

## Introduction to ARTS "Architectural Raised Thermoformed Signage"

# Why Thermoforming?

As sign making technologies continue to evolve and add complexity to the process, a reliable age-old fabricating technique is making a BIG comeback. **Thermoforming** has been around since the day signs were first made from Plastics. As in-house manufacturing goes, it's the process of pre-heating a plastic sheet to a pliable forming temperature. Once the sheet is pliable, it is then formed to a specific shape using a mold. The result is a method for creating a near infinite range of creative sign products.

The **ARTS™** method (originally termed "Displacement Thermoforming") adds a slight twist to the basics of thermoforming. A cold plastic sheet is preheated at high speed while sandwiched between a custom engraved cavity mold and mold blanks in direct contact with hot steel platens. The technique allows the plastic to quickly become pliable and ready for significant pressure. The result is a reorganization or displacement of pre-shaped polymers that fill open cavities in the mold. Unlike other well-known types of thermoforming, the **ARTS™** method can be applied to almost every extruded or cast thermoplastic on the market

The overall manufacturing process for **Thermoformed Raised Signage** has improved significantly over the years. Focus on improvements and repeatability lead to a dramatic increase in Division 10 specifications, especially after 2014 when breakthroughs in production efficiency lowered production costs by more than 50%.

SignForm press equipment has become the industry standard for **ARTS™** manufacturing. With an output potential of around 40 square feet p/hour, the HT-1319 press is now used by over 95% of all Thermoforming Fabricators. It's hydraulic/pneumatic design brings the cost-of-entry into manufacturing in line with other industry standards such as photopolymer.

Once installed, however, the advantages of **ARTS™** manufacturing become quite clear.



## The Advantages of Thermoformed Sign Making

### Competitive Costs and Impacts

- *Thermoformed* signs are manufactured at a *fraction of the time and cost* of other common in-house methods. When measuring the manufacturing speed for a typical 13"x19" panel of custom thermoformed signs (from mold engraving and pre-treatment through thermoforming and inspection), a custom **ARTS™** panel can be ready to finish cut and decorate in as little as 25 minutes!
- *Economy of Scale*: Molds for the **ARTS™** process can be used dozens of times over with little maintenance, or reused hundreds of times over several years with proper storage. When a mold is made for multiple cycles, the manufacturing cost of those signs drop *significantly*. With no method-specific consumable products required, like photopolymer or Rasters, signs cost little more than the standard sheet material and the labor to form and decorate.
- Considering the measurable hard costs like materials and labor, finished sign costs can often fall below \$0.10 p/sq.in. before considering the unseen soft cost advantages like flexibility of material use, yields, remakes, finishing technique consistencies and error correction, environmental impact and the increased value of thermoforming's long-term durability and sustainability. The goodwill between sign maker and end user grows significantly when projects perform as anticipated and no "failed sign remakes" are needed because of simple miscommunication over the facility's environment. Sign makers are free to focus on service and new business, not minimizing the negative impact of remakes.
- Thermoforming's established manufacturing efficiency means energy consumption is lower than virtually all other common in-house architectural sign making methods.

### Inventory Control and Financial Considerations

- With new process guidelines, virtually ALL thermoplastics and plastic alloys can be thermoformed into custom raised architectural signage (see Compatible Plastics & Alloys data)
- All thermoplastic sheet materials used in the thermoforming process are common *off-the-shelf* sheet products currently used in the industry, such as Acrylite, Optix and others. Because sheet stocks can be stored on racks for decades, sign makers can thermoform ALL EXISTING IN-STOCK INVENTORY and convert old or overstock sheet plastics into new signs and revenue.
- All scrap, off-cuts, old or unused signs can be *reintroduced* into the system, even if finished, painted or removed for replacement. Nothing goes to waste in any phase or manufacturing, including remakes or even signs made using other methods, like PETG photopolymer, applique, etc.



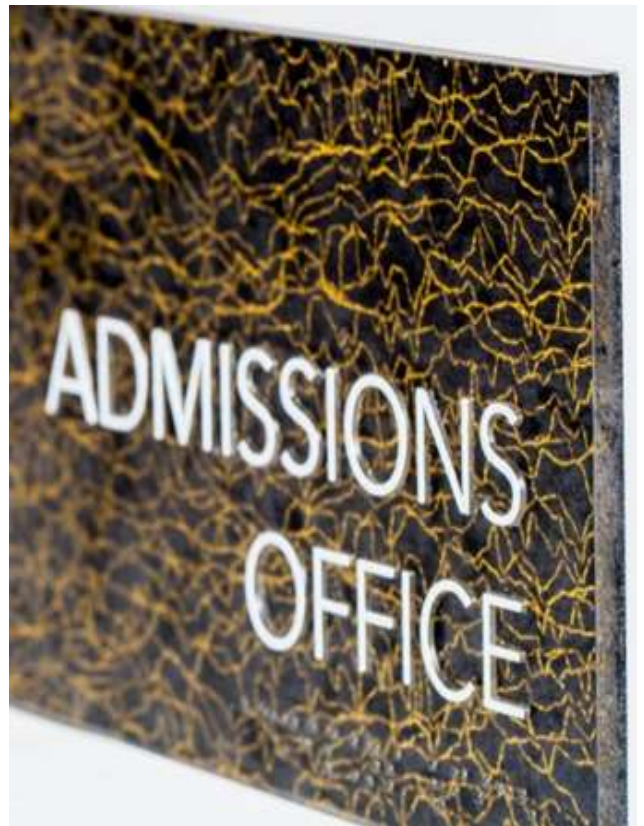


### ***Intellectual Property and Process Freedom***

- In-house ARTS™ manufacturing is open IP and available to *everyone!* There are *no licenses, fees or IP impediments* that could prevent you from bringing the process into your shop.
- The core ARTS™ process allows for unique product development and the potential for Patentable products that are spurred from thermoforming's enormous creative potential

### ***Durability, Sustainability and Environmental Impact***

- Thermoformed Raised Graphic Signs are **MONOLITHIC** (Solid Construction with no applied or laminated elements at all). This one-word definition is being introduced into new Division 10 specifications in order to distinguish thermoformed signage from other common methods.
- The ARTS™ process begins as a solid, flat sheet and ends as a solid panel of custom monolithic raised signs. As a solid end product, the base signage will stay intact regardless of the environment and can be redecorated as needed.
- With the potential for 100% reuse, the thermoplastics used in the ARTS™ process *can function for decades, be removed when new signage is required, incorporated into a new project and reinstalled into the same facility as all new thermoformed signage.* There is no limit to the number of times the material can be thermoformed. This closes the loop on sign recycling, eliminates disposal and opens the door for "Perpetual Signage Programs" that can be managed for as long as the facility and/or the relationship between facility and fabricator exists.
- Thermoforming has the lowest carbon footprint of any in-house manufacturing technique available. There are no disposal issues of any kind (water or waste materials) and molds can be filed for future use for an unlimited time.
- Only **Thermoforming** features the 100% post-consumer recycled plastic material "EnviroStrate™".



## Overview of Thermoformed Sign Manufacturing

*Artwork, Formatting, Mold Making, Thermoforming, Final Fabrication and Decorating*

### Artwork to Mold Making



*Vision 2550 Engraver/Router*

If you are fabricating ADA signs with Photopolymer, then you will recognize many of the workflow steps used in **Thermoforming**. In fact, many of these steps are identical to the photopolymer process.

The design, input and approval of artwork remains standard. However, converting the art to a mold making file instead of film is where the methods differ.

#### **GRAPHICS to be MIRROR IMAGE**

Photopolymer requires an "emulsion down" film negative to create raised copy where Thermoforming requires a mold. The emulsion down requirement for film is why it's processed in mirror image. The mold surface is the emulsion of thermoforming, so mirror image is required.

#### **CONVERT ART FILES for Mold ENGRAVING or ROUTING**

Sign artwork is transmitted to fabrication using the same design and translation software. Nested artwork is engraved or routed into Pionite Mold Blanks.

#### **Dedicated Mold Making with the Vision 2550.**

*Engrave custom 13"x19" Molds for the HT-1319 Thermoforming Press. Mold sizes can vary to maximize yield. We recommend using Vision's Vacuum Table to hold any mold or panel without tape. Cut mold panels to fit the vacuum table and nest art and cut files. 13"x19" molds can be engraved quickly, even with the largest symbols, numbers and letters. Four 6"x9" RESTROOM signs can be engraved and ready to thermoform in 12:00-14:00 minutes.*



*The information below is an overview of thermoforming's simplicity. The SignForm HT-1319 press will thermoform sign panels up to 13"x19". Your purchase includes staff training for every facet of the ARTS process. We can also meet with your sales and marketing staff to help coordinate product introductions and develop competitive strategies for your region or area of service. Ongoing support and development is also included!*

## Prepare Engraved Molds & Materials for Thermoforming

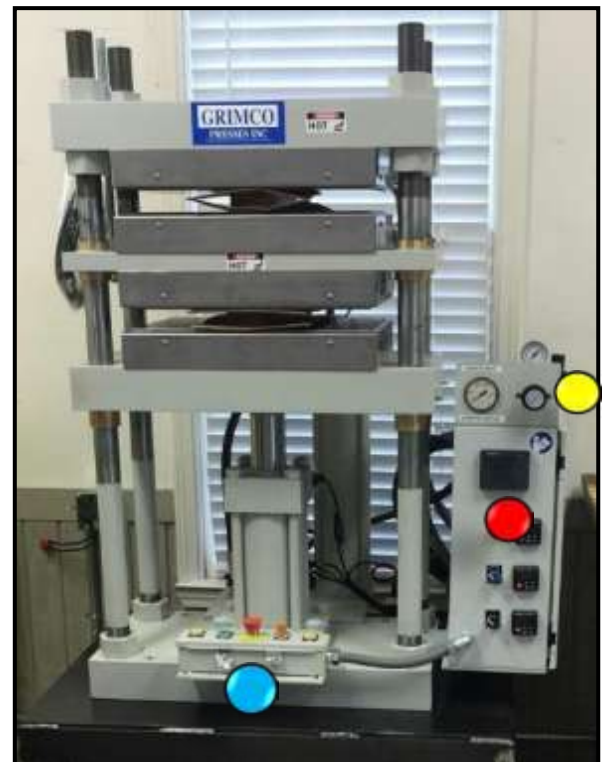
Once engraved molds are ready, they are transferred to the Thermoforming Area for prep and production. Use the AccuCutter 3001/25 to shear materials up to 3/16" and match the materials to each mold. The press operator can easily prepare each mold assembly during the first 30 minutes of the day while the press platens are heating up and have "soaked" at the desired temperature. Prep as follows:

- Clean mold with brush & compressed air
  - Apply liberal amount of McLube 1700L over mold
  - Brush into cavities using Application Pad for 3-5 seconds
  - With the surface still wet, wipe surface of mold with lint free cloth in a circular motion (like waxing a car) until dry
  - Fill cavities with TacFILL of choice (Clear or White)
- 
- Clean Acrylic with WINDEX, place FACE DOWN on MOLD
  - Clean BACK of Acrylic with Windex, check for debris
  - Place Blank over Acrylic and set aside for thermoforming



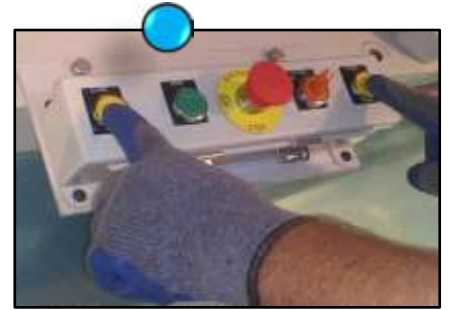
## Operating the SignForm HT-1319 PRESS

- 1) Check the DIGITAL PROGRAM CONTROL screen to verify that you are using the correct thermoforming TIMES. If not, you can program directly or "READ" the pre-programmed "Recipe" for the material you are thermoforming.
- 2) After you verify the thermoforming TIMES, check the PRESSURE OUTPUT GAUGE located atop the Control Cabinet and match it to your process and material size. Adjust pressure as needed using the ADJUSTMENT DIAL to the right of ACTUAL PRESSURE GAUGE. Make sure you are using the correct pressure, especially if the Plastic Material and Engraved Mold is smaller than the Platen Size (example: 10"x14" mold in a 13"x19" press). Use adjustment guidelines as provided or contact SignForm Systems for formulas on the specific model of your press.



### **Operating the SignForm HT-1319 PRESS (cont.)**

Once TIME and PRESSURE settings are correct, you are ready to *BEGIN THERMOFORMING!!!*



- 3) Load the Mold Assembly into the top section of the press. Push the corners of the assembly to line up with the left and right corners of the hot platen.
- 4) Press the two yellow "CLOSE BUTTONS" located on the operator control box. Hold buttons down until platens rise completely and are fully engaged. You will know when to release the buttons when you see the PREHEAT TIMER begin counting up from "0". The press will automatically apply pressure after the PREHEAT cycle is complete.
- 5) After PREHEAT and PRESSURE cycle is complete, the press opens automatically. Immediately move the Mold Assembly to the lower COOLING section and press the two yellow CLOSE BUTTONS. Hold the buttons until the press closes and pressure begins. The timer for COOLING will begin counting up from "0".

### ***After COOLING, the THERMOFORMING CYCLE is complete.***

- 6) Remove the thermoformed and cooled Mold Assembly from the COOLING platens and place it on your inspection table. Load the press with your next Mold Assembly before inspecting the finished thermoformed panel.

Inspecting and troubleshooting a thermoformed panel is easy with plenty of lighting and separate contrasting black/white table padding. A brightly lit inspection table will allow you to hold each panel on an angle and view the surface for imperfections. Contrasting black/white table padding will make seeing miscellaneous flaws in clear materials easy.

If you are not 100% happy with a thermoformed panel, simply reload the formed material in the existing mold or flip the panel upside down onto the engraved mold and thermoform it again. If the project calls for crystal clear acrylic for second surface imaging or paint, you can scrape away contaminants from the thermoformed panel and place it back into the engraved mold. Whatever the reason for running a defective panel a second time, there is never a reason to throw out the defective panel. Thermoforming eliminates waste by allowing you to use every square inch of in-stock plastic sheet, over and over again.

## ***SIGN MANUFACTURING ESTIMATE USING THE SIGNFORM HT-1319 THERMOFORMING PRESS***

What are some of the costs considerations of a thermoformed sign project? Every shop estimates finished costs differently, so we provide you with required steps, stages, approximate times for each process, required materials and universal standard costs based on average vendor quotes. Below is a project example with specifications and drawings calling for 1/8" thick signage, first surface paint with white raised contrast color. A small portion of signs require black and red raised.

There are a total of 1,089 signs equaling 54,386 square inches.

(Not Included are: Artwork Input, nesting and conversion to engraving & cut files, paint prep, paint)

**Signs & Specifications:**

Material: 0.118" Acrylic  
 Finish: First Surface Acrylic Polyurethane / Color: TBD  
 Raised Color: Bright White (with some Black/Red)  
 Fabricator will surface sand raised. Finished example to right:



| <u>Type</u>            | <u>Size</u>  | <u>Quantities:</u> |
|------------------------|--------------|--------------------|
| Elevator Exit Sign     | 6.0" x 18.0" | 32                 |
| Elevator Sign          | 4.0" x 4.0"  | 32                 |
| Egress Signage (all)   | 6.0" x 6.0"  | 66                 |
| Restroom Signage (all) | 6.0" x 9.0"  | 165                |
| Room ID Signage        | 9.0" x 6.0"  | 250                |
| Stair ID Tactile Sign  | 6.0" x 6.0"  | 40                 |
| Student Room ID Sign   | 12.0" x 4.0" | 504                |

The equipment and labor time estimates are based on the following message schedule assumptions:

- 1) All 165 restroom signs have a unique room number
- 2) All 250 room ID signs are unique
- 3) All 504 STUDENT ROOM signs are unique
- 4) All 140 remaining signs or sign sets have repeats

**Total Raw Material Estimates**

Acrylic Sheets (4'x8', 1/8" Extruded White Opaque) - 16 @ \$60.00 ea  
 Mold Sheets (4'x8' Suede for 235 engraved molds) - 14 @ \$84.50 ea  
 Ancillaries Required (TacFILL 100 oz @ \$187.50 + McLube Release Agent 1 quart @ \$30.00)  
 Total Material Cost including drop - \$ 2,367.50  
 Total area of Signage - 54,386 sq.in.  
 Total Material Cost for this Project - \$ 0.0436 p/sq.in.

Pre-Thermoforming Tasks.

Material cutting and prep prior to the project reaching the thermoforming area. Mold making time is estimated based on parameters set on a VISION 2550 Engraver and assumes use of three cutting tools with bit changes and a set feed rate of 3.0" p/second

Raw Material Cut List (use your current shop estimate for times, etc.):

Acrylic cut to thermoform panel sizes for press (16 sheets - 4'x8')

132 - 13" x 19"

126 - 13" x 17"

10 - 13" x 13"

4 - 9" x 17"

Pionite Molds cut for press (14 sheets - 4'x8')

107 - 13" x 19"

126 - 13" x 17"

1 - 13" x 13"

1 - 9" x 17"

Mold engraving (VISION 2550 Engraver)

235 molds - **40 hours Total** (Average 10:00 minutes p/13"x19")

Thermoforming on HT-1319/ Single Operator:

Apply release agent to molds, prep/load mold assembly and feed press. Remove acrylic panel from press, inspect and prep for finish cutting.

272 cycles @ 15 cycles p/hr (med-high volume setting) – **18.5 hours Total**

Finish Cutting:

Total hours should be estimated by fabricator based on how acrylic and project cut file is handled, preferred registration and prep for cutting. I recommend no more than 1/8" separation between signs of possible. It generally works best to set up a multi-panel router bed template so formed panels can be placed inside the template and execute cut files.

Total finish cut time - 20-40 hours depending on preferred cutting method and format

Painting and Contrast Color Raised

Once paint is applied and dried, this project can be sand finished to expose contrast color (Ultra White, Black & Red). No screen ink, vinyl or foil color application needed.

Final Finishing (Tape, Sand, Clean, Inspect) - **15 hours Total**





## IMAGINE, CREATE AND MANUFACTURE WITH THE VERSATILITY OF THERMOFORMING **ARTS™ ENCAPSULATED GRAPHIC ELEMENTS**

### Encapsulating Digital Prints and Other Common Elements for Dynamic Signage

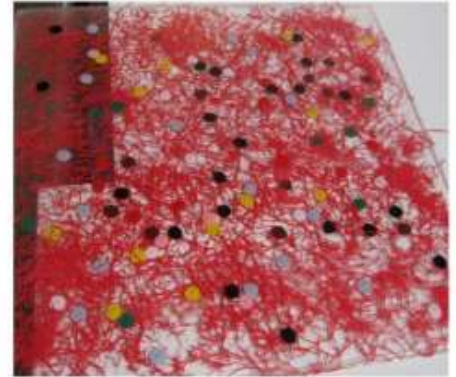
"*The Encapsulation Technique*" is one of several processes used in the SignForm ARTS™ thermoforming system. It's the technique by which graphic elements are permanently fused between multiple sheets of acrylic, creating a separate visual plane that appears "suspended" inside a single monolithic sheet.

As a SignForm client, you and your staff will be trained in the **Encapsulation** technique and how to modify settings for a variety of graphic elements. After installation, we will continue to assist in product development as new business grows and your creative portfolio expands.



Translucent ink pattern on clear vinyl is encapsulated between two clear 1/8" acrylic sheets. Back painted using a silver metallic Matthews Acrylic Polyurethane. Cut, cleaned and tipped to create multiple visual planes within a monolithic structured sign.

**Encapsulating** provides one of the most unique fabricating options on the market and gives your signs a visual impact that cannot be duplicated using any other method. **Encapsulating** capabilities will add to your creative portfolio and give you and your clients the kind of a high quality design twist that was simply not possible until now. With SignForm Systems



here to assist with ongoing product development, you'll never have to shy away from a graphic challenge. You and your sales team will enjoy the many opportunities you'll have to show your new fabricating capabilities. Adding the creative versatility of thermoforming to its unparalleled durability and you'll see why ARTS™ is growing so rapidly and why the "WOW" factor response is so common!

**ABOVE:** Encapsulating Craft Store items to create a fun & functional design! Confetti and "Fuzz balls" were distributed over a sheet of 1/8" Cast Clear acrylic. A raised 1/8" clear face was then applied and formed into a monolithic 1/4" thick sign with all the graphic elements suspended in the center. The signs were back painted, cut & surface printed with white text. The raised is dual purpose tactile and acceptable under the new 2010 standards.



**SOCIAL MEDIA - POSTS**



**Jim Chapman**

Director | Developer of SignForm Systems for ARTS,  
Architectural Raised Thermoformed Signage  
Manufacturing Systems  
Greater Philadelphia Area | Architecture & Planning

Current SignForm Systems  
Previous EcoStrate SFS (SignForm Systems), Inc., Tactile  
Graphics, LLC, Nova Polymers, Inc.

**Thermoforming turns the Ordinary into Extraordinary!**



Turning the *ordinary* into something *extraordinary* is a common theme in thermoforming. This photo shows how ordinary shelf liner and two sheets of clear extruded acrylic are combined to create an indestructible panel of woodgrain raised signage.

It's not just the appearance and durability that's impressive. To the fabricator, it's expanding the creative portfolio to include hundreds of possibilities and truly unique applications for common products we all take for granted. This particular combination adds significant value to the end product with minimal change in cost. Consider this, once formed the manufacturing process is nearly finished. No clear coat, no adhesives and no risk of failure after installation... Simply cut, tip and ship... and who doesn't love the "Wow Factor" bonus?



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Current: SignForm Systems  
Previous: EcoStrate SFS (SignForm Systems), Inc., Tactile  
Graphics, LLC, Nova Polymers, Inc.

## Thinking "Outside the Spec" can be a Win-Win-Win!

***Division 10 Specifications for  
"Thermoformed ADA Signs" are up....  
Way up! But "Approved Substitute for  
Photopolymer" is growing even faster!***

Dodge Analytics confirmed what our family of thermoforming clients have felt and seen for the past few years. In 2016, architectural specifications calling for thermoformed signage increased by 237% over 2015!!



It's not just that specs are up, thermoformed signs are quickly being recognized as an "Approved Substitute" for photopolymer by some of the nation's leading EGD and Architectural firms. So thinking outside the specs can be a "win-win-win" for everyone involved! This photo shows one of our clients thermoforming a custom back painted sign project that was specified photopolymer, but was awarded to thermoforming. A win for the end user whose facility will soon have the most functional, beautiful, sustainable new signage available. A win for the designer whose creative vision can be realized without raw material limitations. And a win for the fabricator, who can manufacture without concern about yields, cost of process errors or environmental failures and remakes after installation. With new process efficiencies, faster mold making speeds and an ever-expanding range of creative product possibilities, everyone wins with thermoforming.



## PHOTOPOLYMER FABRICATORS CAN THERMOFORM ALL PETG BASED PHOTOPOLYMER WASTE

Water-etched photopolymer sheets have been in use as an Architectural Sign material dating back to the 1980's. It wasn't until the enactment of the Americans with Disabilities Act in 1992 that new accessibility requirements for raised copy and Braille brought this unique relief plate technology to the forefront. Photopolymer soon became very popular as an easy, creative way to meet code. In order to satisfy the demands of this new market, printing plate suppliers began to develop photopolymer materials specifically for architectural signage.

When clear PETG based photopolymers were introduced to the market in 1999, designers and architects were given a creative jolt. Photopolymer rose to become the most specified method of ADA sign making in the USA.

Today, thermoforming technology finds itself gaining the same recognition and excitement as early photopolymer experienced in the 1990's. Not only for its creative potential, but also for its unique benefit to the environment. Scrap and waste material recycling and disposal is as important an issue today as the manufacturing method itself, especially when considering which product is used. Thermoforming is the only manufacturing method that gives you complete control over how scrap and waste is handled. Virtually all materials can be reintroduced into the material stream. This includes PETG photopolymer scrap, the most costly of all ADA materials. You can thermoform 100% of waste photopolymer into new signs.

Contact us for samples and information on how thermoformed photopolymer can benefit everyone.



Do you know how much money you're throwing away?

11" x 11" sheet

6.5" x 6.5" sign  
Sell for **\$42.00**  
(\$0.99)

11.0" x 11.0" offcut  
Cost is **\$20.00**  
before you begin.

1/4" Clear Photopolymer  
\$80 p/19x25 sheet (\$0.17 p/sq.in.)

121 SQ IN  
42.25  
78.75 SQ IN  
WASTE

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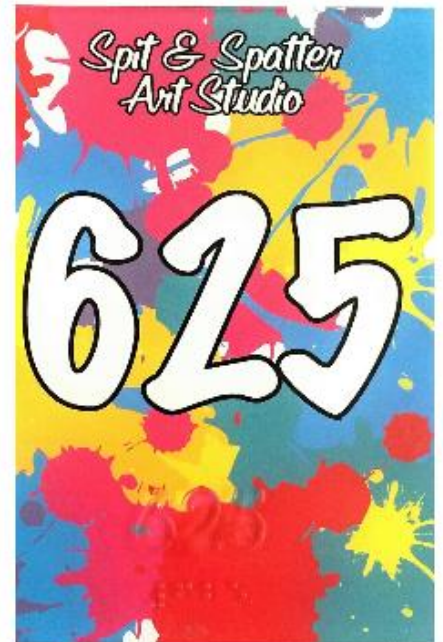
Greater Philadelphia Area | Architecture & Planning

Current: SignForm Systems

Previous: EcoStrate SFS (SignForm Systems), Inc., Tactile  
Graphics, LLC, Nova Polymers, Inc.

**Now you see it.... Now you don't!**

This is a perfect example of what the new 2010 ADA intended with the addition of a "Dual Purpose" option. Identifying signs that convey the same message in two separate and distinct ways. The opportunities for creative design and manufacturing have never been greater. By separating the visual and tactile message, tactile elements can become more uniform, functional and sustainable. The beneficial impact on design and manufacturing can be significant, but nowhere near as significant as the beneficial impact on those for whom the signs are intended to serve. Perhaps we should refer to them as "Dual Service" and reduce the confusion?



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August 2016

**Real Metal Signs... in Minutes? - YES!**

How is that possible? Can my new thermoforming press REALLY press metal signs? Yes! In seven minutes or less, actually.

SignForm processes go way outside the ADA. In fact, even though most sign companies purchase our systems to fabricate monolith custom ADA, the truth is, they can fabricate so much more. If it's raised, it can be thermoformed. In the case of real metal plaques, our process uses no

acid etching, no complex sand casting, no hazardous elements and no waste at all. TacFILL MetalliForm™ Sculpting Compound can be used to thermoform a wide range of products, including dedication plaques, signs, markers and even deep relief 3D graphics.... all using the same molds, times and processes as every other unique sign type in the SignForm ARTS™ method.





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## Encapsulated Common Elements for Value Added Creativity!

A great example of thermoforming's value added creative potential using basic and easy to obtain materials.

**Encompass Sign** of Minnesota encapsulated sheets of honeycomb aluminum between two panels of 1/8" clear acrylic, creating depth and multiple visual planes within a monolithic, custom

raised sign structure. Stunning work! Fabricating step options for this sign type even allow for applying raised copy color/print immediately after thermoforming and BEFORE the sign panels are back painted and routed apart. By rethinking the standard workflow process, we can dramatically reduce project "back tracking" and costly remakes caused by final tipping or printing errors.



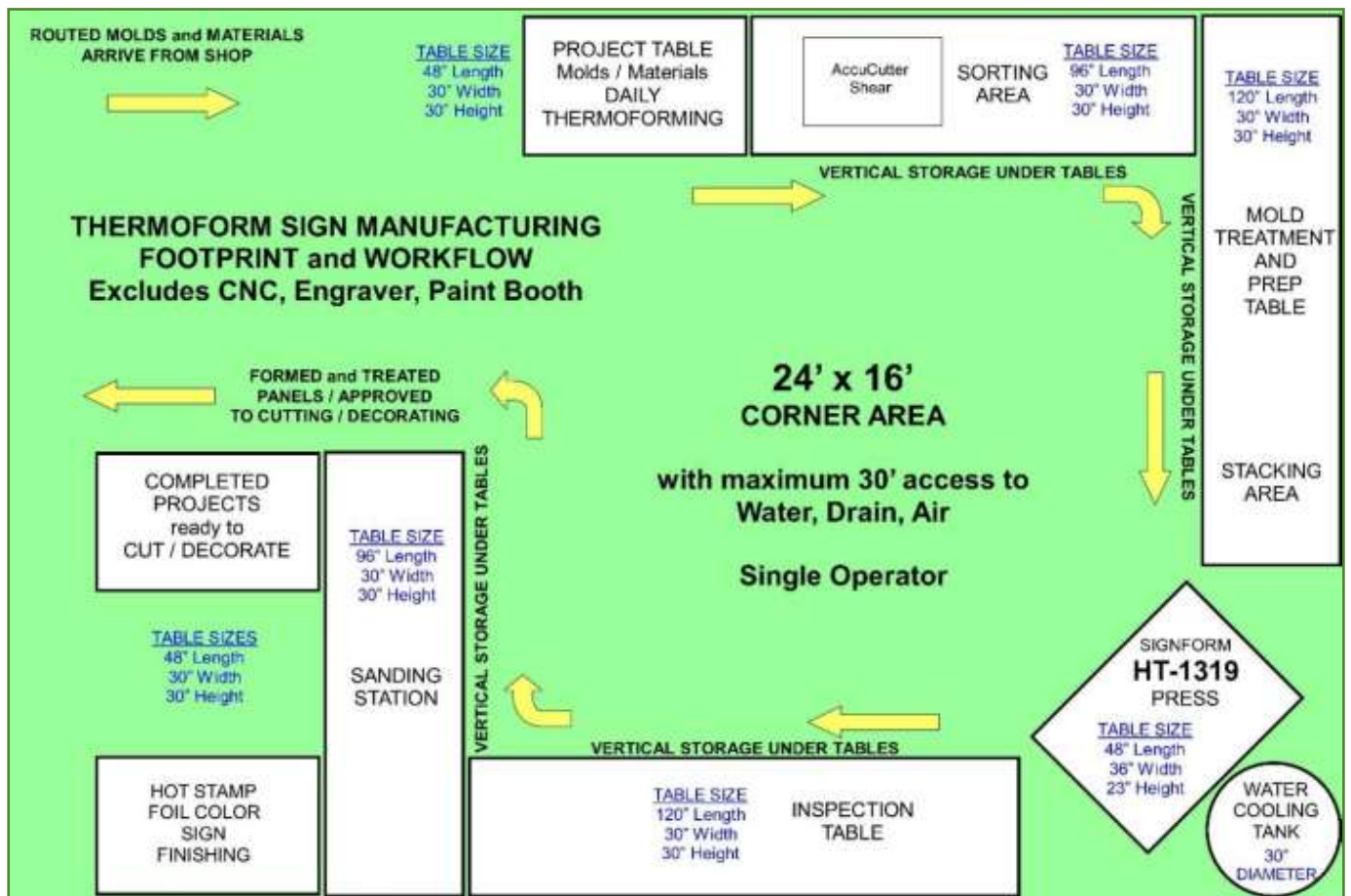
## Manufacturing Cell – Customized Footprint

ARTS™ Manufacturing can be fit into almost any available space within your shop. We recommend access to water and drainage on the same floor as your press. This is used for the occasional replacement of cooling water used in the press cooling tank. You will also need adequate compressor capacity. We recommend your compressor tank be a minimum of 80 gallons with a cut-in/cut-out range between 125 to 150 psi.

Below is a floorplan for thermoforming based on the Cellular Manufacturing concept. It features an efficient workflow model for one or two operators. We recommend you have one primary operator with a backup operator who is available to step in or assist when high volume output is required.

We'll help you design a custom workflow for any available space. This area incorporates a 24 x 16' corner with a maximum of 30' for access to Air, Water and Drain.

Standard Power Requirements – 240 Volt / 3 Phase / 30 Amp (for press only) & Multiple 110 volt wall outlets





## Grimco/SignForm Thermoforming Press and Equipment

### SignForm HT-1319 Press

The Grimco SignForm HT-1319 Thermoforming Press is a pneumatic/hydraulic hybrid unit, custom designed and built for Architectural Sign Manufacturers with experience in fabricating using a variety of available methods such as Rasters and Photopolymer. The **HT-1319** is built for industrial scale manufacturing of custom, monolithic Architectural Raised and ADA Compliant Signage. "ARTS" Thermoforming has a comparatively low cost-of-entry in the high value interior sign market. With an output of up to **45 sq.ft. p/hour** and virtually no maintenance, the SignForm HT-1319 will be the most efficient and profitable piece of equipment in your shop. The ROI on the **HT-1319** is remarkably fast. Let's discuss how and why.



Each Grimco SignForm press includes a full week of on-site installation and staff training. With your purchase, Grimco will provide you with the latest regulatory guide "Signs and the ADA/ABA" by renowned authority Sharon Toji of Access Communications. Grimco has commissioned Ms. Toji to include a special section dedicated to thermoforming and compliant mold making and is available for hire as an ADA consultant.

### SIGNFORM MHS-1530 HOT STAMP PRESS



The SignForm MHS-1530 features high and level pressure across all corners of the moving heated platen. It is easy to operate and adjust "on the fly" to compensate for variable substrate thickness. Foil colors can be applied to both painted and unpainted surfaces. Large platen and sliding worktable allow you to apply foil colors to signs up to 12" x Any Length.



## ACCUCUTTER 3001/25 GUILLOTINE SHEAR



The **3001 Guillotine Shear** is an important tool in the thermoforming area and will be used to trim panels, molds and materials to optimize yield and thermoforming efficiency. Use the 3001/25 to cut all plastics up to 0.25" thick. The guillotine design and long handle provides maximum torque for thicker materials. The shear is outfit with plastic cutting blades and although it will not cut a finished edge on acrylic, it can be used to cut **EnviroStrate™** and other flexible plastics to a finished edge suitable for painting



## COMPLETE SILKSCREEN TIPPING STATION

Silk screen tipping station installed and implemented during press installation. The silk screen station will contain three silk screens of 305 mesh, squeegees, inks, solvents, etc.

**Contact your screen-printing supplier**

For Screens and NAZDAR Source One Inks (9700 Series)

## THERMOFORMING MATERIALS AND MANUFACTURING CELL ANCILLARIES

## PIONITE® THICKLAM MOLDS

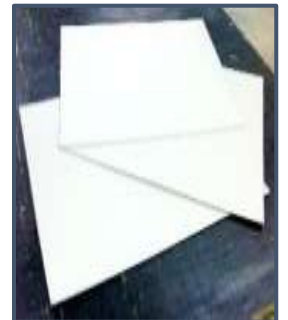
Pionite Thicklam is the recommended material for mold making in the SignForm ARTS™ process. With over a dozen different high-quality textures, Thicklam has proven to be the most economical and reliable laminate for engraving and routing custom images for Architectural Raised Thermoformed Signage. As a key element of your installation, SignForm Systems provides a startup inventory of three standard textures. Suede has a high matte finish, perfect for surface painted applications. Medium Gloss is the most widely used texture because it meets non-glare compliant standards while providing ideal transparency for second surface digital printing and interchangeable window information. Gloss Finish is primarily used as a mold blank to give the back of clear thermoformed panels perfect image appearance, just like the gloss finish found on the back of P-99 non-glare and other acrylics used for windows.

Model # D84SW803SD480

Double Faced Melamine Finish / **Suede** Texture / Eggshell White / 0.090"  
Thick with Brown Phenolic Core / 48" x 96" Size

Model # D84SW803MG500

Double Faced Melamine Finish / **Medium Gloss** Texture / Eggshell White /  
0.090" Thick with Brown Phenolic Core / 48" x 96" Size



# Mold Making Material

Pionite® DecoCor® thick phenolic is designed for commercial applications, but is an ideal product for where the decorative surface must contribute to the structural stability of the finished assembly. DecoCor® panels are available in the following configurations: decorative on both sides or decorative one side.

## Composition

DecoCor® laminate “Mold Making Panels” are highly durable sheet products that combine decorative color papers saturated in melamine resin with phenolic resin-impregnated Kraft layers, thermoset at high pressure. The thickness of the laminate is determined by the number of Kraft layers used. The laminating process combines the durability of melamine resins with the texture aesthetics of decorative papers creating a mold making material that has been the standard in thermoforming for many years.

## Product Availability

DecoCor® mold panels are available in thicknesses up to 1 inch (25 mm) and offer the same chemical and heat/pressure distortion resistance properties as standard Pionite laminate. Thicker grades of mold panels are available in any texture. Please consider the increased weight, which can make manual handling difficult. Custom sized, factory cut sheets are available at a nominal charge and can be ordered to fit your engraver or router bed. Minimum order is only 160 square feet.

## Handling & Storage

To minimize the potential of warpage prior to engraving or routing, mold panels should be stored horizontally at an approximate temperature of 70 °F to 75 °F (21 °C to 24 °C) and 45% to 50% relative humidity. Exposure to extreme temperature and humidity can cause warpage.

## Mold Making for ARTS Method

Mold panels can be sawed, drilled, routed or engraved. Tool bits should be carbide tipped end mill and run at high RPM speeds to minimize chatter or chipping (rare). Router or engraving bits should have a minimum 20-degree draft and run at high RPM allow for increased feed rates, lessening mold making times. Always use ISLAND PATH engraving method with a minimum of 5% overlay. You do not need to eliminate tool marks from cavities prior to thermoforming. See SignForm ARTS method for procedures.



## Care & Maintenance

DecoCor mold making panels feature a durable surface that is easy to maintain for future use in the ARTS process using ordinary care. To maintain the mold panel's lasting texture, cleaning with a solution of warm water and liquid dishwashing detergent is all that should be required in most cases. Stains may be removed with most non-abrasive household cleaners such as FORMULA 409®, GLASS PLUS® or WINDEX® with AMMONIA D®. Light scrubbing with a soft bristled brush may be necessary to remove stains from the depth of the structure on some textured surfaces. Stains can potentially transfer to the surface of thermoformed plastics, which can affect the appearance of clear signage. If the stain persists, use a mild solvent or another application of McLube release agent. Excessive scrubbing or exerting too much force may damage the decorative surface, especially if it has a gloss finish.

**SignForm**  
Systems

Architectural Raised Thermoformed Signage  
648 Bridgeton Pike, Mantua, NJ 08051 USA

[jim@signformsystems.com](mailto:jim@signformsystems.com)

856-217-7706

# TacFILL™

## SCULPTING POWDER



TacFILL™ Sculpting Powder is used in production as a process amplifier. Use TacFILL™ Clear when thermoforming clear materials to increase production output by as much as 300% versus straight sheet acrylic. It can also be used with unlike materials such as PETG and Polycarbonate to generate perfect raised elements that are monolithic and fused with the substrate. TacFILL™ White Sculpting Powder is used when thermoforming white opaque acrylic for first surface painting. Once panels are formed and cut to finished size, signs with white raised contrast color are sanded instead of screen tipped or hot stamped, making white copy signs nearly indestructible. Upon purchase of a SignForm Thermoforming System, we provide enough sculpting powder for over 400 acrylic panels of 13" x 19" each. That translates to over 600 square feet of Architectural Raised Thermoformed Signage. TacFILL is not intended to create contrast color raised copy on unpainted signage.

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### Model # TACFILL-APC-100 – CRYSTAL CLEAR

100 ounce CrystaClear Sculpting Powder – Estimated Coverage = 150 Full Size 13x19 Molds

### Model # TACFILL-APW-100 – ULTRA WHITE OPAQUE

100 ounce Ultra White Sculpting Powder – Estimated Coverage = 150 Full Size 13x19 Molds



EnviroStrate™ is the only 100% post-consumer recycled e-waste material dedicated to the sign community. E-waste is one of the world's most critical waste issues. EnviroStrate is waste plastic based sheet formed from recycled computer housings, keyboards and other casings that have been gutted and the precious metals removed. Our composite traffic sign blanks are made with a post-consumer recycled textile supporting matrix, making them shatterproof in sub-zero temperatures.



Sample Thermoforming Panels – 12.5" x 18.5" x 0.125" when available

## MANUFACTURING ANCILLARIES

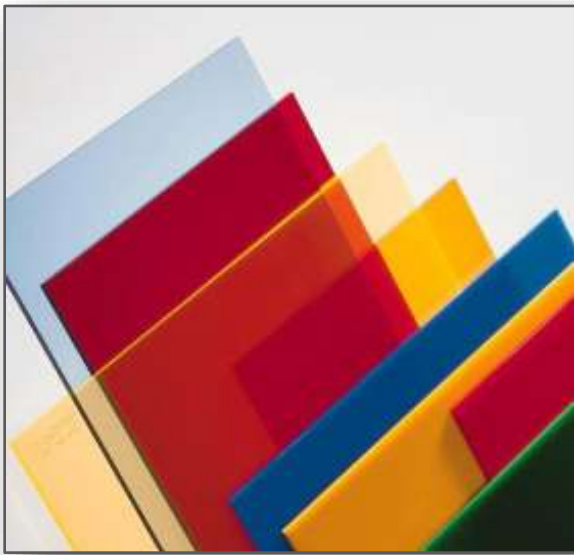


### McLUBE 1700L RELEASE AGENT

16 oz Bottle – McLube 1700L is the recommended release agent for all SignForm processes. It is sprayed onto the face of each mold and is used to prevent thermoplastics from sticking in engraved/routed mold cavities. A single application will remain effective through 5-10 cycles before re-application. One gallon will adequately cover over 5000 molds.

## COMPATIBLE PLASTICS AND ALLOYS

The SignForm System for ARTS™ thermoforming system is the most versatile ADA sign making method available today. With the introduction of cavity fills and process modifications in 2016, the list of compatible plastic substrates expanded over 500%. All of the sheet material listed below can now be utilized in the SignForm creative thermoforming process, as substrates and encapsulated elements for custom raised architectural signage. For available colors, please contact your local plastics distributor or contact SignForm Systems for technical data and process recommendations.



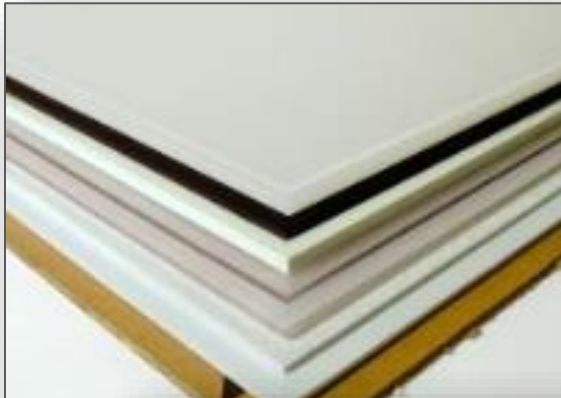
### ACRYLIC – (PMMA) EXTRUDED OR CAST UP TO 1/2" THICK

EXTRUDED Acrylic (PMMA) is the preferred sheet thermoplastic for every day production. When thermoforming raised sign faces for windows or second surface decorating, use clear/gloss Acrylite FF or Optix clear/gloss. When maximum clarity is required, extruded acrylic forms to shape and eliminates color shift for easy matching. CAST Acrylic requires special thermoforming instructions and can be used for its wide array of unique colors and appearances.

### PETG – CO-POLYESTER THIN FLEX FACE AND PHOTOPOLYMER

PETG (aka: Polyethylene terephthalate glycol-modified) is most commonly used as a photopolymer substrate. VIVAK co-polyester sheet is manufactured for photopolymer with a UV resistant cap and stipple surface to prevent cross contamination during processing and to prevent streaks from the chemical bonding adhesive layer between photopolymer and PETG substrate. Using PETG in the SignForm process is simple and fast. Turn old photopolymer scrap and signs into new signs capable of withstanding any environment.





## HIPS, ABS, ENVIROSTRATE™ 100% POST-CONSUMER RECYCLED AND ULTRA-THICK SIGN REQUIREMENTS

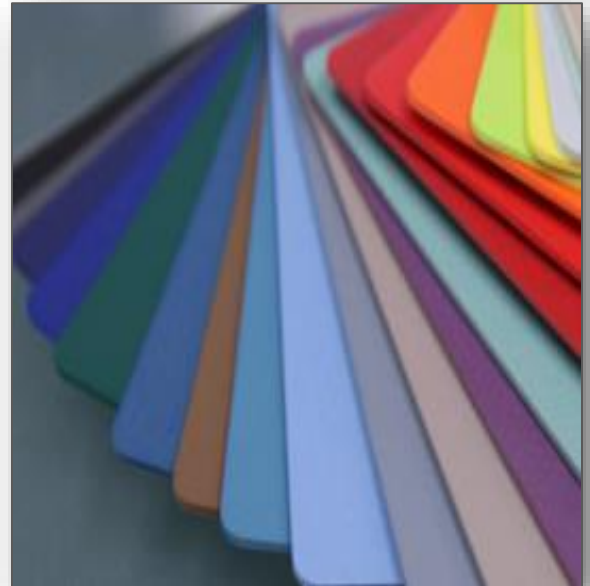
High Impact Polystyrene and Acrylonitrile Butadiene Styrene are low temperature forming flexible plastics most commonly found in vacuum formed plastic products like computer housings, cartridges, keyboards, serving trays, etc. SignForm Systems rescues from landfill disposal all post-consumer recycled HIPS and ABS plastics deemed unsuitable for other products

## ACRYLIC ALLOYS - KYDEX® ACRYLIC-POLYVINYL CHLORIDE

Kydex® Acrylic/PVC alloy is tough, nonporous, noncorrosive, chemical resistant, fire retardant and thermoformable. These plastic sheets have incredible abrasion resistance and virtually no moisture absorption. They are offered in a variety of colors and stocked in black, white, and red. Kydex® is very easy to clean: tough stains, scuffs, and graffiti can be gotten rid of using strong cleaners with no staining or surface damage to the material. Kydex®

sheets are also available with fire ratings of ul94v-o and 5v.

With its wide range of available standard colors, Kydex® can be thermoformed as a viable alternative to sand-blasted signs found in schools and other high traffic, high vandal prone environments that require self-extinguishing characteristics.



## CORIAN® SOLID SURFACE

DuPont™ Corian® solid surface comes in a variety of hues, tones, and colors for every design sensibility and application. DuPont™ Corian® solid surface can be whatever your design imagination commands it to be. Nonporous and stain-resistant, Corian® is easy to clean, making it as ideal a surface for healthcare environments as it is for home kitchens and baths. It's also durable and easy to renew, because the color runs all the way through the material.



## COLOR CAST® AND OTHER ROWMARK PLASTICS

The versatility of thermoforming stretches across all varieties of sheet plastics. The cross over potential from one sign making technique to thermoforming is what makes the future of this fabricating technology so bright. Every product currently used today can be incorporated into ARTS™ manufacturing. Including the beautiful plastics manufactured by ROWMARK. Whether the substrate is made from cast acrylic or polypropylene, the application and process times can be set to convert these plastics into monolithic, one-piece custom raised signage that can be guaranteed to last the life of any facility.



*For more information on the use of other thermoplastic sheet, such as Polycarbonate, PVC, LDPE, HDPE and others, please contact your SignForm Systems representative. Process times vary based on material type, gauge, and manufacturer. Custom process times are established during installation and documented in the SignForm Materials Manual.*