such as Acetone or MEK (methyl-ethyl-ketone). Use a clean white cotton rag and wipe the surface. Do not pour a chemical directly on the membrane as these solvents may affect the coating.

A newly applied or slightly soiled membrane may be cleaned by using a good detergent like Spic-n-Span and a stiff bristle brush. Rinse well to remove detergent film before patching. Observe all precautionary instructions on the labels of these products for safe use.

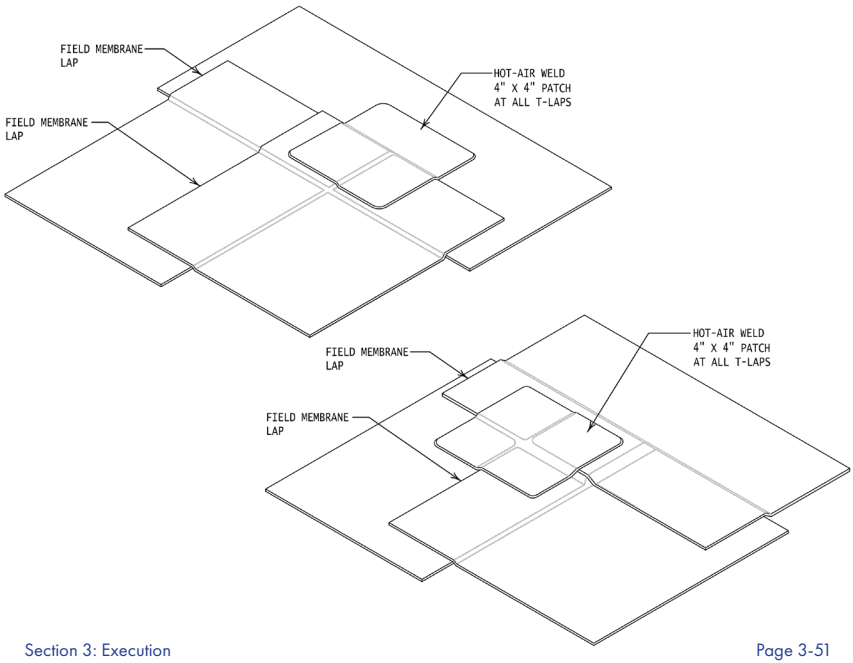
3.9.9 Inspection Patches

1. When a patch is required, weld the entire patch if possible. After the weld cools, check the entire surrounding perimeter of the patch for any welding voids.
2. All areas to be patched must be clean and dry.
3. When patching over a seam, highlight the underlying seam edge.
4. Patches are to be uniform, rectangular with rounded corners and extend to a minimum of 2" beyond the defect in all directions.
5. Whenever a seam requires multiple patches to the point where it becomes aesthetically displeasing, a minimum of a 4" wide cap strip should be welded over the incorrectly welded seam.

3.9.10 T-Joint Covers

T-Joints occur where three overlapping sheets of roofing membrane intersect. Because of the extra thickness of membrane at these locations, these joints may not seal properly due to the "memory" of the membrane.

FiberTite T-Joint Covers are used to seal T-Joints at weld intersections of 3 or more sheets or pieces of FTR membrane. Installation of T-Joint Covers is mandatory on all FiberTite Membrane Systems greater than nominal 45-mil, Vegetated Roofs, Ballast Roofs or where T-Joints have not been properly sealed to exhibit a minimum 1.5" defined crease along the T-Joint.



3.9.11 Inspection/Repair/Patching

1. In the event that an area of the membrane system has been identified for repair, the welding basics discussed in Section 3.5: Welding, represent the basics for repairing the membrane as well.

2. Evaluate the area to be repaired. Patches are to be uniform, rectangular with rounded corners and extend a minimum of 2" beyond the defect in all directions.

3. Repairs can be classified as either "minor" or "major."
   a. Minor: small cuts, holes, burns, punctures or abrasions exposing the base fabric
   b. Major: loose fasteners, large rips, tears or areas with multiple "minor" infractions

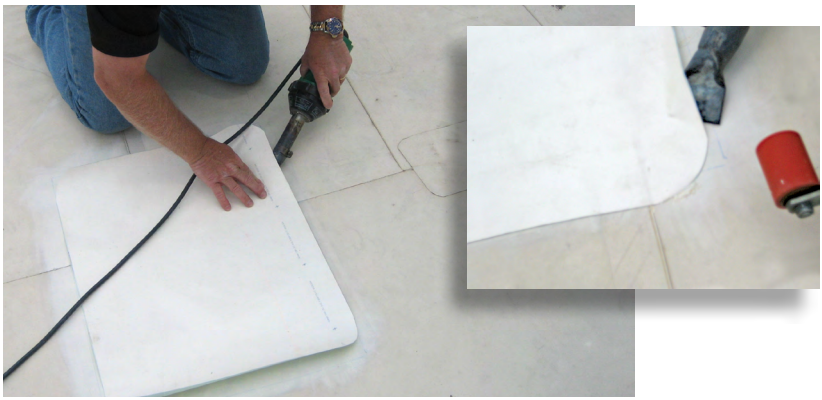
4. When patching a field-weld or seam area, it is a good practice to try to weld the entire patch and highlight the underlying seam edge.

5. Clean up the surface of the membrane and the back side of the patching membrane, a minimum of 2" around the damaged or patch area using a white cotton rag in conjunction with either Acetone or MEK.

6. Do not pour the solvent directly onto the membrane.

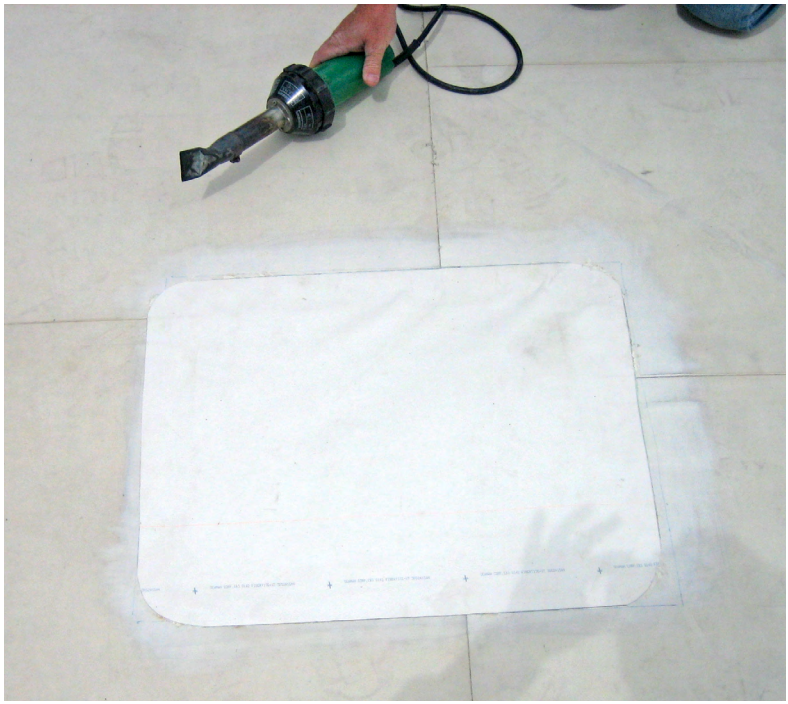
7. Position the patch and align it so it sets square to surrounding seams and tack-weld it in place.

8. Weld the perimeter of the patch, ensuring a minimum 1.5" continuous weld.



3.9.11 Inspection/Repair/Patching (cont.)

9. Once the area has cooled, probe the perimeter to ensure the weld is uninterrupted and 100% watertight.



10. In the event that a field seam requires frequent or multiple patches, a minimum 4" wide strip of membrane should be welded over all the patches/the area to cover all the defects and present a more uniform and aesthetically pleasing appearance.