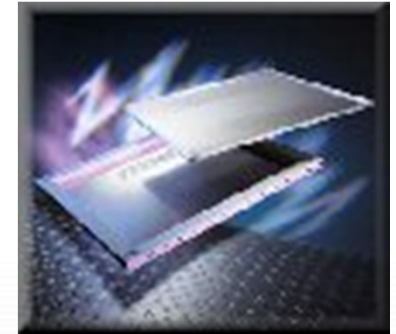


VectorGuard™ Stencils

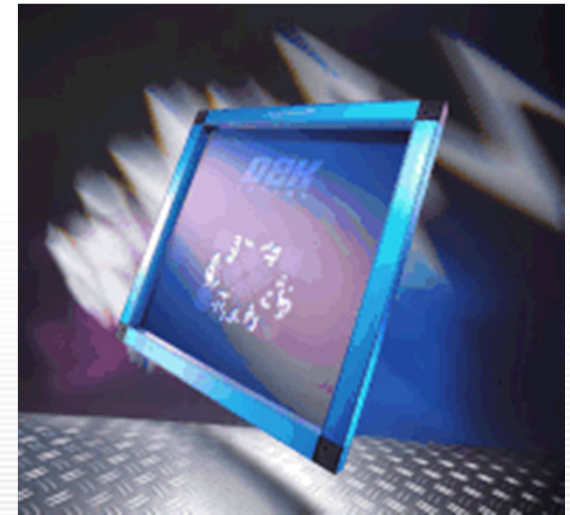


***The right way to Optimize
your Printing Process!***



What is VectorGuard

- ✓ What is VectorGuard?
- ✓ How does it work?
- ✓ What are VectorGuard's advantages?
 - ✓ Positional Accuracy
 - ✓ Reduction in manufacturing costs
 - ✓ Higher yields
- ✓ What is better for my process?





What are Stencils?

Stencils are a precision process tool, not a just holes in a sheet metal.

- Stencils are precision production tools that are designed to provide the PCB manufacture with the means of placing the right amount of solder, in the exact location, constantly and repeatable.

60% to 70% of all defects are created at the printing process

- It is **critical** that we do everything we can to insure that the printing process is under control!



What is VectorGuard?

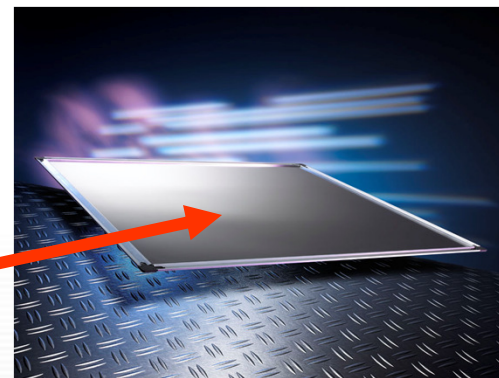
VectorGuard Stencils are the most advanced stencil foil technology available...

- ✓ Provide greater printing accuracy and consistency over the life of the stencil
- ✓ Last longer than conventional Frame Mesh stencils
- ✓ Reduces customer manufacturing costs
- ✓ Improves production yields
- ✓ Safer for operators, and easier to use than any other “frameless or foil stencil” system on the market

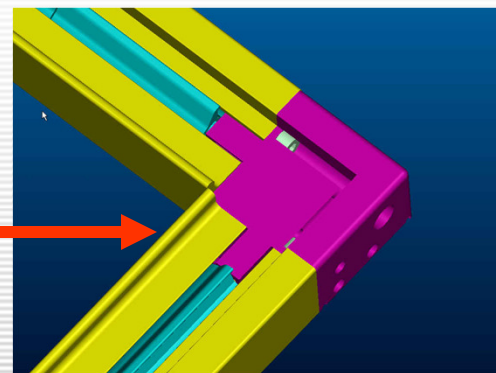
How does VectorGuard Work?

VG stencils are a two- part system

1. A foil that has the image cut into it



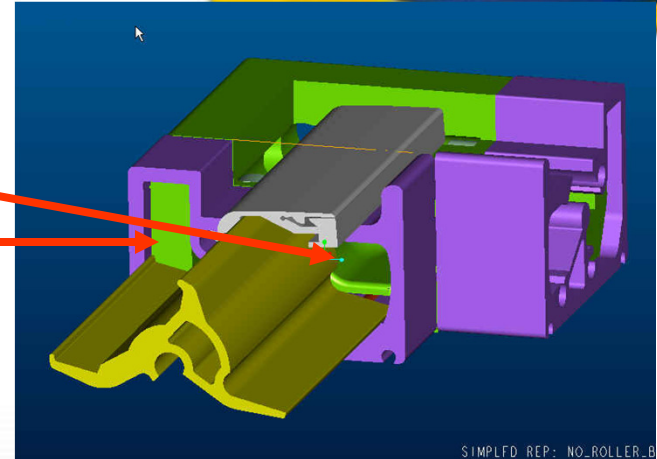
2. A reusable frame that the foil goes into during production



How does VectorGuard Work?

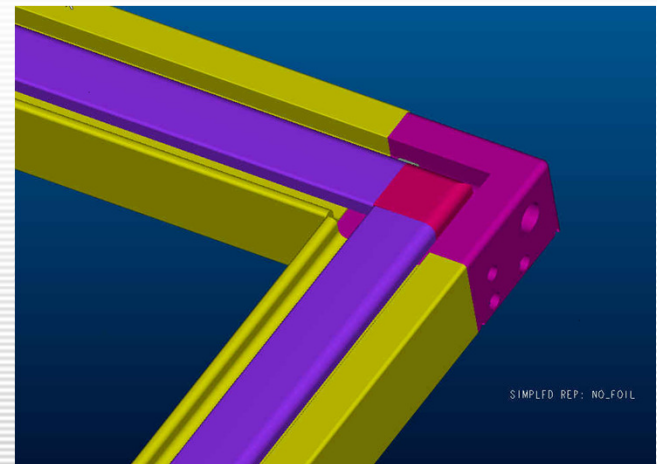
✓ Rocker motion

- Springs apply tension
- Air-tube acts as piston
- Mechanical system that locks stencil into position



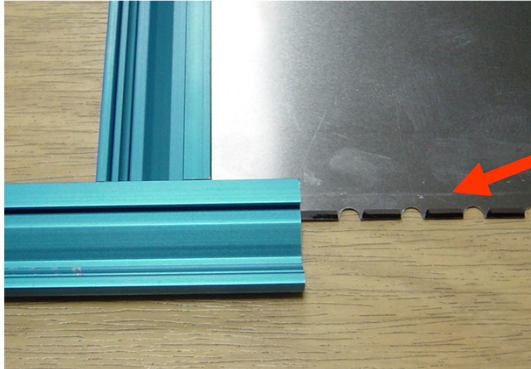
✓ Safe operation

- All springs and air-tubes are enclosed for operator safety and long-life of the frame



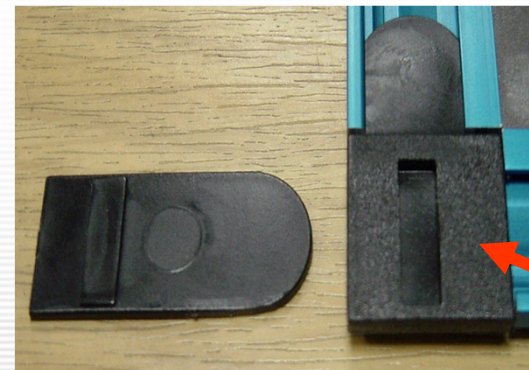
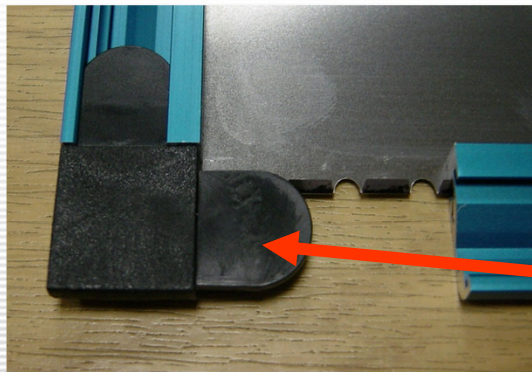
✓ Designed for most machine brands and types

How does VectorGuard Work?



Metal on Metal connection for better tension, greater print area, and more consistent positional accuracy

Extrusions are slid over the edge of the foil and locked into place.



Extrusions are locked in place with three corner connectors and one locking connector

How does VectorGuard stencils provide greater accuracy?

➤ VectorGuard stencils provide greater positional accuracy and consistency because...

- ✓ **do not rely on polyester mesh**
 - ✓ Poly Mesh will break down and loose their tension or tolerances' over time
- ✓ **do not rely on epoxy bonds**
 - ✓ Epoxy bonds can degrade or breakdown over time
- ✓ **are re-tensioned every time you use them,**
 - ✓ Retain their positional accuracy better then mesh stencils that can loosen up over time
- ✓ **do not depend on a washing chase**
 - ✓ Do not need added frames to protect the foils during cleaning in most cases like other “frameless” systems do

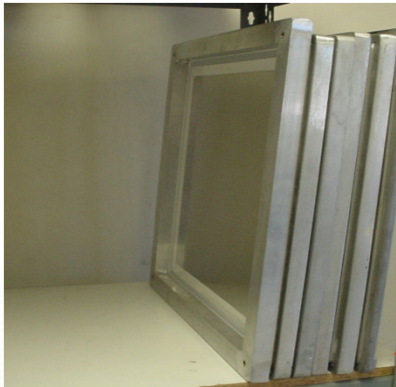
How does VectorGuard Stencils reduce my manufacturing costs?

➤ VectorGuard Stencils...

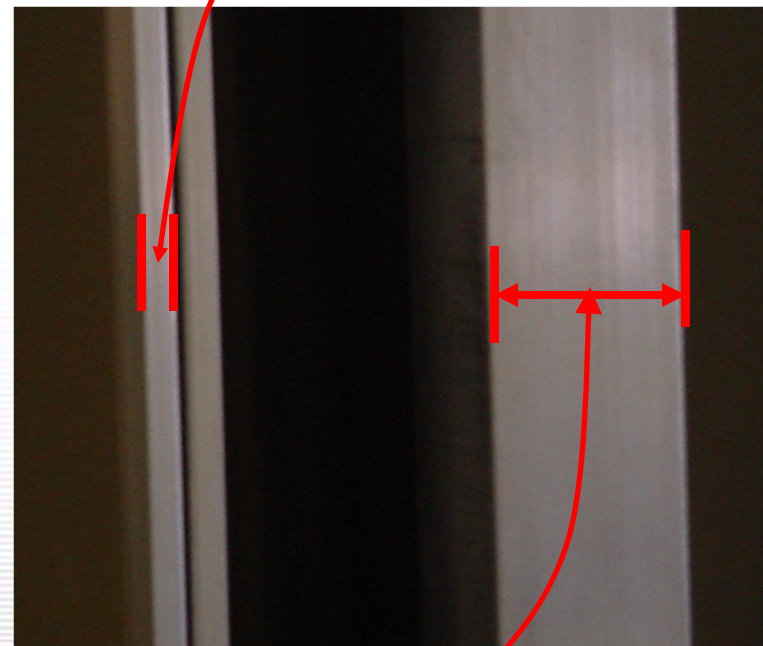
- ✓ **Take up less floor space**
 - ✓ VG stencils use approximately 1/5 the storage requirement of conventional Frame Mesh stencils thus saving valuable manufacturing floor space
- ✓ **Last longer than conventional Frame Mesh stencils**
 - ✓ VG stencils do not loose tension or come apart due to broken glue bonds or stretched mesh and thus do not have to be replaced.
- ✓ **Do not require returning or recycling of old frame**
 - ✓ Or the floor space to store the old frames until shipping

VectorGuard Storage advantage

VectorGuard foil Thickness
.195"



**Typical
Stencil
Storage**

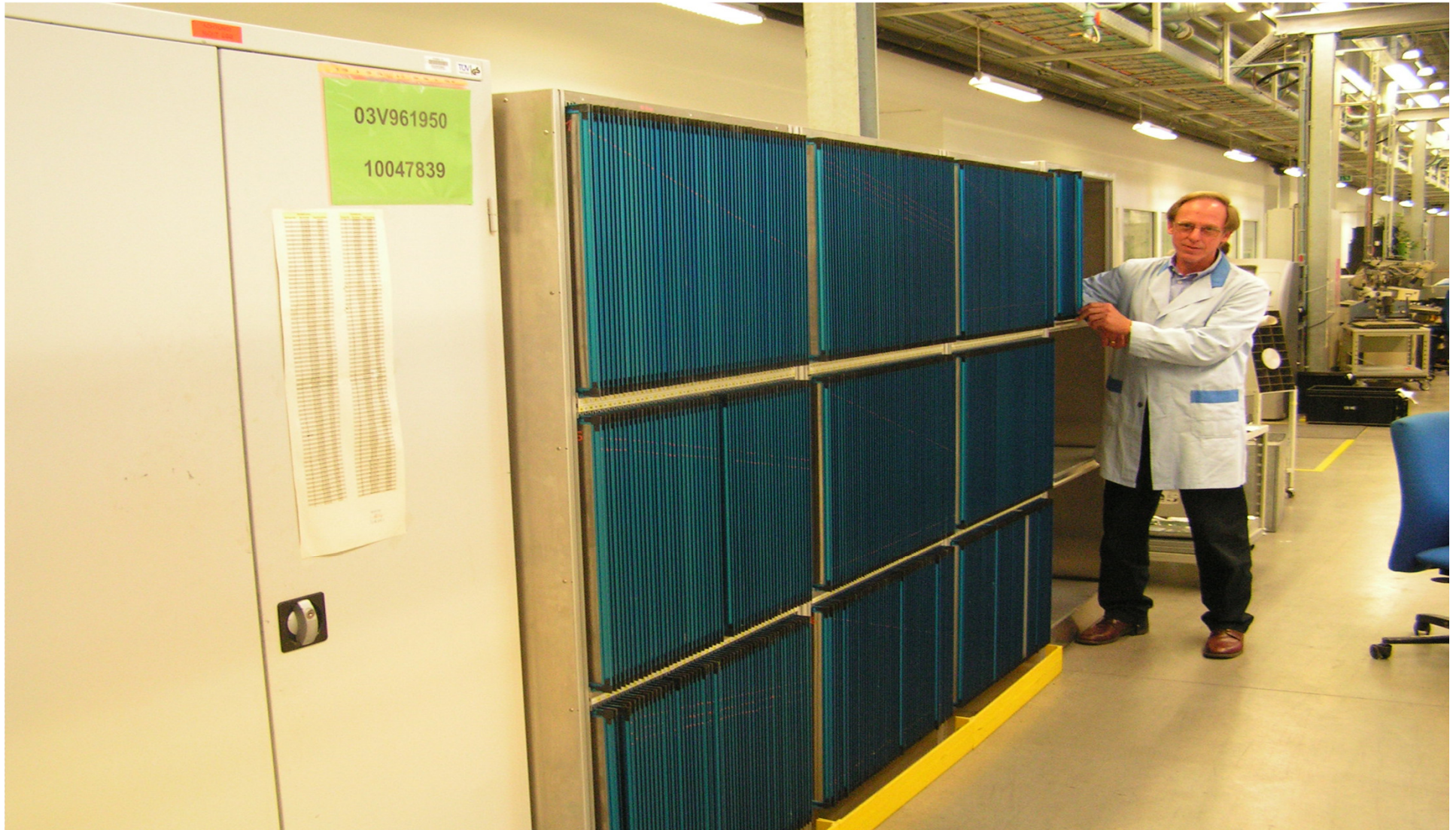


29" x 29"
frame Thickness 1.5"

VectorGuard solves your storage capacity issues by allowing you to store five VG foils in place of one framed stencil.



650 VectorGuard Frames!



How does VectorGuard Stencils reduce my manufacturing costs?

➤ VectorGuard Stencils...

✓ Lower Foil Cost

- ✓ VectorGuard Foils typically cost less than conventional frame mesh stencils

✓ Packaging

- ✓ Foils are packaged into user friendly re-usable boxes for ease of storage and reference on the floor over time

✓ Only require 1 master frame per line

- ✓ Runs off of standard clean / dry shop air

✓ Greater available print area

- ✓ Greater available print area for large board applications

How does VectorGuard Stencils reduce my manufacturing costs

➤ VectorGuard Stencils...

- ✓ **Rush applications...**

- ✓ VG stencils are faster to manufacture because there is no waiting time for the epoxy bonds to cure for local delivery applications.

- ✓ **Last Longer then conventional Frame Mesh technology stencils...**

- ✓ Poly mesh can break down over time due to

- ✓ The age of the stencil where the poly can break down over time or the glue bonds can become loose or break all together

- ✓ The heat and chemicals used during the cleaning cycles

- ✓ **Safer then any other foil stencil systems**

- ✓ No exposed sharp edges like with other systems

NOTE: VG stencils do not have these issues

How does VectorGuard Stencils improve my process yield?

➤ Positional Accuracy

✓ Higher Tensions

- ✓ VG stencils have as much as 50% more tension of conventional Frame Mesh stencils...
 - ✓ Mesh Frame stencils are typically average around 20 to 22 Newtons
 - ✓ VectorGuard stencils are typically average around 30 Newtons
- ✓ Higher tension means that the stencil is...
 - ✓ Less likely to shift or have the foil “float” on the board
 - ✓ Reduced foil deflection or “stencil stretch”
 - ✓ Frame Mesh stencils can stretch or deflect with wear and age, especially under high volume conditions or higher pressures applied by the squeegee blades

VectorGuard and Lead Free...

➤ Lead Free solder Paste and Stencils...

- ✓ *NOTE: Lead Free solder paste does not have the same spread characteristics on the pad like SnPb paste does, thus positional accuracy is critical for successful Lead Free manufacturing*
- ✓ **VG stencils are locked into position,**
 - ✓ They do not float or shift over time like conventional Frame Mesh stencils
 - ✓ Especially under the tension of a print stroke.
- ✓ **VG stencils have less deflection**
 - ✓ Are be better aligned to the board
 - ✓ VG stencils hold positional accuracy over time better then Frame Mesh stencils.
 - ✓ Important when using 1:1 print to pad aperture ratios
 - ✓ Reduces the opportunity of solder balls and bridging

How easy is VectorGuard to mount into the frame?

➤ VectorGuard Stencils are the easiest frameless stencil system to mount into the frame.

- ✓ Only takes a few seconds to mount a VG stencil
- ✓ VG stencil frames are **spring loaded** using the **ABSENCE** of air to activate the tension
 - ✓ Some systems need a continual supply of air to maintain their tension
 - ✓ Will loose air or lead and thus loosen up in the printer
 - ✓ Air supply can vary or is interrupted or is not clean and dry.
- ✓ VG stencils do not require any screws or other type of tension bars like older “frameless” systems do

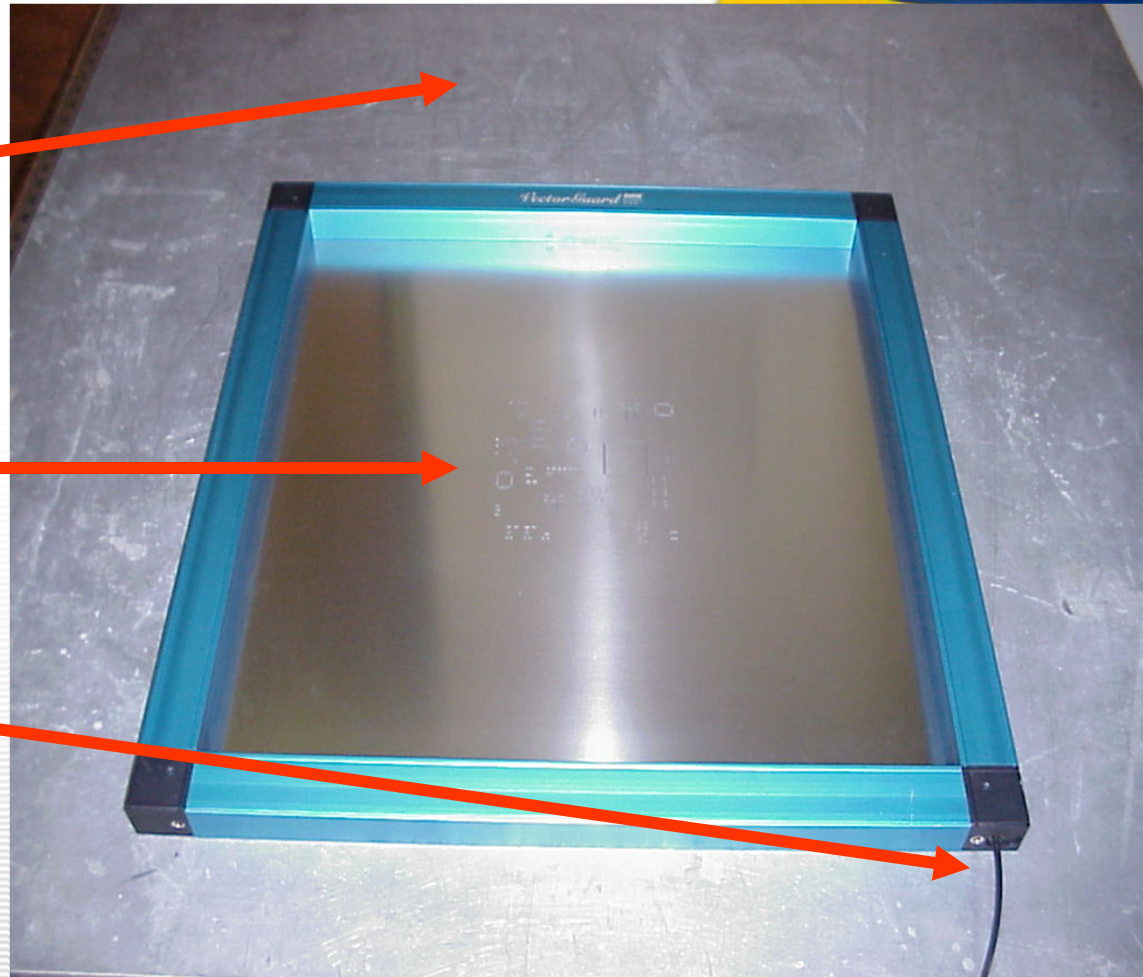
VectorGuard™ mounting procedure.

Mounting area
Needs to be
a solid flat
surface.

Place the foil on the flat
surface with the
squeegee side up

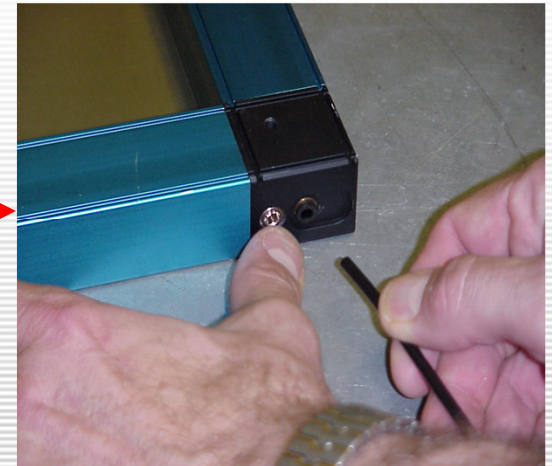
Then place the frame on
top of the foil with the air
connected and just hit
the foot switch and
release to connect the
foil to the frame

It's just that simple!



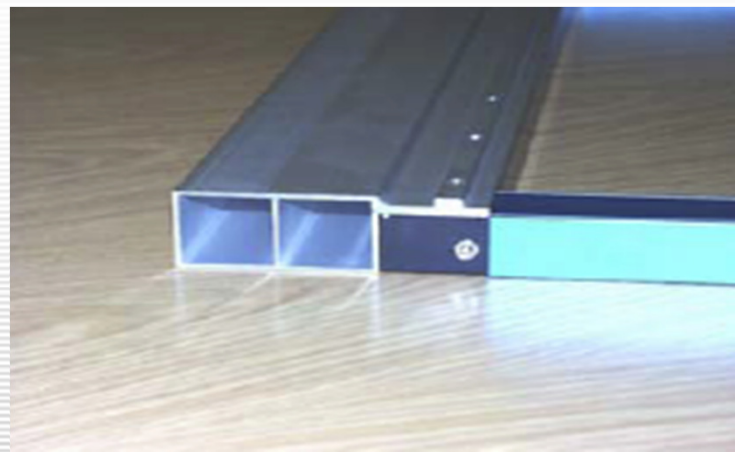
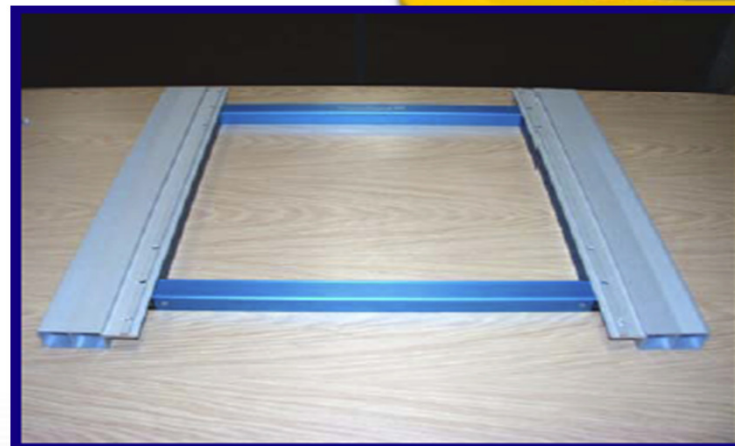
VectorGuard™ System

The Loading procedure for Foil Tension.



Sidebar Kit

- The sidebar option will provide flexibility by enabling the user to adjust for center justified or front justified image orientations.
- The sidebar kit is available for the VectorGuard 260 and 265 frames.
- This will enable the user to extend the frame size to 29" x 29" without having to use a larger foil.



VectorGuard Foil Technology

Application
Complexity



VectorGuard Platinum

400um to 60 um
For Micro Technology

VectorGuard Gold

Ultra Fine Pitch
Electroform stencils

VectorGuard Silver

Laser Cut Nickel foils
For smoother apertures

VectorGuard Blue

Laser Cut Stainless Steel
Applicable for most SMT applications

VectorGuard Foil

VectorGuard® Foil Sizes →

Stencil Manufacturing Processes ↘

	VectorGuard 260 23" x 23" (584.2 x 584.2 mm)	VectorGuard 265 23" x 29" (584.2 x 736.6 mm)	VectorGuard 265W 29" x 29" (736.6 x 736.6 mm)
VectorGuard Blue Laser Cut StainlessSteel	X	X	X
VectorGuard Silver Laser Cut Nickel	X	1	1
VectorGuard Gold Eformed	X		
VectorGuard Platinum Microengineered Eformed	X		

1 Requires OptiQuard

VectorGuard Technology is better for my process because...

✓ VG stencils...

- ✓ provide for greater printing accuracy and consistency throughout the life of the stencil
- ✓ last longer than conventional Frame Mesh stencils
- ✓ reduces customer manufacturing costs
- ✓ improves production yields by reducing soldering defects
- ✓ are safer for your operators due to no exposed sharp edges or sides
- ✓ are easier to use than any other “frameless or foil stencil” system on the market