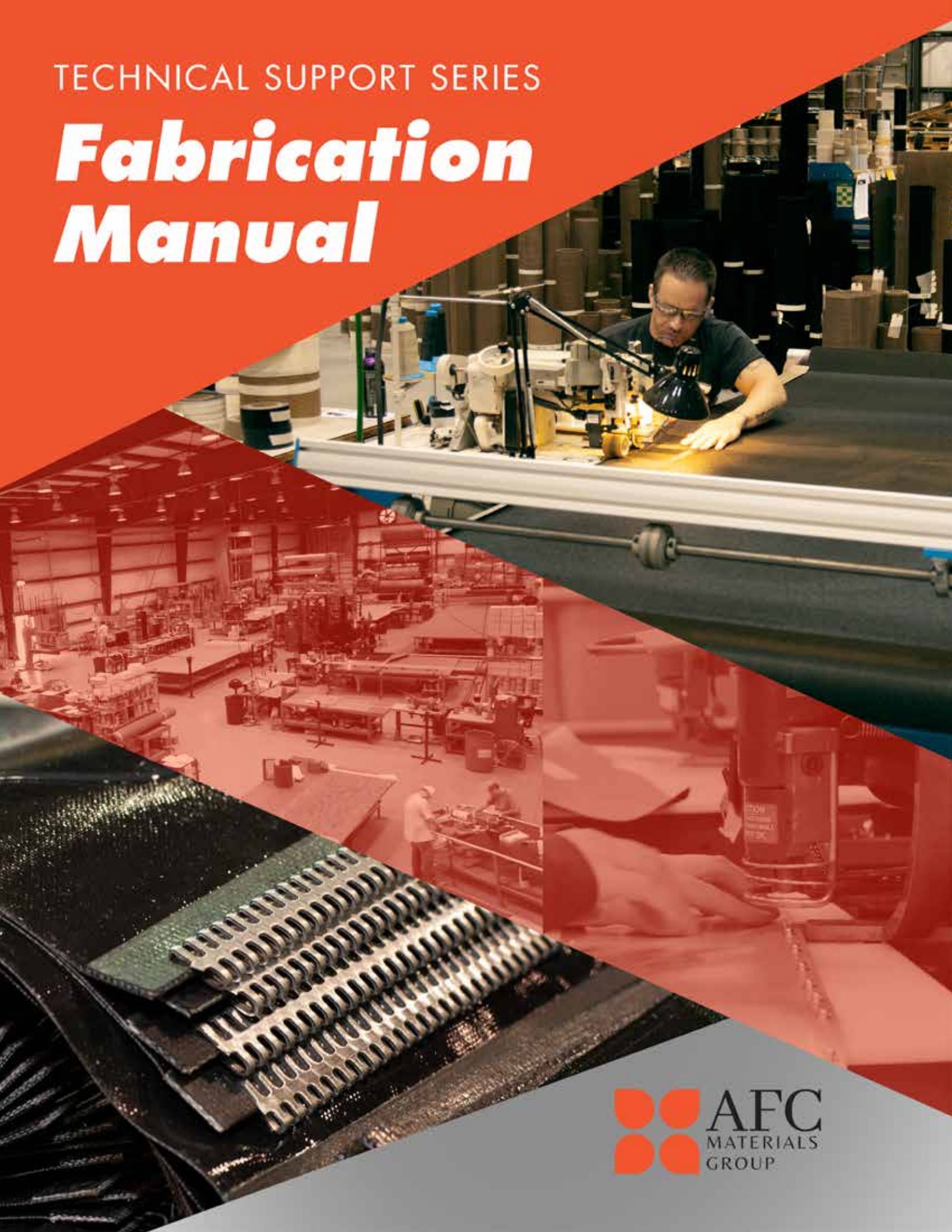


TECHNICAL SUPPORT SERIES

Fabrication Manual



TERMS USED IN THIS GUIDE

PROCESS BELT AFC manufactures only process belts. This means that the product being conveyed is somehow changed as it is transported on the belt. Common processes include heating, cooking, curing, drying, cooling, freezing, vulcanizing, crosslinking, etc. AFC does not manufacture drive belts.

WARP YARN Woven textiles are the substrate for almost every belt made by AFC. Woven fabrics have two sets of yarns (fibers). The yarn that runs the length of the belt is called the warp yarn.

FILL YARN The yarn that runs across the belt is the fill yarn

PTFE is the short version of Polytetrafluoroethylene. This is a high temperature plastic (polymer). PTFE made by DuPont is called Teflon. In this guide we will only use the term PTFE

SILICONE or silicone rubber is a high temperature elastomer with a rubber like feel. Silicone has good release (non-stick) properties and a high coefficient of friction

BONDING FILM PTFE coated fabrics are difficult to bond to other PTFE coated fabrics. To obtain a good bond it is necessary to use a bonding film between the PTFE coated materials. The use of a bonding film is essential for field bonding such as joining the ends of a belt. AFC provides FEP and PFA bonding films.

COEFFICIENT OF FRICTION is a measure of how slippery a surface is. PTFE coated materials have a very low coefficient of friction. In other words they are very slippery.

FLUOROPOLYMER is a term meaning a plastic (polymer) having Fluorine as one of the components. All fluoropolymers are high temperature plastics. This group includes PTFE, FEP, PFA and many others

PEEK is a strong, high temperature polymer (plastic). The full chemical name is polyetheretheretherketone.

KEVLAR is a very strong high temperature fiber. Kevlar is a trademark of DuPont.

NOSEBAR or NOSEROLLER is a very small diameter device, usually located at the exit end of a conveyor. This design applies high bending stress to the belt seam. Kevlar belts are usually recommended for this type machine.

SEAMS METALLIC

Metal Seams are the most common method for joining conveyor belts of all types. Most metallic seams, when used on AFC lightweight belting, will require an end reinforcement called a bullnose to be attached to both belt ends. This increases the thickness and strength of the belt ends prior to installing the metallic seam. See Page ___ for bullnose design information. The temperature rating for all metallic seams is higher than the rating of all AFC belting materials. For service above 500°F, special bullnose attachment methods may be needed. Consult AFC for design when the operating temperature is above 500°F. Metallic seams are not recommended for microwave ovens.

CLIPPER LACING

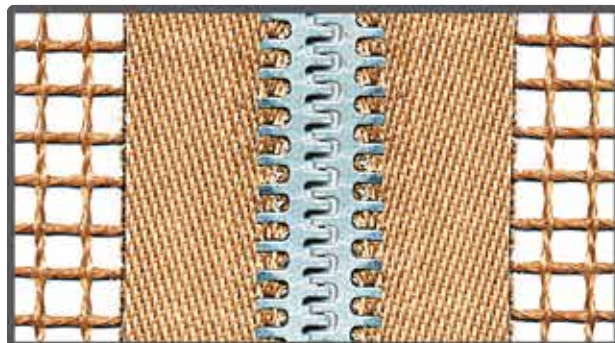
This seam consists of a series of small wires that pierce the belt end. A metal pin is inserted to join the belt ends. Three sizes are available. UX1 and 25LL are steel. Size 36LL is stainless steel.



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	★★	N/A	★
SOLID WEAVE	★★	★★	★★	N/A

ALLIGATOR LACING

This seam consists of a continuous metal strip. Teeth penetrate the belt ends to attach the alligator to the belt. A metal pin is inserted to join the belt ends together. AFC stocks two varieties. Style 00 is galvanized steel. Style 00S is stainless steel.



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	★★	N/A	★
SOLID WEAVE	★★	★★	★★	N/A

PLATE LACING

This seam is stronger and thicker than clipper or alligator. It is recommended only for very thick belting, such as 300-62. Style RS 62S is our only stock plate lacing. It is stainless steel.



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	N/A
SOLID WEAVE	N/A	N/A	★★	N/A

SEAMS HEAT SEALED NON-METALLIC

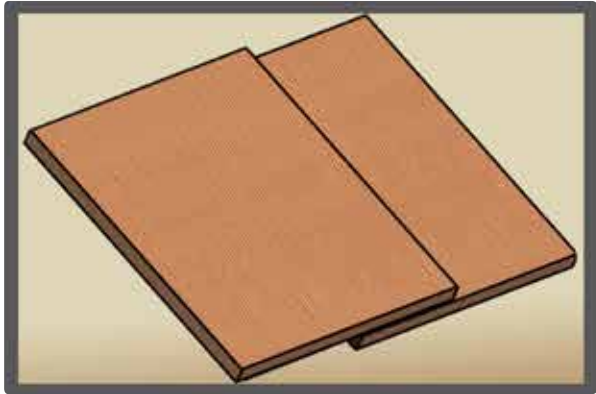
Heat Sealed Seams are non-metallic seams. Smaller belts are typically supplied as endless belts with a heat sealed seam formed at AFC. Larger belts can be heat sealed at the end-user's location. AFC offers a complete package for this type of installation, including the belt, sealing tools, sealing supplies, and on-site training/technical assistance. See the section in this manual on **TOOLS** for additional information. All of the seams in this category can be joined endless at the end-user's location.

SIMPLE OVERLAP

This is the most common type of heat sealed seam. The seam will be approximately twice as thick as the belt body. This seam is simple to install in the field and is often as strong as the belt itself.

- Applications:
- Laminators • Side Sealers
 - Belt Grills for Cooking Food

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	★★	N/A	★
SOLID WEAVE	★★	★★	★★	N/A



DIAGONAL OVERLAP

Similar to the simple overlap, except at an angle (other than 90°) to the edge. Diagonal seams are used when roller sizes are smaller than recommended.

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	★★	N/A	★
SOLID WEAVE	★★	★★	★★	N/A

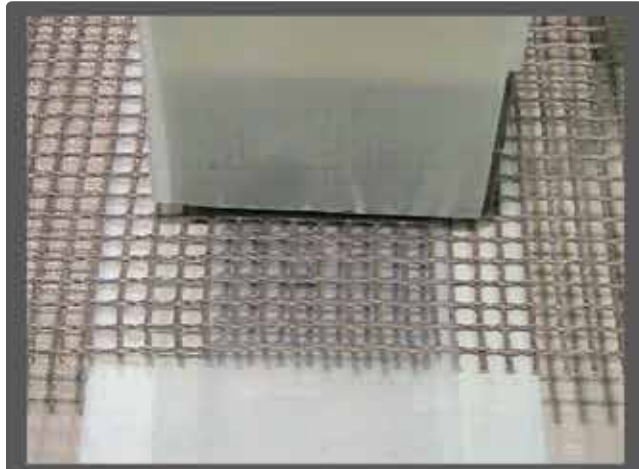


OPEN MESH OVERLAP

Ovens for processing aluminum cans will often use a heat sealed overlap seam in order to prevent tipping of the cans at dead plate transfers. AFC offers a seam prep kit to facilitate heat sealing at the end-user's location. See page 16 for more information on AFC's seam prep kit. Virtually all belts for making aluminum cans are heat sealed in the field by the end user. See page ___ for heat sealers used in this type of installation.

- Applications:
- Aluminum Can IBO Ovens
 - Aluminum Can Washer Dry Off Ovens

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	★★	N/A	★
SOLID WEAVE	★★	★★	★★	N/A



SEAMS HEAT SEALED NON-METALLIC

Heat Sealed Seams are non-metallic seams. Smaller belts are typically supplied as endless belts with a heat sealed seam formed at AFC. Larger belts can be heat sealed at the end-user's location. AFC offers a complete package for this type of installation, including the belt, sealing tools, sealing supplies, and on-site training/technical assistance. See the section in this manual on **TOOLS** for additional information. All of the seams in this category can be joined endless at the end-user's location.

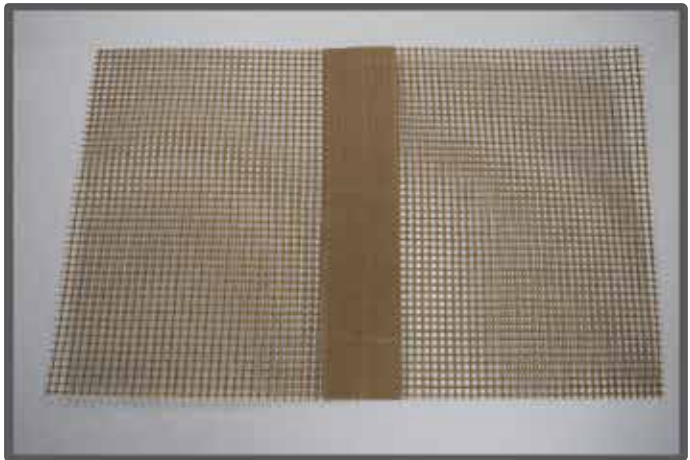
OPEN MESH BUTT

This seam is similar to the OPEN MESH OVER-LAP seam in that it is primarily used for processing aluminum cans. The butt seam will be slightly thinner than an overlap. It will also be slightly weaker and more difficult to fabricate in the field.

Applications:

- Aluminum Can IBO Ovens
- Aluminum Can Washer Dry Off Ovens

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★★	★★★	N/A	★
SOLID WEAVE	★★★	★★★	★★★	N/A



BUTT SEAM SOLID WEAVE

All AFC belts can be butt seamed with the use of a back reinforcement at the seam. A top reinforcement is also recommended to cover the crack in the seam on the product side. Butt seams are often thinner and more flexible than overlap seams. For machines that sometimes reverse directions, butt seams are recommended. Butt seams can be 90 degrees or diagonal.

Applications:

- Bi-Directional Belts
- Laminator Belts
- Side Sealers

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★★	★★★	N/A	★
SOLID WEAVE	★★★	★★★	★★★	N/A



All of these heat sealed seams can be ordered at a 90 degree angle (straight across) or for machines with small rollers, an angled seam can be ordered. AFC can provide belts sealed endless at AFC or open ended. AFC is the only supplier of PTFE and Silicone coated belts that also offers the full range of belts, tools, bonding films, supplies, and training needed for field installation of belts. Finger Seams are a special form of a heat sealed seam. They are described in a separate section on Page ___ of this guide.

SEAMS

SOFT SEALED

NON-METALLIC

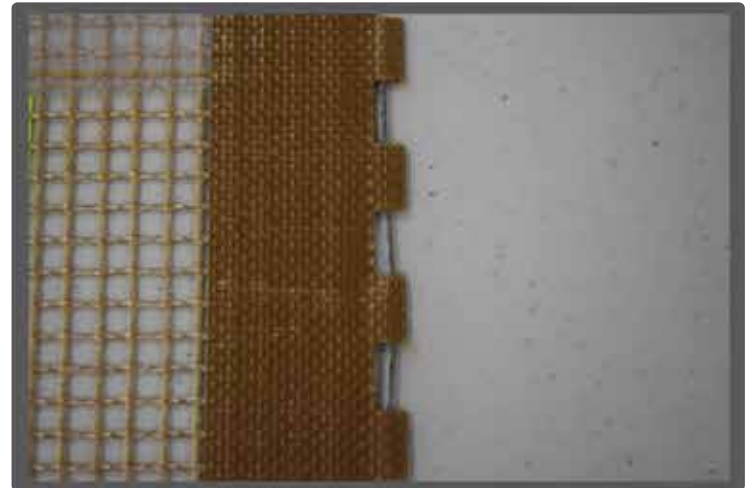
Soft Sealed Seams are non-metallic seams. The loops are constructed with PTFE coated fabric. Soft sealed seam belts which are used for food service applications are described on page __. Soft seals are also well suited for microwave ovens when a non-metallic pin is used. Most soft seal seams use a non-metallic pin to join the belt ends. Metallic pins, metal flat bars, and fluoropolymer coated metal pins are also available. See page __ for information on available pins.

ATTACHED SOFT SEAL

Belts constructed from PTFE coated fiberglass cannot be folded over to form an end loop. All fiberglass belts, both open mesh and solid weave, must use an attached PTFE coated Kevlar fabric to form the loops. The soft sealed fabric can be sewn and/or sealed onto the belt. The soft seal forms its own bullnose reinforcement.

Applications:

- Tortilla & Pizza Presses



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★★	★★★	N/A	★
SOLID WEAVE	★★★	★★★	★★★	N/A

SELF LOOP SOFT SEAL

Belts constructed from PTFE coated Kevlar can use the belt material itself to form the soft seal loops. No additional material is needed. The loop can be formed by sewing, sealing, or both. This construction results in a very flexible seam and a smooth surface on the product side (top) of the belt.

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★★	★★★	N/A	★
SOLID WEAVE	★★★	★★★	★★★	N/A



Open mesh belts that require airflow across the seam area can choose from several designs. This section describes options for pin seams only. AFC recommends a pin and leader kit be used together with all of the seams on this page. See page ___ for details on this product.

Sewn On Kevlar Loop

Open mesh PTFE coated fiberglass **cannot** be folded back on itself. A separate piece of open mesh Kevlar must be sewn onto the belt ends to form the loops. AFC strongly recommends the use of a PEEK spiral with this type of seam. For belts wider than 24 inches, the addition of a PEEK spiral is essential.

Applications:

- Hot Air Circulating Ovens



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	N/A	N/A	N/A
SOLID WEAVE	N/A	N/A	N/A	N/A

Rewoven Kevlar Loop

PTFE coated Kevlar belts requiring maximum airflow in the seam area should consider a re-woven seam. This provides even more airflow than the simple foldback seam described above. A belt material having a Kevlar fiber as the warp yarn must be used for this seam. This seam is also available with a PEEK spiral termination. For belts wider than 24 inches, the addition of a PEEK spiral is essential. See page ___ for details.

Applications:

- Hot Air Circulating Ovens



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	★★	N/A	N/A
SOLID WEAVE	N/A	N/A	N/A	N/A

Open mesh belts that require airflow across the seam area can choose from several designs. This section describes options for pin seams only. AFC recommends a pin and leader kit be used together with all of the seams on this page. See page ___ for details on this product.

Simple Foldback Loop (Kevlar)

Open mesh PTFE coated Kevlar Belts can use a sel-loop seam constructed by simply folding the end of the belt back against itself and sewing it. This provides good airflow at the seam. AFC strongly recommends the use of a PEEK spiral with this kind of seam. For belts wider than 24 inches, the addition of a PEEK Spiral is essential. See page ___ for details.

Applications:

- Non-UV Curing Ovens
- Hot Air Circulating Ovens



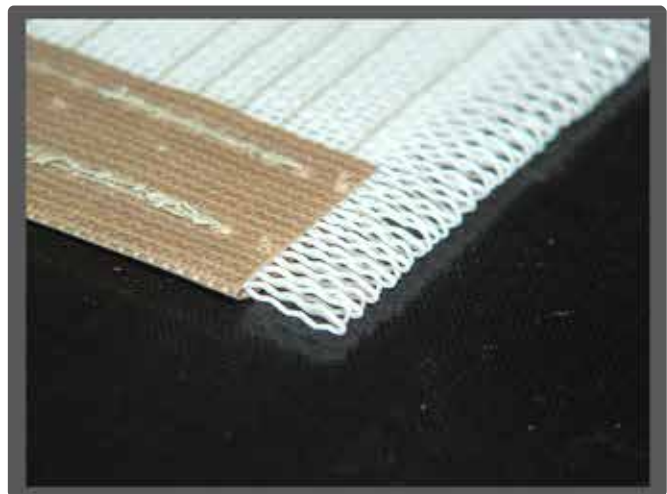
	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	N/A	N/A	N/A
SOLID WEAVE	N/A	N/A	N/A	N/A

Simple Foldback Loop (Monofilament)

Belts of any width, made from monofilament fabric, can use a simple fold-back loop seam. This is the preferred seam for monofilament.

Applications:

- Food Dehydrator Ovens
- Pasta Drying Ovens
- Hot Air Circulating Ovens under 300°F



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	★★
SOLID WEAVE	N/A	N/A	N/A	N/A

SEAMS

REWOVEN

ENDLESS

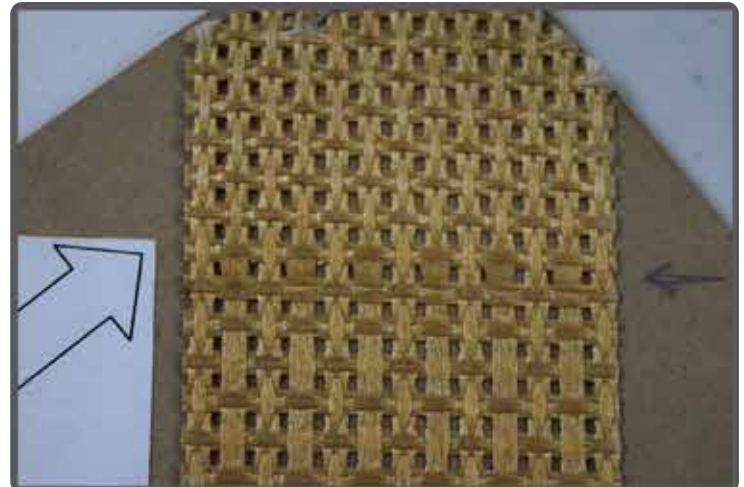
Rewoven seams are made endless at AFC. There is no pin in these seams. The machine must be disassembled in order to put on the belt.

REWOVEN FIBERGLASS STYLE 27-37

AFC is the only supplier of this seam. It is the only fiberglass belt material that can be woven endless. The result is a seam with the same porosity, the same thickness, and the same appearance as the body of the belt. Temperature rating of this seam is also much higher than any other seam offered by AFC. Please consult AFC for applications higher than 500°F.

Applications

- Foam Curing Ovens
- Photovoltaic Cell Ovens
- Off Gassing Process



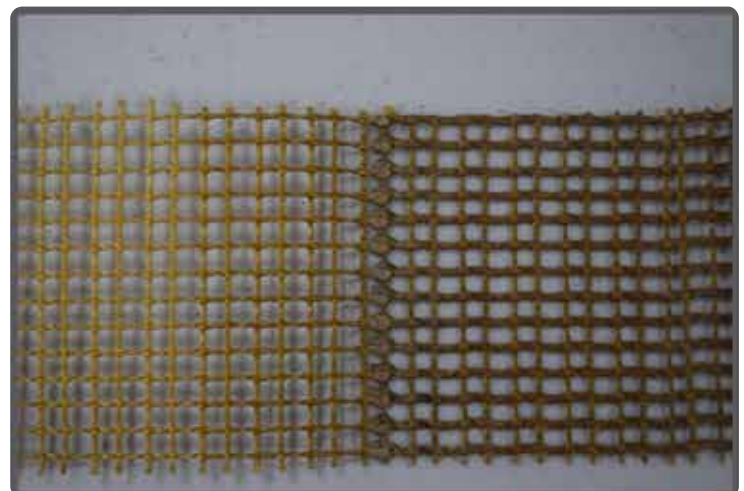
	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	N/A	N/A	N/A
SOLID WEAVE	N/A	N/A	N/A	N/A

REWOVEN KEVLAR

AFC's 507-27 and 507-42 can be rewoven to maintain maximum porosity across the seam. The belt will be made endless at AFC. The end user may also consider AFC's Rewoven Kevlar Seam with a PEEK spiral pin added. Porosity at the seam is close to an endless woven seam.

Applications

- Small Convection Ovens
- Small Non-Woven Ovens with Nose Bars



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	★★	N/A	N/A
SOLID WEAVE	N/A	N/A	N/A	N/A

This section describes options for rewoven Kevlar seams. These seams can only be used on Kevlar meshes due to them using part of belt as a rewoven seam. They offer a high level of porosity.

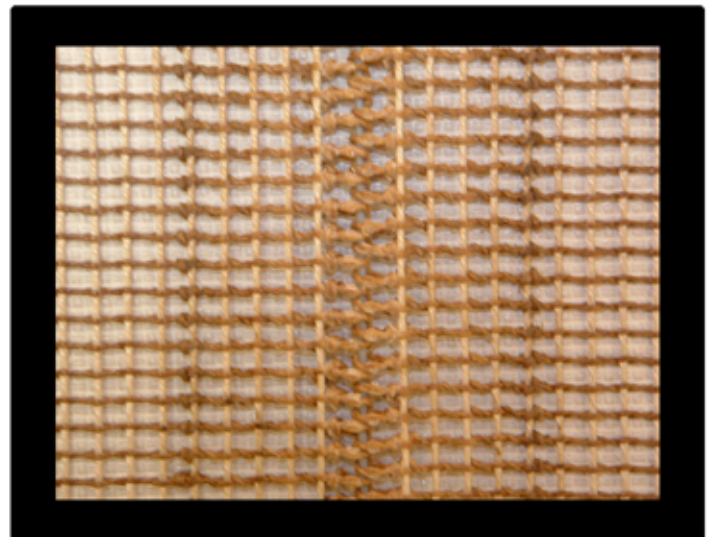
REWOVEN KEVLAR SEAM

Open mesh Kevlar styles (507-27, 507-42 and 507-44) can be rewoven to produce a seam that is very near to the porosity of the belt body. Loops of the seam are formed from the Kevlar warp yarns. This seam is best used for belts under 2 ft wide. For belts wider than 2 ft, we recommend a Rewoven Kevlar Seam with a PEEK Spiral.

Applications:

- Small Convection Ovens
- Nose Bars
- Small Non-UV Curing Ovens

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	★★	N/A	N/A
SOLID WEAVE	N/A	N/A	N/A	N/A



REWOVEN KEVLAR WITH PEEK SPIRAL

Open mesh Kevlar Styles (507-27, 507-42 and 507-44) can be rewoven to include a PEEK Spiral termination. This is our most porous pin seam. AFC recommends this seam for belts over 2 ft wide.

Applications:

- Non-Woven Processing

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	★★	N/A	N/A
SOLID WEAVE	N/A	N/A	N/A	N/A



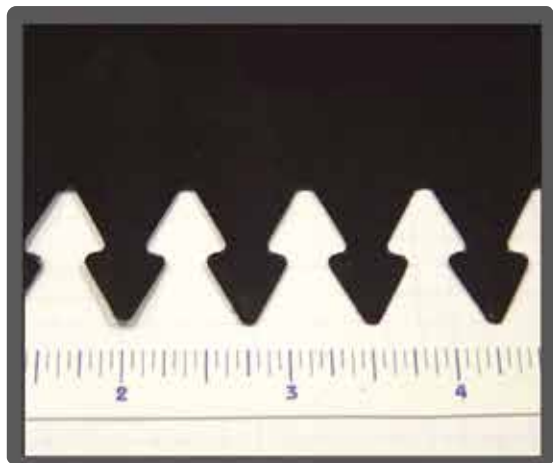
SEAMS FINGER SEAMS

Applications needing the thinnest possible seam should consider a finger seam. The finger design allows for a very thin back reinforcement, resulting in a seam that has a minimal change of thickness at the seam. Finger seams are recommended for applications needing minimal mark-off (seam impression) of the products being conveyed. Machines with very small roller diameters or nose bars are two examples of applications needing maximum flexibility at the seam.

Processes that heat the product by conducting heat through the thickness of the belt should also consider a finger seam. Thickness change in a seam area is minimized with a finger seam. Therefore, the change in thermal transfer rates is also minimized. A PTFE film can be applied to the top of the fingers to improve release and cleanability. This film is referred to as a molded seam. It is recommended for all food applications of finger seams. See page __ for details on molded seams.

ARROWHEAD FINGER SEAM

AFC offers both a small and large Arrowhead Seam. The small arrowhead is used for belts under 12 inches wide and the large arrowhead is used for belts 12 or more inches wide. This design is recommended for end users who need to install a finger seam at their location. AFC can provide the necessary tools, materials, and training needed to enable the end-user to install their own finger seams.



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	N/A
SOLID WEAVE	★★★	★★★	★★★	N/A

DIAGONAL SMALL ARROWHEAD FINGER SEAM

A Diagonal Small Arrowhead Finger Seam is recommended for belts under 12 inches wide. It is used on machines with very small rollers, including nose bars.



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	N/A
SOLID WEAVE	★★★	★★★	★★★	N/A

SEAMS

FINGER SEAMS

Applications needing the thinnest possible seam should consider a finger seam. The finger design allows for a very thin back reinforcement, resulting in a seam that has a minimal change of thickness at the seam. Finger seams are recommended for applications needing minimal mark-off (seam impression) of the products being conveyed. Machines with very small roller diameters or nose bars are two examples of applications needing maximum flexibility at the seam.

Processes that heat the product by conducting heat through the thickness of the belt should also consider a finger seam. Thickness change in a seam area is minimized with a finger seam. Therefore, the change in thermal transfer rates is also minimized. A PTFE film can be applied to the top of the fingers to improve release and cleanability. This film is referred to as a molded seam. It is recommended for all food applications of finger seams. See page __ for details on molded seams.

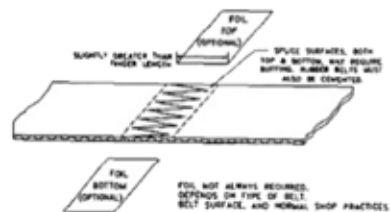
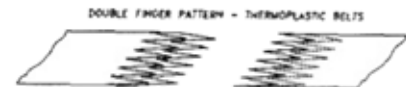
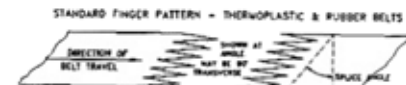
NOTCH SEAM

This design is an earlier version of a finger seam. New belt applications should use a finger seam instead of a notch seam.

Applications

- Laminators with Large Rollers

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	N/A
SOLID WEAVE	★	★	★	N/A



All finger seams offered by AFC require a reinforcement strip on the back side of the fingers. Most belts can use a 3 mil reinforcement (.003 inches thick) with good results. The use of a very thin backing strip keeps the thickness of the seam to a minimum and also provides a seam with maximum flexibility.

All finger seams and notch seams will have the reinforcement on the inside of the belt. This provides a smooth surface on the product side of the belt. In special cases, the reinforcement can be placed on the outside of the belt. Finger seams to be used on machines with nose bars may want to consider this design.

SEAMS

SILICONE ONLY SEAMS

Silicone coated fiberglass fabrics can be fabricated with many of the seams listed in other sections of this manual. These include metallic seams, soft seal seams, and PEEK spiral seams. This section describes seams that are specific to silicone coated fiberglass belts.

STEP SEAM

AFC multi-ply silicone fabrics included our 300-42 (two plies of fiberglass) and 300-62 (three plies of fiberglass). These materials can be ply split and rebonded to form a seam that has a smooth product surface and minimal change of thickness in the seam area. AFC can provide an endless belt (bonded endless at AFC) or we can provide ends prepared for seaming at the end user's location.

Rebonding of the seam can be accomplished by two methods. RTV silicone adhesive will provide a good bond without heat. It requires 24 hours to obtain full strength. Heat activated silicone bonding agents are also available from AFC. This method achieves full strength in about 20 minutes. Heat activated bonding requires additional tools and supplies, all of which are available from AFC.

Applications

- Mail Handler Belts
- UV Curing Ovens



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	N/A
SOLID WEAVE	N/A	N/A	★★	N/A

DIAGONAL STEP SEAM

Diagonal step seams are recommended for applications having small rollers. All the information shown above for Step Seams also applies for Diagonal Step Seams.

Applications

- Mail Handler Belts
- UV Curing Ovens



	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	N/A
SOLID WEAVE	N/A	N/A	★★	N/A

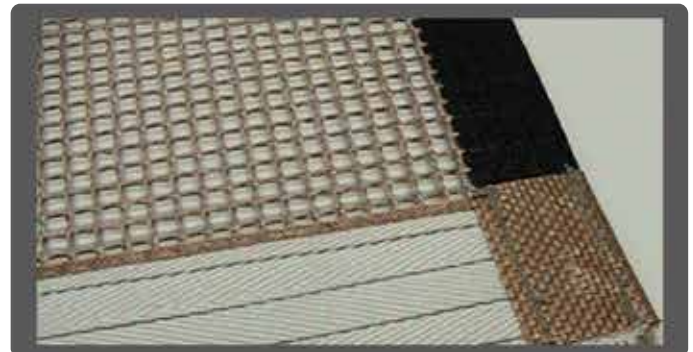
SEAMS

MISCELLANEOUS SEAMS

BULLNOSE ONLY

End reinforcements can be added to the end of the belt to prepare the end for installation of grommets, holes, or other mechanical fasteners. Often the end user installs these devices. AFC can provide these devices as well. See page __ for details.

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★	★	N/A	N/A
SOLID WEAVE	★	★	★	N/A



CUT & SQUARED

Installing a belt at the end user's location by heat sealing will require accurately cut ends. The customer may choose to make the final cut himself. This is recommended for large machines where the new belt ends may become damaged while threading it through the machine. Smaller machines may opt for cut and squared ends. The belt ends will be accurately cut to the exact final length and squared. This simplifies the heat sealing process for the end user.

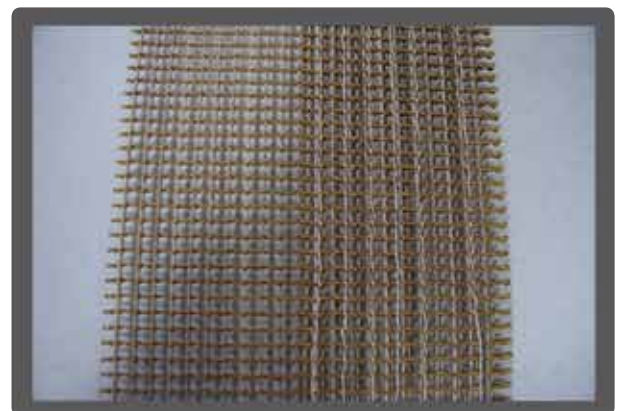
	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH			N/A	
SOLID WEAVE				N/A



SEWN ONLY

Applications requiring an extremely flexible seam can use a sewn only seam. Special cases may also consider a Sewn Only bullnose to obtain maximum flexibility.

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★★	★★	N/A	★★
SOLID WEAVE	★★	★★	★★	N/A



SEAMS

MISCELLANEOUS SEAMS

RUBBER EXTRUSION HIGH HEAT SEAM

Ovens with exceptionally high temperatures should consider a seam originally developed for rubber extrusion vulcanizing ovens. This diagonal seam uses a combination of heat sealing and sewing to withstand the high temperatures.

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	★	★	N/A	N/A
SOLID WEAVE	★★	★	★	N/A

OFFSET BUTT SEAM

Small belts, such as band sealer belts, are constructed with two layers of thin fabric. Each layer of the belt has a butt seam that is reinforced by the other layer of the belt. This results in a belt that has exactly the same thickness at all points around the belt, including at the seam. This design is limited to narrow belt widths. Please consult AFC for belts over 3 inches wide using this seam.

	PTFE Coated Fiberglass	PTFE Coated Kevlar	Silicone Coated Fiberglass	Mono-filament (uncoated)
OPEN MESH	N/A	N/A	N/A	N/A
SOLID WEAVE	★★	★★	N/A	N/A



At AFC Materials Group we know that you want to be an industry leader. In order to do that, you need high-quality, customized belting, delivered on-time. The problem is poor construction, low quality, and late shipments, which make you feel frustrated and under pressure. We believe you shouldn't be forced into a solution that doesn't fit your needs.

We understand that you want to focus on the quality of your product without worrying about the performance of your belts, which is why we have been collaborating with customers for over 30 years on belting solutions.

Here's how to do it with our 3-Step Success Plan:

1. **Connect**
2. **Collaborate**
3. **Configure**

Call a Customer Success Team Member today to discuss what we can build for you. So, you can stop losing time and wasting money and instead increase throughput and meet your customers' needs.



**SOLUTIONS THAT
FIT YOUR NEEDS.**

14 Waler Court
Lake in the Hills, IL 60159
800-334-9372
FAX 800-336-3938
afcmaterials.com
sales@afcmaterials.com

