

## PVC-Coated Weldable Webbing

# Flexible Strength

**for vinyl banners  
and signs.**



PCV-coated Weldable Webbing, here applied using the trim-to-edge method, adds substantial tensile strength to banner edges to prevent fabric stretching, the biggest problem for grommets.

- *Enhanced quality for smaller shops.*
- *Increased efficiency for high volume companies.*
- *Plenty of productive applications.*
- *Install with confidence.*



To keep both costs and weight under control, banner and sign makers are always on the lookout to find ways to use lighter materials.

Using PVC-Coated Weldable Webbing™ to reinforce lightweight fabric signage provides several structural options and achieves proven durability advantages.

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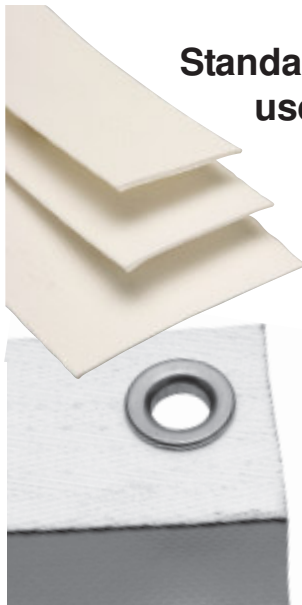
## PVC-Coated Weldable Webbing - **the Material**

# Additional Strength for Vinyl Fabric

Non-wicking *Weldable Webbing* is tightly woven polyester (PET) webbing fully coated and impregnated with thermoplastic vinyl (PVC). Proven in the European curtainside trailer industry, and now widely accepted in the North American fabric structure, tent, tarp, sign, and banner industries, PVC-Coated Webbing achieves maximum-strength welds using **hot air, hot wedge, or high frequency welding**. It can be bonded using vinyl-solvent adhesives. And, as a textile product, it can also be sewn.



Curtainside trailers have a rib of PVC-webbing every half meter attached to tension buckles along the deck of the trailer.



### Standard types commonly used to reinforce signs, banners, billboards.

**Type 1281** comes in three widths with increasing tensile strength:

25mm - 1"	<b>1400 lbs.</b>
30mm - 1-3/16"	<b>1650 lbs.</b>
47mm - 1-7/8"	<b>2900 lbs.</b>

**Type 7010** for conditions that demand extreme strength:

50mm - 2"	<b>5900 lbs.</b>
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By welding panels together and adding additional structure and reinforcement with weldable webbing, visual communication companies can produce spectacular, grand format signage on vinyl fabrics. When installed on location, they are expected to stay in place. So, given the weight of a finished sign and the dynamic forces that will affect it, the remaining question is: how strong does it need to be?

# PVC-Coated Weldable Webbing - the Material

## Additional Strength for Vinyl Fabric

PVC-Coated Weldable Webbing™ adds the flexible strength of webbing to various vinyl-coated fabrics as needed in different applications. It has become a standard structural component in the fabrication of curtainside truck walls and in building tents and tensile structures. Manufacturers are able to place increased tensile strength where they need it, based on the design and load characteristics of



their products. This same strength is available to vinyl sign and banner printers to be sure that their creations can be hung with confidence.

PVC-Coated Weldable Webbing™ is tightly woven polyester web with finished edges, engineered for longitudinal “tensile” strength (end-to-end pull strength). The polyester yarn inside is the same fiber that is used to weave rugged “sling webs”



or flexible “round slings” used by riggers to lift heavy loads. It is strong stuff. The webbing is woven with tightly finished edges, just like

the seatbelt in your car. (It is not a strip of narrow material slit off a wider roll.)

The woven inner “scrim” of PVC-Coated Weldable Webbing™ is coated with a special vinyl surface. It is formulated to be compatible with the surfaces on the coated or laminated vinyl fabrics commonly used in the tent, curtainside truck, and sign industries.

In the finishing process, heated PVC paste is applied to the scrim using a special process that actually impregnates vinyl completely through the woven fibers, not just on the surface, to be sure of maximum adhesion.

When positioned against another vinyl-coated fabric (or another piece of PVC-Coated Weldable Webbing™), the vinyl material on facing surfaces can be welded. A chemist would say that vinyl is a polymer, and thus its molecules can be easily disassembled and rejoined with other vinyl molecules,

combining the two separate surfaces into one single construction. On the practical, industrial level, the essential point is that heat, radio waves, or chemical solvents can soften vinyl. If two surfaces are similarly softened and pressed together while still soft, they will join and re-harden together as a welded bond.



### Photos:

Top Left: PVC-webbing seen as reinforcement on the insides of a curtainside trailer.

Bottom Left: PVC fabric containment boom uses PVC-webbing to hold chains and weights under water.

Above: PVC coated webbing is used in all types of large and small tents and fabric structures.

# PVC-Coated Weldable Webbing - the Material

## Product Specs

Substrate Webbing (Scrim): 100% Polyester.

Impregnated Coating: Polyvinyl Chloride (PVC).

Non-Wicking Construction.

Part Number	Width mm.	Width in.	Nominal Width in.	Standard Colors	Thickness (mm)	Thickness in.	Tensile kgs.	Tensile lbs.	Weight gr/m	Weight oz/yd.
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### Lighter Weight and Standard Products

1281-25	25	1"	1	white	1.00	3/64"	700	1400	24	0.8
1281-1	30	1-3/16"	1	white	1.00	3/64"	750	1650	28	1.0
1281-2	47	1-7/8"	2	white black gray	1.00	3/64"	1300	2900	49	1.6
7007	47	1-7/8"	2	black	1.60	1/16"	2400	5200	78	2.5
7010	50	2"	2	white	1.65	1/16"	2800	5900	83	2.9

### Heavier Weight and Specialty Products\*

(in ascending order by tensile strength)

4630	25	1"	1	white black	1.80	5/64"	2000	4400	50	1.8
5052-628	28	1-1/8"	1	white	2.50	3/32"	3000	6600	90	3.2
4763-99	30	1-3/16"	1	white	3.30	1/8"	4500	9900	105	3.7
5052-110	50	2"	2	white	2.25	5/64"	5000	11000	133	4.7
4763-165	50	2"	2	white	3.30	1/8"	7500	16500	179	6.3

\* Consult manufacturer concerning machine settings for welding thicker materials.

# PVC-Coated Weldable Webbing - for Grand Format jobs

## A Reliable Structural Component for Dependable Installations

The first question to consider is the weight and type of fabric to be used. In many cases, building a banner with strong webbing reinforcement can allow moving down in fabric weight or moving from solid fabric to mesh.

Using lighter fabric definitely requires a good plan for proper reinforcement. This almost always includes applying webbing around the perimeter of the sheet. In addition, webbing is sometimes sandwiched inside overlap seams or placed behind butt seams. For large, multi-panel banners and for building wraps, designers may also add “runners” or “ribs” of

webbing horizontally or vertically across large sheets to stabilize the fabric against edge curl or to resist pulling on the bias.

Even with mesh or light fabric, the physical weight of a large wrap covering a construction scaffold or a giant sign spanning the entire side of a building necessitates the use of proper webbing reinforcement. Those calculations are made based on the weight of the sign or banner fabric by itself, *plus calculations of additional loads* due to environmental forces.



### Photos:

Bostonians have been driving by this Celtics banner for four years. Mesh fabric is bordered with 30mm pvc-coated webbing.

Stunning, high resolution graphics in the Big Apple. Clarity of images requires installations with solid tension for a flat, clean, no-ripple appearance.



# PVC-Coated Weldable Webbing - for Grand Format jobs

## A Reliable Structural Component for Dependable Installations

The variety and range of types of signs in this category is broad — everything from covering the whole side of a large building, to running printed fabric along the perimeter fence of an urban jobsite, to huge banners that hang in a stadium. And many types of smaller constructions can also undergo significant stress. Truckside banners, for example, may be traveling down a highway at 80mph and banners strung across streets can exert a tremendous pull on the poles to which they are attached.

The sign designer must consider all of the loads that will be pulling, tugging, and jerking his creation at its attachment points. These are really not simple or easy calculations. It is truly the job for an engineer familiar with both the physics of wind load analysis and the appropriate provisions of the applicable building codes to determine the required strength of a large sign. Some signs have very little exposure to natural forces while others must be prepared for hurricane force environments. Square area is, of course, the primary consideration but many additional factors come into play including the structural characteristics of the sign, height above ground, number of supports, and surrounding structures or topography.

*The most important structural consideration for the fabric sign itself is to insure that the edges of the installed panel will not stretch. Material stretch defeats grommets. And sagging material catches more breeze, causing more flapping, tugging, and tension. So it is necessary to consider not just the point load at the individual attachment points, but also the tensile load pulling from attachment to attachment along the banner edges.*



A clean installation using concrete anchors and washers into an edge reinforced with pvc-coated weldable webbing.

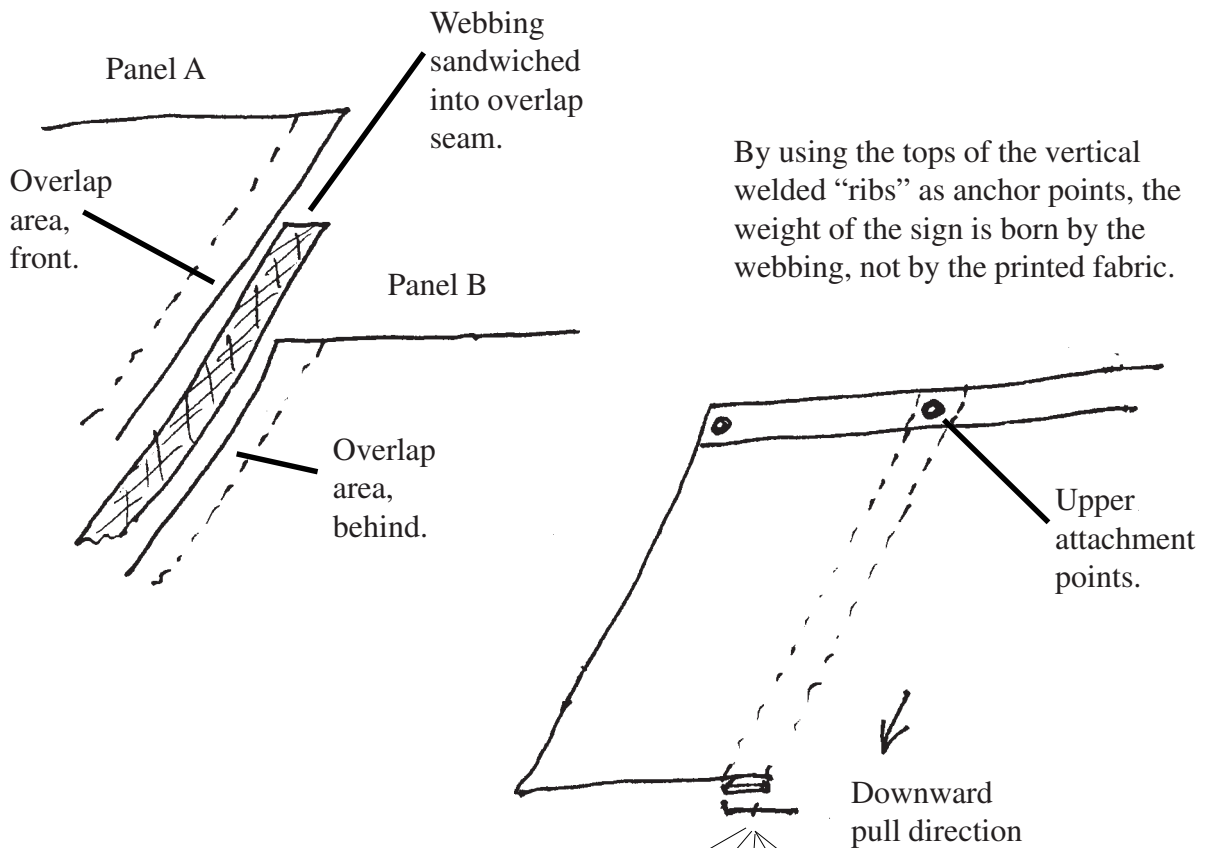
With a good idea of the structure that will be required, a sign maker can choose the appropriate fabric to print.

In addition to applying the appropriate weight of webbing around the edges of a sheet, final assembly features may also include webbing being sandwiched into overlap seams (see drawing), extra rib strips added across calculated load points, or webbing used to attach “D” rings at the ends of support runs.

# PVC-Coated Weldable Webbing - for Stronger Construction

## Three-Layer Sandwich Seams.

Since PVC-Coated Weldable Webbing is coated on both sides, it can be welded between panels of fabric inside an overlap seam.



By using the tops of the vertical welded “ribs” as anchor points, the weight of the sign is borne by the webbing, not by the printed fabric.

Wide format printing invites even wider format finished jobs... requiring welded seams and solid installation. Here webbing welded into sandwich seams takes the load off broad panels of mesh fabric.



# PVC-Coated Weldable Webbing - for Grand Format jobs

## A Reliable Structural Component for Dependable Installations

### High-Load Installation Considerations: Banner Reinforcement Solutions

At the big-boy end of the vinyl banner industry, so-called *grand format* signage, the anchoring devices used and the attachment systems employed are really matters for the construction industry. If a huge fabric banner is going to be attached to the side of a building, the owner of that building wants to know what the damage to his building will be. And the advertiser, sign printer, and sign installer want to be sure that the banner is securely hung so that it stays in place and is not damaged by environmental forces.

There have been cases that made people chuckle... but not the sign builder or advertiser... when a building owner has refused permission to hang a grand format sign when he realized that the installer was planning to drive concrete anchors into his building.

In these large applications, the anchoring hardware used is not fancy. It is probably not anything on display at sign shows. We are dealing with simple, dependable, and heavy-duty nuts, bolts, and washers, plus lots of specialty construction industry devices like hammer-drive pin anchors or expansion shields, all used to attach things to the sides of buildings. Thus, many of the

little clips and gadgets sold by our friendly sign supply guys are no longer practical.

Assuming that the building owner and the local building inspector are satisfied with the attachment mechanisms to be used, another structural component to be considered is the structural integrity of the sign itself. Is it strong enough to withstand the forces that will affect it? (Calculate fifteen pounds per square foot times the square area of the surface divided by the number of attachment points.)

Sign builders are not always expert in dynamic load estimates. And clearly, some banner edges are not finished strongly enough. We don't think the building will fall down. And we have confidence that the installer will use hefty enough hardware to hold the sign in place. But will the sign itself hold up to the combined loads of (1.) desired tension (for a flat surface), (2.) additional sources of steady tension due to the normal pull of gravity and occasional strong, sustained winds, and (3.) the flapping and tugging caused by lighter or gusty winds.

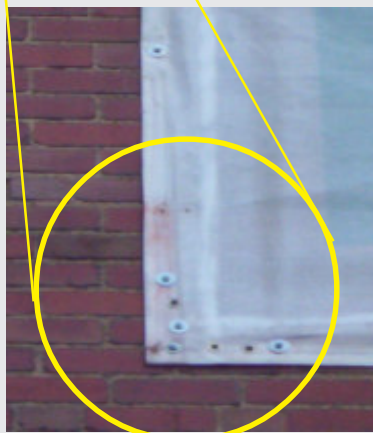
Once the question has been raised, there is no defense for building a large format sign without sufficient structure.



When an installer works on the side of a building, he wants a sign that will fasten solidly with whatever type of hardware is appropriate for the surface onto which he must attach it.

# Finishing for No-Worry Installations ...

**Sometimes grommets can be in the wrong place....**



It was obviously a struggle to find solid anchoring points for the corner of this 40x40 banner.

**PVC-Coated Weldable Webbing™ is recommended, instead of hemming, when banners:**

- will be hung outdoors in conditions that may involve significant wind or rain;
- are expected to last for several months outdoors;
- will be taken down and re-hung several times;
- are so large that their own weight demands extra reinforcement;
- and/or, when the span between anchor points is long.

When attaching fabric signs to a building side, installers sometimes prefer that the fabric edges be reinforced with PVC-coated webbing but that no grommets are installed. This allows for precise positioning of concrete anchors exactly where needed. One technique used is to push a power drill bit through the webbing on reverse. This produces just enough heat to make a clean hole with nicely sealed edges.

## PVC-Coated Weldable Webbing - in Smaller Shops

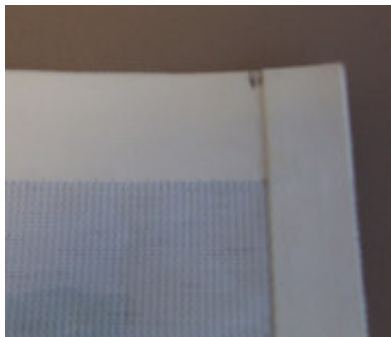
# A Practical Material for Reinforcing Smaller Vinyl Banners and Signs

### Advantages of PVC-Coated Weldable Webbing™ ...

There are several uses and many different methods of applying PVC-Coated Weldable Webbing™ in the sign and banner business. The primary benefit is, of course, added strength. There are as many examples of how to use the webbing as there are sign makers, but some of the key points to remember are:

### Stronger

When applied to the back edges of a banner (called “trim to edge”), the webbing takes up the entire corner-to-corner load so there is no worry about your banner fabric ripping or stretching. Since material stretch is the primary cause of grommet failure, grommets installed in the webbing are much more structurally secure. The trim to edge technique also allows designers to use the full dimensions of their printed fabric.



Adding webbing to the back of a banner or sign using the “trim-to-edge” method is one of the best ways to reinforce perimeter mounting points, usually grommets, and is also a much faster finishing technique compared to stitching a hem.

### No Hems Needed!

With welded-on webbing edges, there is no need to hem. Hemming (folding material over and attaching it to itself) creates a finished look that has become traditional for cloth banners. In fact, hemming has been necessary since the dawn of scissors – it has been necessary to fold material over to prevent an unfinished, cut edge from fraying. Hemming also creates a double or triple layer of material that becomes a thicker edge in which to cut holes for mounting grommets. Some hems are stitched; others are accomplished by using an adhesive tape. But neither type of hem significantly strengthens the span from corner to corner. For indoor and short-use banners, a simple hem may be sufficient. For outdoor banners exposed to the elements, for any banner or sign that will hang for a long time, or for banners that may be taken down and re-hung several times, the extra strength provided by PVC-Coated Weldable Webbing™ is recommended.

### Easier and Faster

Applying PVC-Coated Weldable Webbing™ is faster and easier than sewing, especially for small banners. Some shops estimate that they can cut down their finishing time by 75% versus sewing hems. With the proper equipment, any shop can do it in-house. And there is no need for the added expense or the lost time waiting for jobs sent out to be finished elsewhere.

#### *Shop Tip..*

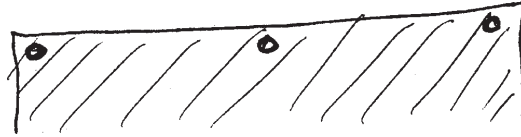
*When working with webbing edges using a small free-rolling welder on a work bench or on the floor... Begin by setting an anchor point by stapling or taping a “tail” where you will begin your weld. By working away from a firm starting point, you can better “drive” a straight line with the welder. Snip the tail off after the run is complete.*

# PVC-Coated Weldable Webbing - in Smaller Shops

## A Practical Material for Reinforcing Smaller Vinyl Banners and Signs

### Other Methods of Finishing Banner Edges.

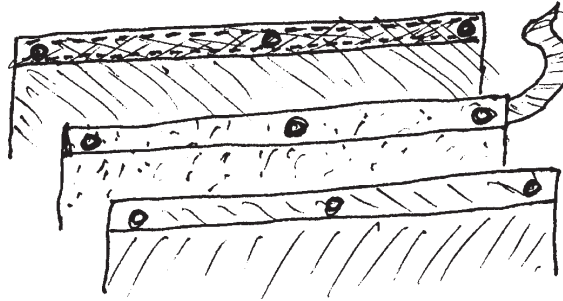
Installing Grommets into Plain Fabric.



Provides zero additional strength and no extra thickness for grommet installation. Only for the cheapest temporary indoor banners.

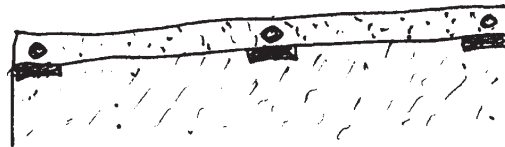
Hems: folding material over onto itself. Different methods of securing:

- Stitching
- Tape
- Welding



Folding adds a little extra thickness for grommets and gives a finished look but only doubles tensile strength of fabric along edge, say from 150 to 300 lbs. Not sufficient to prevent stretching and therefore grommet failure in many outdoor conditions.

Hems with Grommet Backing: (extra layers of material inserted to provide thickness at grommet locations).

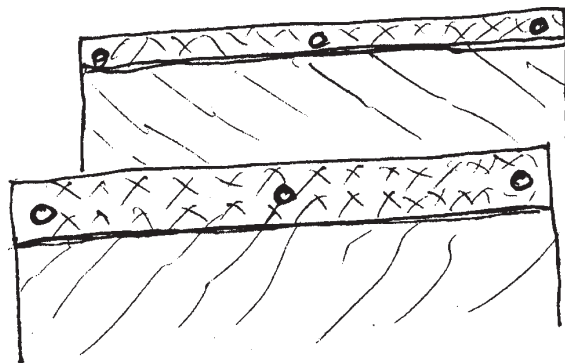


Provides extra thickness for grommet installation but does not significantly increase tensile strength between mounting points permitting material stretch.

### Adding Strength and Structure with PVC-Coated Weldable Webbing

Different widths and weaves provide various tensile strengths, much stronger than fabric:

- 1" - 1400 lbs
- 1-3/16" - 1650 lbs.
- 1-7/8" - 2900 lbs.
- 2" - 5900 lbs.



Easy "trim-to-edge" method requires no folding or hems. Adds thickness for stronger grommet mounting and provides substantial tensile strength along entire edge. Webbing takes the load between mounting points taking stress off banner fabric.

## PVC-Coated Weldable Webbing - in Smaller Shops

# A Practical Material for Reinforcing Smaller Vinyl Banners and Signs

Sign manufacturers all have their own tricks and clients may specify anything as a starting point. But it is important to build a sign that will stay in place as installed. The performance features of the selected fabric and the strength of the added weldable webbing can combine to produce a dependable and durable construction. Several points to consider include:

- Choosing the appropriate material by weight and construction is very important. Going lighter may be possible using mesh, for example, but using light fabric also requires being sure to use all appropriate reinforcement.
- Remember that PVC-coated webbing is weldable on both sides. This allows application within an overlap seam when joining panels.
- After edge webbing is welded, it is important to install any grommets so that the webbing takes the load. For example, at corners, edging strips should be overlapped so that a grommet can transfer the load to webbing in both directions.
- Applying webbing along the sides of signs and banners can prevent curled edges.
- If using D rings as attachment devices, webbing looped back on itself can hold them, but it is necessary to anchor the loops by stitching or riveting to prevent peel.
- It is also helpful to remember that welding repairs can be done in the field using a hand-held heat gun and a roller. If ever it is necessary to add additional reinforcement and to rejoin separated components, welding on site can be much more cost-effective than taking down an entire sign and transporting it to somewhere where something can be sewn.

Any and all of these sign construction ideas will be covered by local regulations and codes. When permits are required, construction and installation must be quantified to an inspector's satisfaction. In many cases, using weldable webbing with its published tensile strength as an edge finish can demonstrate that load factors were properly considered with an appropriate safety ratio built-in.



(Remember that, despite all the discussion here about fabric welding, PVC-Coated Weldable Webbing is still a woven textile product. It can also be stitched, as would any other webbing. Note also on this application that a fabric rivet is also used to support the d-ring loop fold-back.)

# PVC-Coated Weldable Webbing - the Welding Process

## A Range of Technical and Cost Options

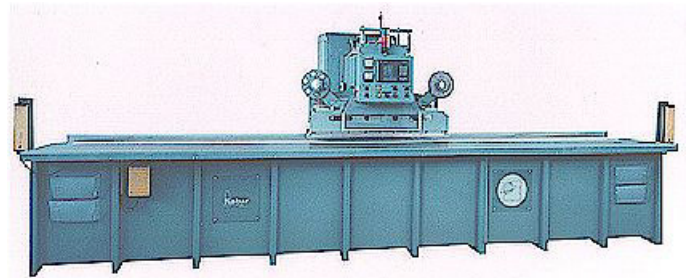
### Many Options to Consider

Fabric welding is a relatively recent development in the sign and banner business. But it is a proven technology that has been used in many industries for decades. It is used for everything from high-tech tensile structures to low-tech roof materials.

Welding is a useful capability for outdoor sign producers, even for those with printers capable of running the widest available fabrics... because even if you can print 16 feet (5 meters) wide, someone will want you to produce something wider. Thus, printing companies are initially and primarily concerned with welding sheets together, typically using overlap seams, to construct grand format graphics.

The industry uses three different types of welding devices, each with its own characteristics and advantages.

**Electronic Welding:** Using various wave transmitters (ultrasonic, “impulse”, or radio frequency or “RF”) these sophisticated machines employ a generator that directs electronic waves (ranging from 2.0 to 20.0 KHz) between a pressure bar and a platen. Fabrics to be welded are placed on the platen, the bar is pressed down on the fabric, and electronic wave action activates the PVC molecules enough to weld facing surfaces held by the bar.



**Hot Air Welding:** Air heated to over 400° F is directed through a nozzle precisely into the space *between the fabrics* to be joined. The heated surfaces are then pressed together by a roller that follows the nozzle. (Note, this is not the same technique as using a “heat press” that introduces heat from the outside of the materials pressed.)



**Wedge Welding:** Fabrics to be joined pass through spaces above and below a heated metal wedge as it moves along between the materials. The resulting heated surfaces are then pressed together by a trailing roller.



#### Photos:

Top Right: A traveling bar, high frequency welder.

Left: Production scale hot air machine with traveling welding head.

Middle Right: Shop hot air welder can be used on a work bench or on the floor.

Bottom Right: Wedge welder, used on work bench, often with a track system to insure straight welds.

NOTE: links to a number of welding equipment manufacturers can be found at [www.louisagreen.com](http://www.louisagreen.com).

# PVC-Coated Weldable Webbing - the Welding Process

## A Range of Technical and Cost Options

### Welding: Methods and Equipment Choices

Return on an investment in welding equipment is a function of the volume of welding to be done. Clearly, a small shop that does only a few banners a week is different from a large production operation making thousand of billboards each month. The range of start-up costs can vary from the acquisition of a large piece of capital equipment down to the purchase of a functional shop tool. But it is also becoming clear that the variety of available machine choices makes in-house welding a worthwhile consideration for just about every business that produces signs, banners, awnings, tents, tarps, or anything else made out of vinyl coated fabric.

High-volume production operations looking at large investments in welding machinery must first choose their preferred welding process (RF, hot air, wedge). But beyond that, there is a wide range of machine features to consider including process controllers and material handling devices. It turns out that standard production operation of even the larger, more sophisticated welders is something that most regular shop employees can pick up quickly and handle effectively after a small amount of training. But, if for no other reason than the floor space required, consideration of a large industrial welder is a significant decision process for most companies.

Smaller shops usually rule out large machines for reasons of space, let alone budget constraints. But that does not leave them without an interesting mix of possibilities for “starter” and medium scale operations. As the budget gets lower, the practicality of radio frequency machines diminishes. But hot air and wedge welders can offer quite sophisticated operational features that fit most shop budgets, all the way down to simple hand-operated hot air guns.

#### *Remember...*

*The main reason companies use welders is to join panels to fabricate larger works.*

*The same welder used to make overlap seams can also be used to apply PVC-Coated Weldable Webbing for structural reinforcement, often without even adjusting the settings.*

Among the many variables to consider when looking at welding machines is the width of the welded area as determined by hot air nozzles, hot wedge dimensions, or the bar of a high frequency machine. It is important to settle on a practical width for the most common seams or webbing to be welded and/or to understand what is involved in changing welded-width dimensions if that flexibility is desired. Many banner shops, for example, can normally be content with one-inch seams and webbing edges... but they later find out that it may be more desirable to use two-inch seams and webbing edges when they print on mesh fabrics. Switching back and forth between different widths brings up the question of the ease of interchangeability of certain parts in the welding machine and it should be determined if this is important to the user as part of the equipment purchase decision.

Each sign and banner business is unique. But evaluating the potential return on investment of an appropriately sized welding capability is something that any company that prints on vinyl fabrics should consider.

# PVC-Coated Weldable Webbing - the Welding Process

## Understanding Fabric Welding

### Welding: Technical Considerations

The success (or failure) of welding two pieces of fabric is determined very simply: did they stick together? If the operator and client are happy with an overlap seam or a nice strong webbing reinforcement around edges of a job, then it is successful. If the seam comes apart or the webbing pulls off, then someone is going to be dissatisfied.

Most welder manufacturers are more than happy to offer training and technical support. So there is plenty of information and advice to be had. But before the details of operating a specific machine on a specific fabric, there are a few generalities that are helpful as an overall framework of understanding.

*The primary relationship to consider is between the three variable components of the welding process: heat, time, and pressure. Understanding and controlling these three is the key to accomplishing good welds.*

### Heat

Just the right amount of heat – technically exciting the molecules so that they “plasticize” – is necessary to soften the two surfaces so that they can be joined. Too little heat and the surfaces stay too hard to be joined. Too much heat and you damage the fabric or burn down the shop. Heat is the key variable to control, whatever the type or source.

### Time

Time, of course, plays into this equation in several important ways. Power or temperature settings on a welding machine are based on dwell time or pass time assumptions. Even at a correct temperature or power setting, if the process is too fast, the surfaces might not soften. Or if the process is too slow, the material might be damaged. Either variation can defeat the intended weld. Also, after the molecular joining phase of two softened surfaces is accomplished, the success of the final weld is dependent on the appropriate amount of pressure being applied soon enough and for a sufficient amount of time to allow the weld to solidify. If the pressure comes too late, surfaces might have already hardened so that they cannot properly join. And if the pressure is not applied for enough time, even if it begins on time, the weld might be incomplete.

### Pressure

Pushing two softened surfaces together and holding them so that the vinyl coatings actually join requires pressure. Technically, it is so that the plasticized molecules can re-link to each other. This is accomplished directly by a high frequency bar as it applies radio waves, or it is accomplished by a roller device that follows immediately behind the heat source on a hot air or wedge welder.

# **PVC-Coated Weldable Webbing - the Welding Process**

## **Additional Technical Considerations**

Operators who weld fabric must always be conscious of these three key variables: heat, time, and pressure. But there is more to understand.

It is important to be familiar with the welding performance characteristics of different materials. Interestingly, some users will swear that a material welds well when others have trouble or claim that the same material will not weld. Clearly there are many variables.

It is important to determine before anything else that a material is, in fact, weldable at all. This is done by welding it to itself. Then, when joining different materials, they must prove to be compatible. Machine and material manufacturers will have technical guidelines and can give advice. But ultimately, shop experimentation may be necessary to determine the appropriate machine settings to accomplish a good weld.

Lightweight webbing, for example, usually welds at similar settings to the way a machine would be set up to weld overlap seams in banner fabric. Medium weight webbings might only require minimal machine setting adjustments, while heavier, dense webbings (not normally used on signs or banners) may need special adjustments.

Surfaces to be welded should be clean and free of contaminants.

### **Strength Testing**

Once welded, the question automatically comes to mind: how strong is it? (This is different from the other important concern: how strong does it need to be?)

To understand the strength-of-weld question, one must first visualize a side view of a three-layer sandwich: on the top is the scrim of the first fabric; in the middle is a layer of joined-by-welding vinyl coating material; and on the bottom is the scrim of the second fabric.

### **Shear Strength**

The initial test of strength would be the “shear” strength of the weld, that is, the parallel sideways forces working to slide one surface off the other surface. This is ultimately a function of the square area being stressed. In most cases, even when the overlapped welded area is very narrow, it does not take too much length for the square area of the weld to make it very strong against a shear stress. This is because the pull is working against the entire welded area.

### **Peel Strength**

By contrast, a subsequent test of a weld would be its “peel” strength. In this test, it is impossible to expect a fabric weld to be very strong since peeling is, in fact, only tearing the weld apart one row of joined molecules at a time. A good weld should not peel off easily but it will peel.

The force needed to peel the vinyl away from whichever side of the peel gives first is the maximum strength that the weld can hold. This is an important point. Because, if the welded vinyl molecules are joined strongly, the fully joined layer of vinyl will then peel away from the weaker of the two scrim materials onto which the vinyl coating has been applied. This leaves a “peel footprint” that shows the exposed woven scrim.

# PVC-Coated Weldable Webbing - the Welding Process

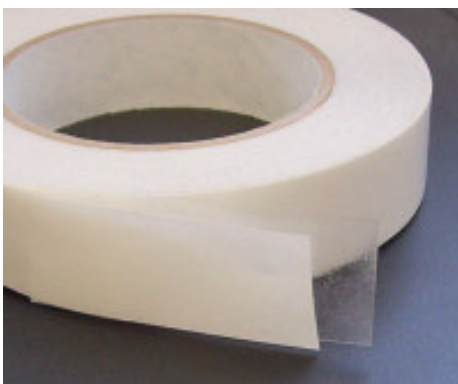
## Other Options

There are at least two common alternatives to the use (and purchase) of welding machines. Both can be used to apply PVC-Coated Weldable Webbing to signs and banners.

Many industry suppliers offer a range of solvents and adhesives that will nicely join vinyl surfaces. So even the smallest shop can make overlap seams or add PVC-Coated Weldable Webbing™ to finish their signs and banners. It is important to read and understand the directions on how to use these products since they vary significantly. Simple solvent glues are easy to use but they still require careful application and various waiting periods before joining surfaces. The ability to have a feel for when a surface is appropriately “tacky” to be pressed to another surface is a learned skill. When ready to be pressed, a sufficient amount of pressure must be applied for a sufficient amount of time to achieve a strong bond. Some other adhesives do not require waiting time but do require mixing based on the use of “accelerators” or other two-part formulations.



However prepared and applied, according to their manufacturers, these “glue” products can achieve as strong a bond between two vinyl-coated surfaces as is achieved by any of the mechanical welding machines discussed above. Considering that all that is actually being joined is two layers of polymeric vinyl molecules on facing surfaces, it is not unlikely that this is a legitimate claim. What may be more difficult to justify when considering glue as a means of welding vinyl is the unavoidable difficulty of handling the material and the chemicals in a clean, efficient operation, especially with mesh materials. Nonetheless, even the largest producers with the most sophisticated welding machinery should probably have a can of their favorite vinyl adhesive somewhere in the shop for small repairs and for curved or short welds that are not easily achieved on their production welding equipment.



Another choice is to join vinyl coated surfaces using one of the many types of two-sided “banner tape”. This method is certainly easy and may be the quickest way for a small shop to do small jobs. It is also clear that two-sided tapes can and do hold webbing reinforcements in place, just as they attach material to itself in a folded hem. For smaller vinyl banners and signs, using tape with webbing is a legitimate option. The two questions that may arise in considering this method are: first, the cost of tape as an additional material (compared to simply joining the vinyl surfaces to one another by welding); and, second, the technical concern of attachment strength, shear and peel, compared to a fully bonded weld.

# PVC-Coated Weldable Webbing - **Welding Economics**

## A Profitable Cost-Value Relationship

### Weldable Webbing: Cost Considerations

Most sign businesses find that offering PVC-Coated Weldable Webbing™ as an option or as a standard structural component of their vinyl fabric signs and banners is not only cost-effective, but also profitable.

At \$0.53 per meter, one inch weldable webbing costs approximately 16 cents per foot.

At \$0.62 per meter, two inch weldable webbing costs approximately 19 cents per foot.

*Shops are known to charge 50 cents or more per foot for reinforced edges.* So there can be a significant built in mark-up for using weldable webbing.

Further margin enhancement can be realized when the installed reinforcement allows printing on lighter, less expensive fabric.

Three additional less obvious but important financial advantages are:

- the uncalculated savings realized by building more solid signs and banners versus the cost of the repairs and failures that using less dependable methods might have caused;
- savings realized by finishing jobs in-house compared to the cost of sending printed work out for finishing; and
- saving significant time by using welding as a finishing method versus slower stitching operations.

*A word of caution based on experience:* purchasing planners should bring in sufficient quantities of weldable webbing with enough lead time to avoid last-minute, express shipping. The product is heavy. There are numerous examples of printers placing rush orders requiring overnight shipments... and in many situations, they could have received twice as much product for the same cost if they could have shipped by ground, rather than overnight service.

### Samples and Testing



We encourage production departments to experiment and practice with the webbing on a variety of vinyl fabrics using various welder settings and methods. We also encourage companies to experiment with weldable webbing in any application where welding might be used instead of stitching. Please contact our Customer Service department and request the quantities and types you need to fully explore the performance of coated webbing in your finishing and fabrication operations.

### Purchasing

More information on Weldable Webbing including product specifications and pricing, plus ordering information and credit applications, can all be found on [www.louisagreen.com](http://www.louisagreen.com).

The Louis A. Green Corporation has been supplying specialty narrow fabrics for industrial applications for over sixty years. Please call with any questions and let us know how we can be of service.

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