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Participants in a project of the graphic design department of the Philadelphia College of Art, under the direction of Inge Druckrey

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The design of commercial signs in America is a kind of surviving folk art. There are no prominent sign designers as there are, for example, prominent architects; there are no schools to educate sign designers; and very little has been published in the way of criticism or instruction in the art of sign design. Most of the expertise that exists is in effect a set of trade secrets of sign manufacturers. And yet, signs are almost as important in the cityscape as architecture; at night signs become the visible city.

Recently the argument has been put forward strongly that American signmaking is really a flourishing art form to be admired and cherished just as it is. This argument is generally supported by colored pictures of exuberant signscapes like the Las Vegas Strip, Times Square, or Downtown Miami. The flaw in this argument is that the low-budget imitations of Las Vegas, found on every commercial street corner in the country, are in actuality unspeakably dismal; along with smog and soot they help to make the cities and highways unbearable.

Opposing the lovers of Las Vegas are the garden club persons who hope to suppress every trace of commercialism everywhere by writing strict anti-sign zoning codes. In their view, commerce is a kind of social disease to be concealed as much as possible from public view—like a drunken uncle.

Between these extremes of laissez-faire and prohibition are several other possibilities. One is to find new ways to open the hitherto closed field of sign design to the talent and imagination of young designers in the way that furniture design was opened in the 1940s. Inge Druckrey and her class at the Philadelphia College of Art have made a useful move in this direction by studying the signs in the neighborhood of the College, not as critics but as designers. The information they have developed opens the door a bit. The beginning of a new vocabulary emerges and the technology of signmaking is related to other fields of graphic design. Most importantly, this study provides designers everywhere with a model approach to this important field.

Alvin Eisenman, Professor,  
Graphic Design  
Yale University

Signs documents anonymous street sign forms and fabrication techniques. Materials for this study were assembled as a project of Inge Druckrey's graphic design class at the Philadelphia College of Art, in the fall semester, 1972. (Ms. Druckrey is currently Assistant Professor of graphic design at Yale University.) One of several projects designed to utilize the city as a learning environment, it deals with the direct, "undesigned" graphic images that form a major part of the urban street scene. This study is concerned with signs produced by craftsmen at the direction of shopowners, bankers or government personnel, not graphic designers. The resulting forms are of interest to designers for two reasons: 1) they have become the pervasive verbal images of our streets; and 2) they utilize many fast disappearing fabrication techniques that should not be lost to young designers.

Randomly selected at the 17th and Sansom Street intersection of center city Philadelphia, all the major categories of outdoor signage were identified by the students; forms that can, of course, be found on the streets of any American city. Once identified, each category was very deliberately studied in terms of materials, manufacture and application. Working in teams, students developed information on each sign type by photographing innumerable examples and observing and photographically documenting the various manufacturing processes used to produce each kind of sign. Only a small segment of their extensive documentation could be included here and this study, even in its entirety, does not pretend to exhaust the field of street signage.

Examples chosen for the study include: signs made in plastic, metal and neon, signs with interior or exterior light sources, printed decals and stencils. Information concerning the manufacture of these sign types was assembled from sources all over the city of Philadelphia, from individual craftsmen as well as larger manufacturing plants. Most of the photographs were taken in and around Philadelphia and New York.

Professor Eisenman states in his foreword that expertise in the area of commercial signage is a set of manufacturer's trade secrets. This fact, coupled with the loss of a body of trained craftsmen, means certain of the techniques examined here have to be classified as dying forms. Neon sign fabrication, fast disappearing as a trade, is a delicate, highly skilled process requiring an exacting apprenticeship. Signs that would formerly have been produced with gas-filled, bent tubing are now often made of various colored plastics. A number of young artists, working with problems of light and recognizing the inherent qualities of neon, have revived the medium in recent years; their interest has brought new life to the form. Neon's low energy consumption (compared with alternative light sources) should now bring new advocates to it for practical reasons.

Just as the arts of cabinet-making, weaving and dress-making gradually have been lost to the marketplace, hand-painted signs, though still employed for one-of-a-kind situations, will soon disappear altogether. These once highly regarded trades are now in the category of home crafts. Ironically, these craft-hobbies fill leisure time created by the machines which have displaced them in the marketplace.

In DQ 92, a number of valuable "tools of the trade" are reexamined with unbiased eyes, as Ms. Druckrey and her students have looked at the question of street signage in a fresh, non-judgmental way. In so doing, they have developed an impressive body of previously undocumented urban information.

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4	Plastic Signs
10	Metal Signs
16	Neon Signs
22	Signs with Interior Light Sources
26	Signs with Exterior Light Sources
30	Decals
34	Stenciled Signs

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We are grateful to the many Philadelphia craftsmen whose invaluable assistance in assembling information made this issue of Design Quarterly possible.

# Plastic Signs

Plastics, particularly acrylics and laminated plastics, are the most widely used materials for sign production.

Acrylic plastics can be colorless, combining the transparency of glass with lighter weight and greater resistance to breakage, or colored, to be opaque or semi-opaque. Opaques maintain the most intense and even color quality and are used particularly in lighted signs to hide the light source.

Acrylics have good resistance to weather and little fading from exposure to sunlight. They can be heated to conform to almost any shape and can be sawed, drilled and machined like a soft metal.

Plastics, however, are sensitive to temperature change. Expansion and contraction allowance in the ratio of 3/16 inch for every four feet is permitted by catching the sheet edge in a metal frame, allowing the face to "breathe" without restraint. Bolting or other inflexible fastening which does not provide for this expansion, may result in sign breakage. Large, flat, horizontally installed sheets will become deformed under continuous pressure from snow, ice, water or their own weight.

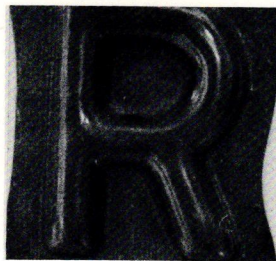
Laminated acrylics made from scrap materials and plastic resins can be fabricated like wood or soft metal. Their thickness varies with the number of layers used. Laminated acrylics are inappropriate for molding or vacuum forming and are used almost exclusively for engraving. Since they are opaque, they cannot be used with an interior light source.

## Fabrication processes

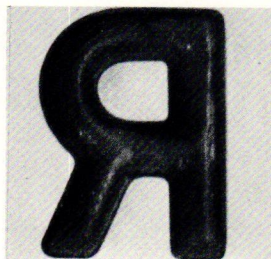
Vacuum forming, molding, die-cutting, engraving, sandblasting, casting, framing, mounting and coloring.

## Vacuum Forming

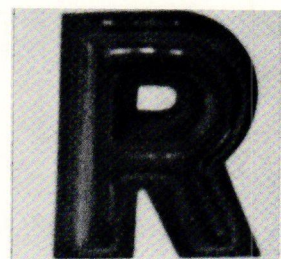
Vacuum forming is a process based on air pressure differentials. Heated plastic is clamped directly to the edges of a female form and sucked into a mold by air pressure. It can be stretched to various sizes, depending on the thickness of the sheet and the amount of heat applied. Vacuum forming is used especially for large signs, as it tends to give greater strength and durability to the form. It also can be used for individual letter forms. Vacuum formed letters have fairly round edges.



"R" vacuum formed from flat plastic sheet.



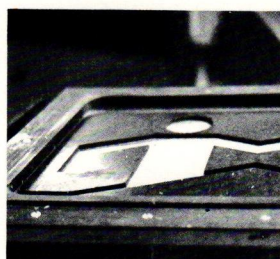
Cut flush with letter form.



Cut with a lip around letter form.

## Molding

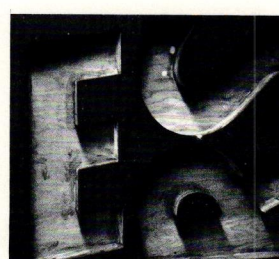
The process of molding is very similar to vacuum forming and is sometimes used in conjunction with it for more precise definition. A heated sheet of plastic is placed between male and female dies and pressed into a form. This method, though expensive, allows for good detail because two dies are used.



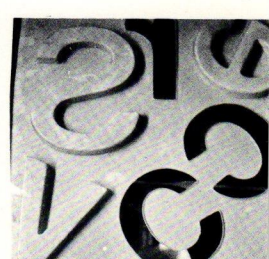
Female half, metal mold.



Produced plastic image.



Female half, wooden mold.



Produced letter forms.

## Die-cut Plastic

Plastic can also be die-cut. Only used when large quantities of signs are required, this technique is more expensive and less precise than sawing. Letters can be mass-produced as well as custom-made and any type font may be used.

## Engraved Plastic

Two-color laminated plastic is generally used for engraving. The image is cut through the first color exposing the second and allowing the first to become the background. This process is more permanent than painting an engraved area. Engraving is most frequently used for small identification signs.

## Sandblasting

For large signs, an image is sandblasted through a rubber stencil laid on top of the plastic.

## Cast Plastic

Casting is a cheap, fast process used to produce small letters in mass quantities. A silicone rubber mold is filled with polyester and allowed to cure. These letters are used primarily for bulletin boards, and range in size from 1/4 to 18 inches.

## Framing and Mounting of Individual Letters

A vacuum formed letter cut with a lip can be inserted in a metal or plastic frame, or can be mounted on canvas, metal or plastic backgrounds. Large sawed letters can be glued (though not totally weather-proofed) or fused with ethylene dichloride to another plastic. This fusing process is only applicable between acrylic plastics or mylar.

Stick on letters

Either vacuum formed or sawed letters have pressure sensitive adhesive on the back. They adhere best to smooth, hard, non-porous surfaces and are not intended for use where a permanent bond is necessary, such as outdoors.

Magnetized letters

Made of magnetic plastic, these letters adhere to any ferrous metal surface. They must be custom painted.

Clip on letters

Clips are attached to the back of molded plastic letters. They can be made and used in a number of different ways: with tacked on runners, placed directly on a corrugated plastic background, or pressed into the grooved backing of a bulletin board (cast letterforms are generally used for bulletin boards).

## Coloring of Plastic Signs

Multicolored plastic signs can be made using spraypaint, silkscreen or pigmented plastic.

In hand painting, the paint (acrylic lacquer) is always applied to the back of the sign to insure greater protection from weathering or normal abuse.

Spray-painting

A clear sheet of plastic is sprayed with a thin rubber film, which is then cut away (similar to a stencil) exposing the area to be painted. After the image is completed, a fine coat of white paint is sprayed over the back of the entire sign to intensify the colors.

Silkscreening

An image is silkscreened to a clear sheet of plastic, then sprayed from the back with another color to supply the background as well as to protect the first color. Painting can be done before or after the forming process. If paint is applied before forming it becomes partially fused to the plastic and produces a permanent coloration.



Image on silkscreen.



Image screened on plastic sheet.



Sheet in dome form, spray-painted from back.  
3 foot diameter

Vacuum form with silkscreen image:

**Pigmented plastics**

Pigmented plastics are supplied from the factory in a relatively wide variety of colors. They are the least susceptible to fading of the color alternatives, but the most expensive.

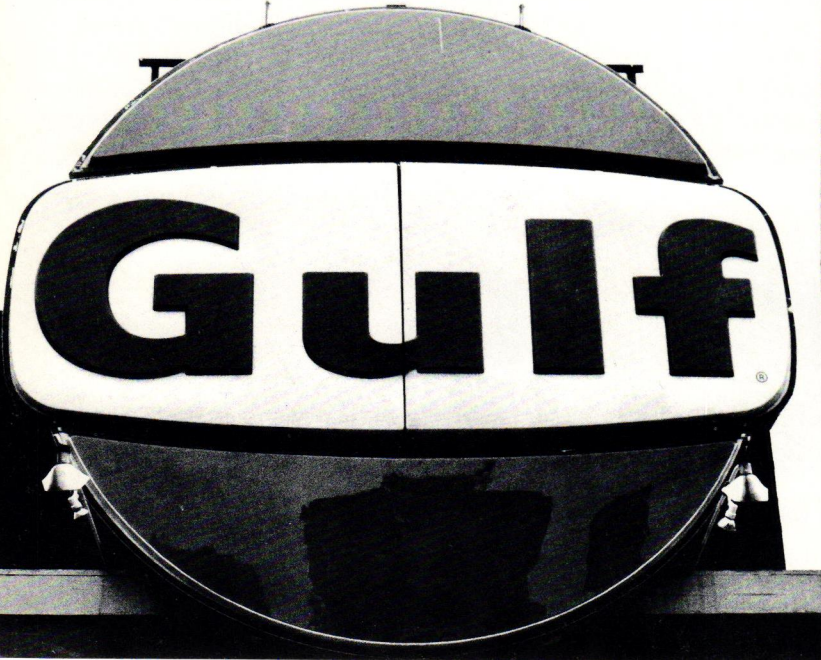
Molded sign, painted from back.  
2 1/2 x 9 feet

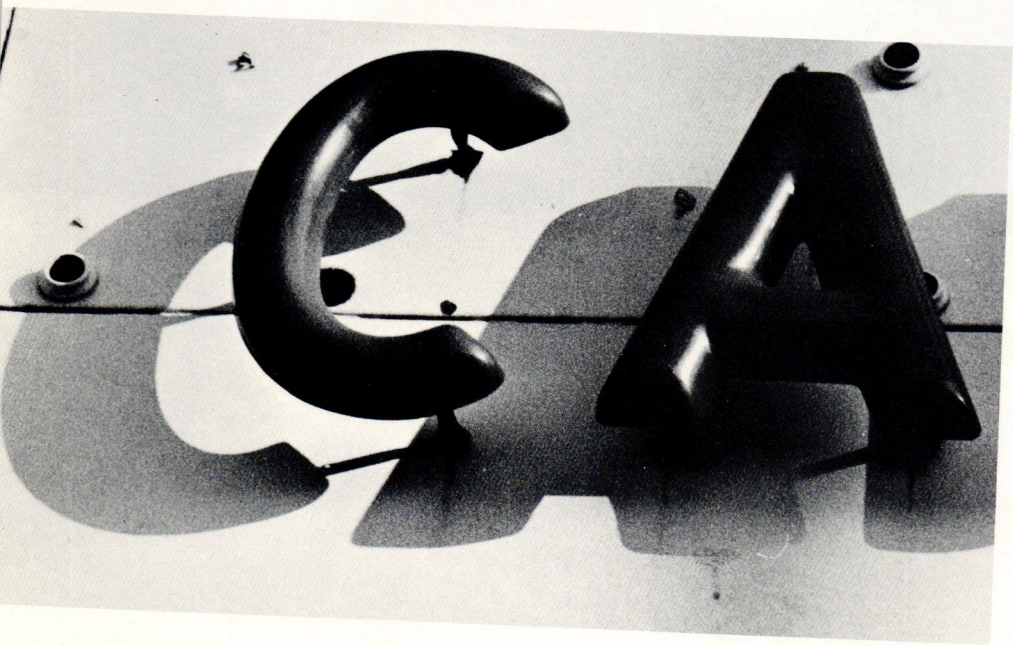
Vacuum and male-female forming, spray painted from back. 5 x 9 feet

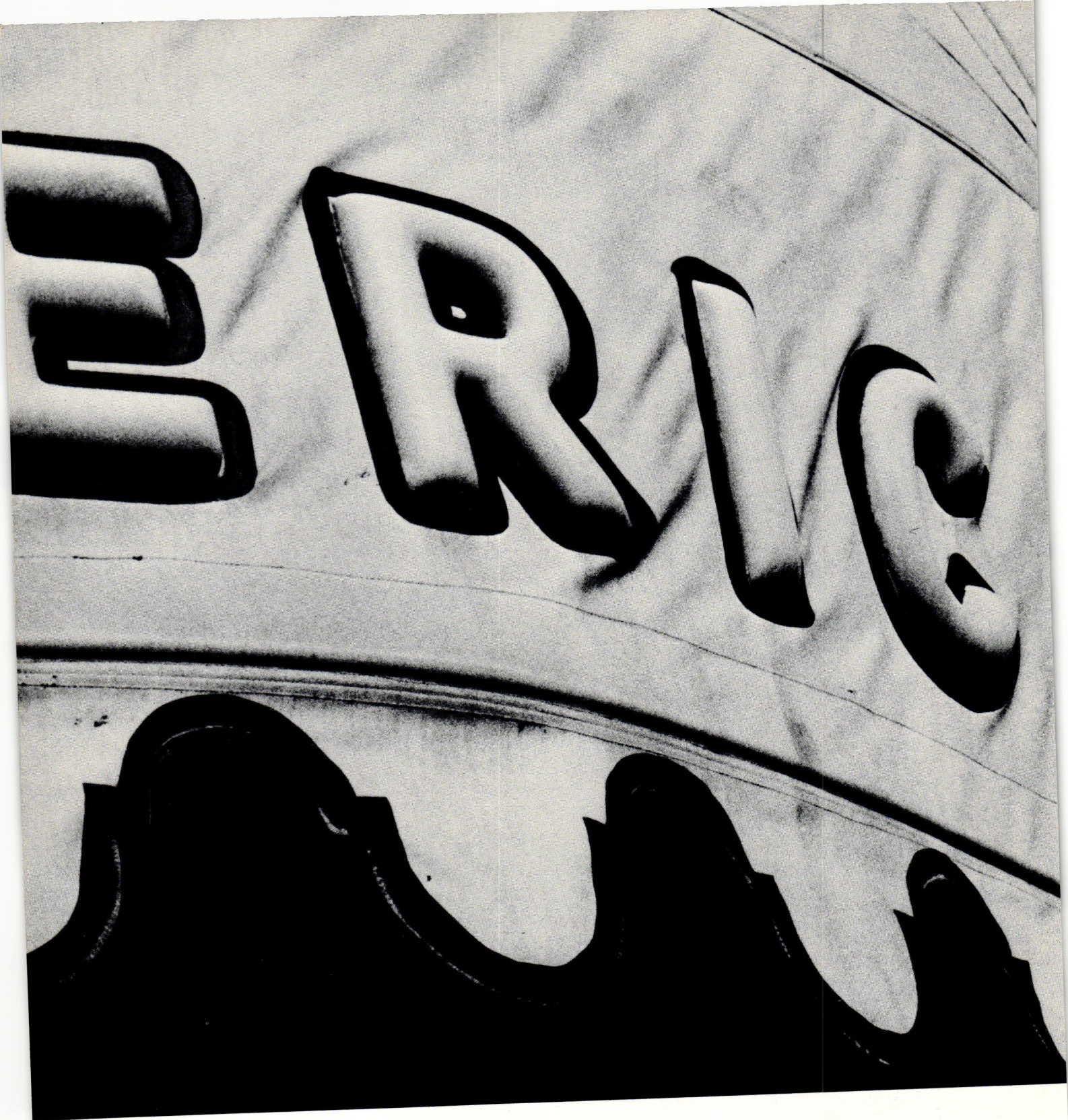
Vacuum formed in sections, painted from back.  
9 foot diameter

Vacuum formed pigmented plastics.  
3 x 6 feet

Vacuum formed letters of pigmented plastic, mounted on metal rods.







Vacuum formed letters,  
mounted from rear in canvas  
awning. 1 foot high

Sawed plastic forms as  
backing for sign on canvas  
awning.

Sawed plastic letters in  
metal frames.  
2 feet high

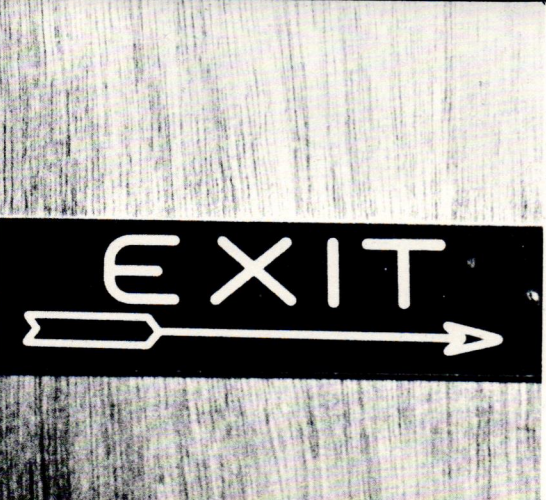
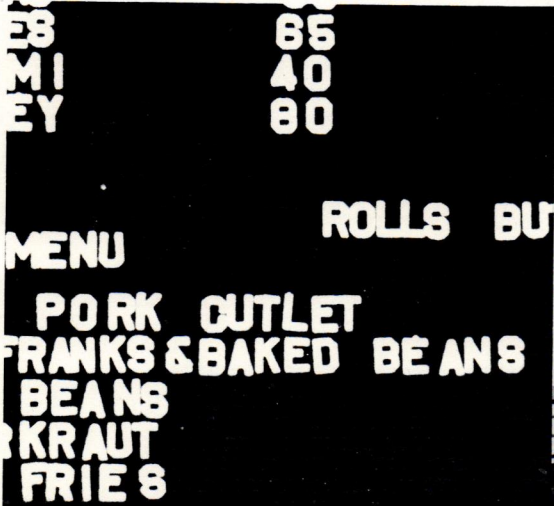
Cast plastic letters.

Molded letters of pigmented  
plastic, clamped into channels.  
2 feet high

Two color laminated plastic,  
engraved.

Die-cut letters fused to  
plastic background.  
3 feet wide

Vacuum formed letter of  
pigmented plastic, clamped  
to flat plastic sheet.



# Metal Signs

Metal is an extremely versatile material for sign fabrication. It is very durable and may be fabricated in a wide diversity of methods.

## Fabrication processes

Cast metal, sawed metal, fabricated sheet metal, stamped metal, die-embossed metal, engraved metal and etched metal.

## Cast Metal

Cast metal signs are solid, one piece signs or individual letterforms of a relatively heavy gauge. They are often used when durability or prestige identification is required.

### The casting process

The casting process is carried out in three steps. A pattern is made, usually out of wood, metal or plastic, which looks very much like the finished sign, except that it is slightly larger in all dimensions to allow for shrinkage of the metal as it cools. Next a mold is prepared by packing special molding sand around the pattern. After the mold is completed, the pattern is removed and molten metal is poured into the mold. To facilitate removal of the pattern, side edges have a slight taper or draft. After the casting has cooled, it is removed from the sand and cleaned of all excess material. Finishing methods include: machining, polishing, plating, anodizing, enameling and painting.

### Mounting

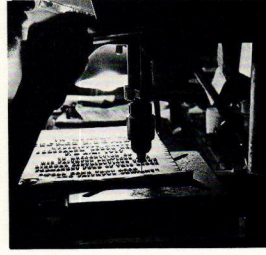
Metal signs are mounted with metal rod wall fasteners, various adhesives, or by welding, brazing or soldering onto a metal surface.



The mold.



Sandcasting process.



Finishing cast metal plate.

## Sawed Metal

Sawed metal signs are solid, often one piece signs sawed individually by hand. They are used whenever durable identifications in low relief or large or unusual sign forms are desired.

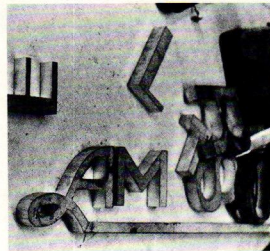
### Fabrication process

A paper pattern is made and attached to a metal plate. Following the pattern, the sign is cut out with a band saw. Any metal is usable that can be sawed. Stainless steel, for example, can be used up to a thickness of about 1/8 inch or aluminum up to 1/2 inch.

Finishing requires only the removal of any rough edges by belt sanding and filing. Further treatment may involve enameling, plating or anodizing. Wall attachment techniques are basically the same as those for cast metal signs.



Finishing sawed metal forms.



Finished letter forms.

## Fabricated Sheet Metal

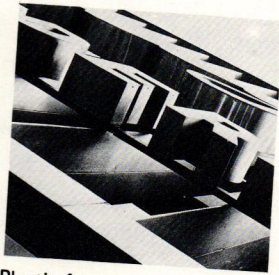
Fabricated sheet metal signs are hollow, thin walled three-dimensional signs. They are constructed by hand from many separate pieces. Sides and face of the signs are flat and usually broad in area. Various sheet metals such as stainless steel, copper or aluminum may be used.

## Fabrication process

A paper pattern of the sign face is attached to the metal and the forms are cut out. These forms are given depth with the addition of sides. Sides and face are seamed by either soldering for steel, heliarc welding for aluminum or brazing for copper. Size limitations for this kind of sign are very flexible and can go up to ten feet in length. The surface of the sign can be finished by polishing, plating, anodizing or enameling.



Cutting process.



Plastic face on sheet metal sides.

## Die-stamped Metal

Die-stamped metal signs usually consist of individual letterforms stamped out of sheet metal, either aluminum or stainless steel.

The signs are stamped out cold on a press and then finished. Two dies are used in the process. A smaller die (or punch) fits inside a larger die called the matrix or simply the die. The dies fit very closely together and forms are cut out by a process of shearing. Sheet metal is placed over the matrix on a press bed. A punch is mounted on the ram of the press and forced down by hydraulic or mechanical pressure, just far enough to shear out the forms.

Finishing is done by plating, anodizing, enameling, polishing, or painting.

## Die-embossed Metal

Die-embossed metal signs are sheet metal that has a soft, rounded, low relief dimensional surface. Usually they are found in relatively small sizes as whole signs, however, individual letterforms, hung separately, sometimes are used to cover a large area. Die-embossed metal signs are most often used as light weight, inexpensive markers, where low cost, durable, mass-produced signs are needed.

The fabrication process is very similar to the die stamping process, but the metal is shaped rather than sheared. The dies in this process do not fit as closely as in die-stamping and thus allow the metal to be contoured or embossed.

After embossing, the sign is usually finished by enameling or silkscreening. A base color is applied to cover the entire sign and the raised parts are then either roller-coated or silkscreened in a second color. These signs are usually bolted to a wall or post.

## Engraved Metal

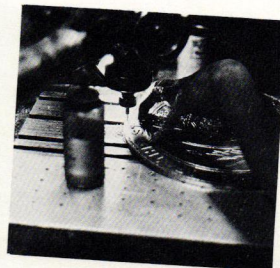
Engraved metal signs are cut as shallow negative relief, often filled with enamel to make the letters stand out. They are generally used as small identification signs or dedication plaques, having much the same quality as cast metal.

A pattern is usually cut into plastic or metal and can either be prefabricated or custom made. To get good definition, the pattern should be slightly larger than the original. The pattern and a fresh plate are first locked into separate positions on the engraving machine. The position of the two plates determines the percentage of reduction. Engraving is done over a tracing device or pantograph. On one end of the device a needle or stylus follows the groove of the pattern; on the other end, a rotating needle routs out a groove on the fresh plate, reduced but exactly following the pattern. The width of the engraved line can be extended by using multiple strokes but beyond a certain limit the quality of the engraving tends to decrease.

Finishing is usually done by filling the grooves with enamel. Adhesives or metal rod wall fasteners are used for mounting.



Engraving with pantograph.



Engraved letters.

## Etched Metal

Etched metal signs are thin plates that frequently have a large body of small or intricate design elements in extremely shallow, negative reliefs. Letterforms are often colored or filled with enamel to make them more visible.

### Fabrication process

Etching designs are first made in precise layout. This artwork is then photographed to the desired size and a film positive made. The positive is placed over a plate which has been coated with a light-sensitive gel. On exposure to a bright light source, the areas of the gel which were covered by the opaque part of the film remain soluble and are removed by running hot water over the plate. These unprotected areas are etched out in an acid bath. The plate is then rinsed, dried and finished. Mounting again uses adhesives or metal rod wall fasteners.



Cast metal form.

Sawed metal.

Cast metal.

Cast metal mounted on metal rods.

Cast metal.

Fabricated sheet metal mounted on metal rods.

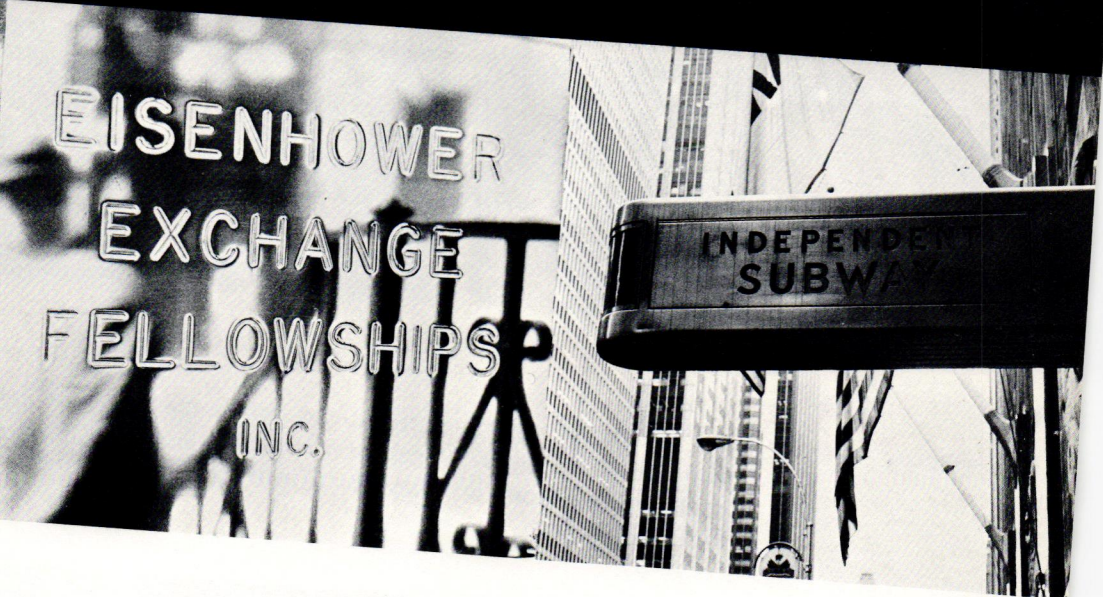
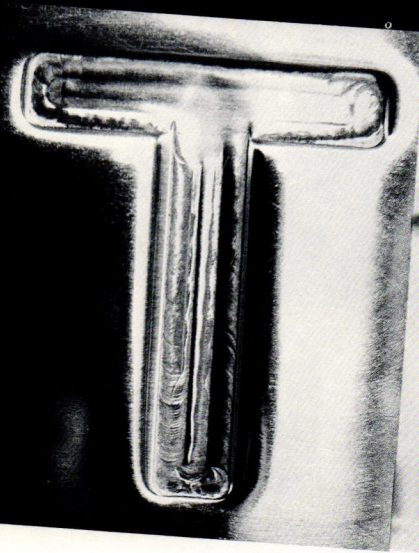
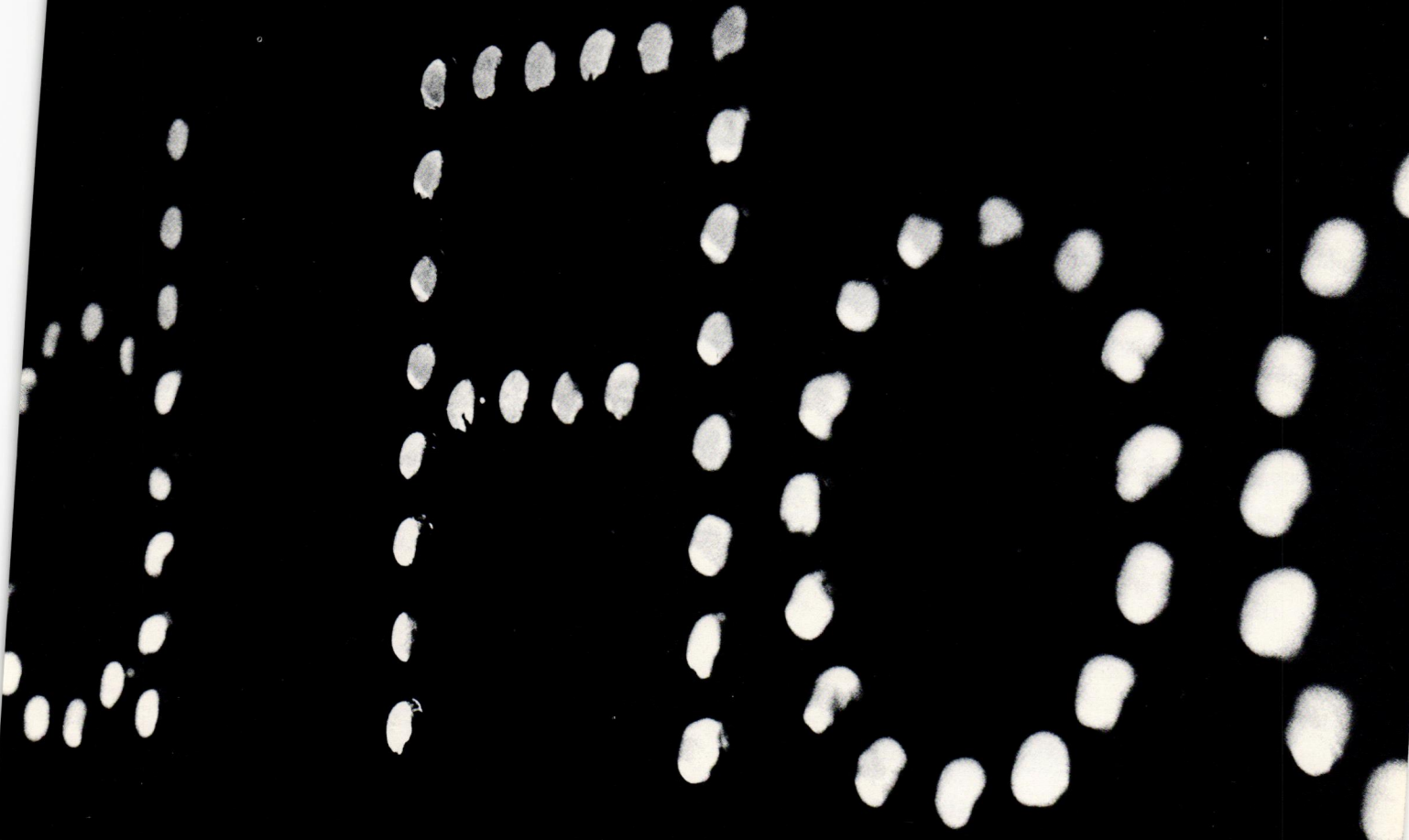
Sawed metal mounted on metal rods.  
1 1/2 feet high

Fabricated sheet metal with plastic face.





Die-embossed sign.  
Die-embossed sheet.  
"US Mail" 2 inches high



EISENHOWER  
EXCHANGE  
FELLOWSHIPS  
INC.

INDEPENDENT  
SUBWAY

Punched metal, backed with white plastic, lighted inside.

Die-embossed sign. 1/8 inch high letters

Die-embossed trademark. 1/8 inch high letters

Engraved metal letter.

Engraved metal sign. 3 inch high letters

Sawed metal, reverse cut, plastic backing.

# Neon Signs

Neon is an inert, colorless, gaseous element. When contained in a glass vacuum tube, through which an electrical current is passed, it produces a reddish-orange glow.

Neon is the term generally used to describe lighted tubing of all colors. This misconception exists, because at one time it was the most commonly used gas. Other gases such as argon, krypton, helium or xenon are used, combined with liquid mercury and various fluorescent coatings to produce light tubing of various colors.

Glass tubing can be bent to follow practically any pattern, enabling it to function simultaneously as light source and communication medium. In contrast to other lighted signs, neon signs are easy to maintain and have, under normal conditions, a very long life. With the increasing use of plastic and diminishing number of skilled neon craftsmen, neon is gradually being displaced as a sign medium.

Tube bending, joining of tube sections and introduction of the gas.

Skeleton forms placed in a channel letter, on the surface of a swing sign or used in conjunction with a painted sign.

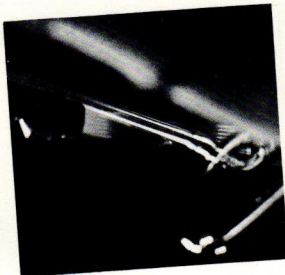
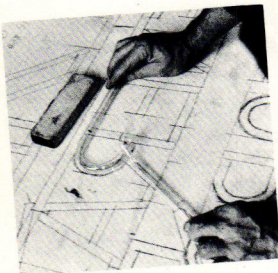
Fabrication Processes

Tube Mounting

## Fabrication Process

Tube bending

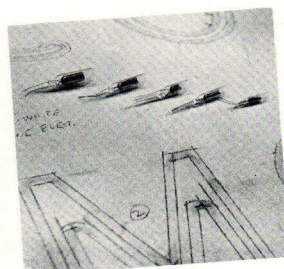
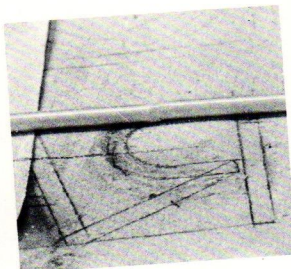
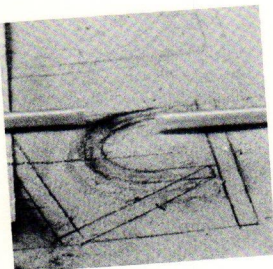
The first step is preparation of a pattern which reads in reverse on an asbestos sheet, so that all bends and electrodes are behind the readable portion of the tubing. A section of tubing to be bent is first heated over a low intensity flame. As the glass begins to soften, the bend is carefully made to conform to the pattern. When tubing is bent, it tends to flatten out, so it is reheated and air is blown into it until the diameter of the bend is uniform with the rest of the tube.



Tube bending process.

Tube joining

Usually several four foot tubing sections must be joined to complete a pattern. A splicing torch is used to heat both sections of tubing; the ends are then brought together, reheated, gathered slightly and allowed to cool. Electrodes come in a glass tubular housing conforming to the diameter of the other tubing and are joined in a similar manner.

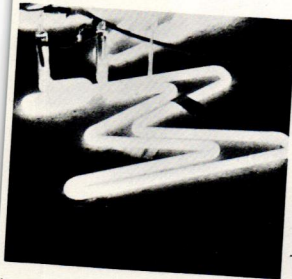


Electrodes.

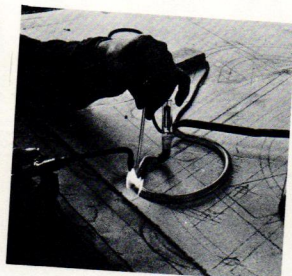
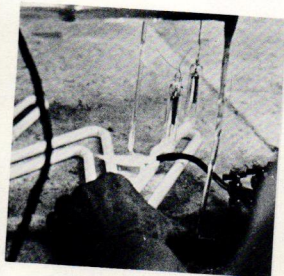
Tube joining process.

## Introducing the gas

After the tubing is bent and the sections and electrodes joined, the tubing is ready to be evacuated and the gas introduced. A five millimeter piece of tubing connected to an evacuating pump is inserted into the finished tube and all air is removed. After the vacuum is complete, gas is introduced through the same piece of tubing which is then sealed off. All bends and connected sections which should not be visible are painted out, using a special opaque black paint or black tape.



Introducing the gas.



Painting out non-readable areas.

## Color

The various gases used are colorless and only take on individual color characteristics after an electrical current is introduced.

Neon is a red-orange color; argon is ultraviolet, but in combination with a small amount of liquid mercury it yields a blue light; helium is white-gold; xenon is blue-white with a white cast; and krypton is purple in combination with a small amount of argon. Other colors, yellows, greens, rose, copper-gold, are obtained by coating the tube with a fluorescent powder. Neon in combination with a blue fluorescent coating, for example, yields a rose color. Argon, in combination with a yellow coating is green. Deep rich colors such as ruby or very dark blue are obtained by using colored glass tubing.

## Mounting

### Skeleton signs

Skeleton letters can be connected to various frame structures which are usually free hanging inside a window. Such frame structures are: a self-contained metal frame with a bracket holding the transformer in back of the tubular unit, used for mass-produced promotional signs distributed by major companies; lighted glass tubing which can serve as a frame as well as a part of the design; or, if the sign is not too intricate or fragile, a glass or metal rod which can be braced to the top of the sign.

### Channel letters

Channel letters are three dimensional, usually fabricated from sheet metal with either open front or open back.

### Open front

Neon tube is mounted to the front of a metal letter, closely following its shape. The metal channel letter becomes the sign during the daytime and is practically invisible at night when it functions only to confine the light to the shape of the letter.

### Open back

Neon tube is attached to the back of a letter with a solid metal front. The letters are pin-mounted away from the wall. At night, the lighted tubing creates a silhouette of the sign. To disperse the light evenly, the background should be made of a nonreflective material.

### Swing signs

Signs visible from two sides are described as "swing signs." Used in connection with neon, these signs are usually boxlike structures containing a transformer and all connecting wires. Neon tubing is mounted flush with the surface of the structure.

### Combined with a painted sign

Quite often neon signs are used in combination with painted signs, increasing their readability in daylight as well as at night. Light paint on a dark background, for example, will reflect light, confining it to the shape of the letter, an effect similar to a channel letter. Lighted neon tubing tends to change the surrounding background in color value and intensity.

### Motion

Flashing or an illusion of motion can be incorporated into all of the previously mentioned sign types. The flashing of separate elements can be programmed in any predetermined speed or order. Each element must be connected to an individual transformer. A connecting plate moves, engaging and disengaging the transformer and electrodes of various units that will light accordingly.

FASHION  
WIG  
CENTER





Tubular sign.  
Frame functions as design  
element and sign support.

Neon combined with painted  
sign face.  
Swing sign.

Open metal channel letter  
before insertion of neon.

Neon tubes in open channel  
letter.

Closed channel letters with  
neon in back, mounted ten  
inches from wall.

WLG S

1



Tubular sign.  
5 feet long

Skeleton sign from rear.  
Painted out areas and  
supporting glass rods visible.

---

# Signs with Interior Light Sources

---

Signs with an interior light source are generally made of plastic and fabricated in a manner similar to plastic signs.

## The major components

A metal frame functions both as sign support and container for a concealed electrical installation.

The sign face and a light source are installed in the frame.

---

## The Sign Face

### Single face signs

Frequently consisting of a closed metal frame with a plastic face, the sign is mounted on or recessed into a building facade.

The sign face can receive an image in a variety of ways.

Flat or molded transparent plastic can be hand or spraypainted using stencils, or silkscreened from the back. When lighted, varying degrees of transparency are determined by the color or number of coats of paint applied.

Individual plastic letters can be fused to a flat or corrugated sheet of acrylic plastic, clipped into the corrugated plastic, or set on runners mounted on flat or corrugated plastic backing.

If a metal face is used, the design is cut in reverse. Openings are either backed with a flat sheet of plastic or filled with molded or cast plastic which can either be flush with the surface of the sign or extend slightly beyond it.

Channel letters may also be considered single face signs. Three-dimensional letterforms, usually made from sheet metal, function as their own encasement with the face left open or covered with plastic cut to the shape of the letter.

### Double face signs

Signs with two faces set back to back into a metal rim are called double face or swing signs. To be visible from two sides they are usually hung from a bracket or mounted on poles.

## Light Sources

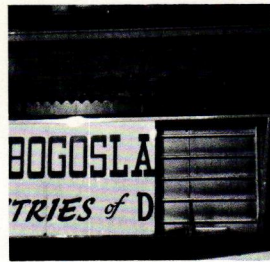
### Incandescent lighting

Only practical for very small signs, incandescents may be used for special effects such as flashing signs. The bulbs themselves may form the letter, or they may be arranged in a grid, with any combination of lightbulbs flashing to form simple letters or numbers.

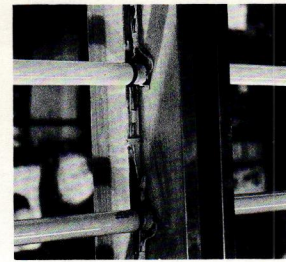
The frame for this type of sign is usually a metal box with a sunshield glass front, mounted to a building. Within this box, each bulb is placed in its own black tubular frame to direct the light and prevent glare from adjacent bulbs.



Incandescent light.



Fluorescent light behind plastic.



Fluorescent tubes mounted in metal frame.

### Fluorescent tubes

Fluorescent tubes are the most practical light source for internally lit signs. They require a minimal electrical installation and come in a wide variety of sizes.

The tubes are placed not more than one foot apart and four or more inches away from the face of the sign to achieve an even light quality. Large signs generally consist of several panels for quick accessibility when tubes need to be replaced.

### Neon tubing

Neon tubing is generally used as the interior light source for channel letters. Intense colors can be obtained by using the same color in both neon tube and plastic face.

6.46

630

*Polly* BROS.  
SPORTING GOODS

*Sally*

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Incandescent grid in metal frame.

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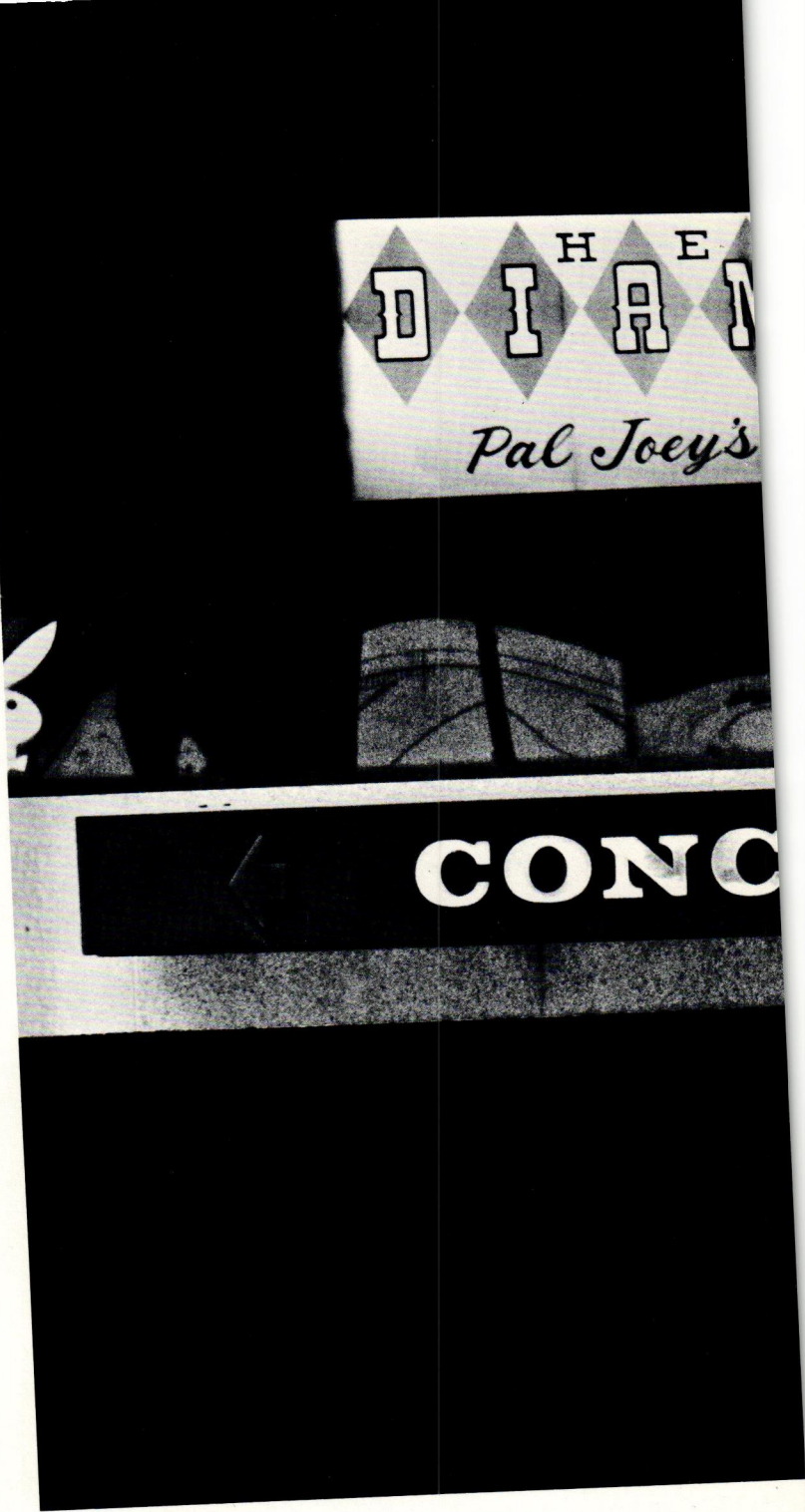
Top: neon tubes in channel letters.

Bottom: Fluorescent tubes behind corrugated plastic sheet.

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Neon tubes in channel letters with plastic front.

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Fluorescent light behind vacuum formed plastic, spray painted from back.

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Fluorescent tubes behind flat plastic sheets painted from back.

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Fluorescent tubes behind flat plastic sheet painted from back.

---

Fluorescent tubes behind reverse-cut metal filled with white plastic.

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Fluorescent tubes behind white plastic openings in reverse-cut metal.

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**PRINTING INSTANTLY**

R Y  
**N D S**

SHOP THAT IS )

*The Playboy Club*



**COURSE - SUBWAY**



**FIDELITY  
BANK**

# Signs with Exterior Light Sources

An exterior light source provides the simplest and cheapest way to light a sign, in terms of both installation and maintenance. It is used to light large painted or printed signs, such as billboards, or signs made of various opaque materials such as metal, stone or wood.

Major lighting techniques

Floodlighting, spotlighting and backlighting.

Light sources

Mercury, quartz-iodine, fluorescent and incandescent lights.

## Lighting Techniques

Spotlights

Spotlights are the simplest kind of outside light sources and can be set up easily. They are strong, focused lights, used to light small areas from above, below or side. Spotlights must be carefully placed to avoid reflections. Mercury, fluorescent or incandescent lights are used.

Floodlights

Floodlights are used for uniform illumination of a large area. Light types are: mercury (electric arc in mercury vapor), quartz-iodine, halogen-reflector floodlights, fluorescent lights and, in some instances, also incandescent light.

Backlighting

Backlighting or silhouetting a sign can be done in several ways. Neon tubes, set into the back of an individual letter or sign usually of fabricated sheet metal, will produce a glowing repetitive outline of the letter or halo effect. Reflecting light off a wall, with the letterform or sign extending away from it, will create another silhouetting effect.

## Light Sources

Mercury and quartz-iodine

The most common floodlights are mercury and quartz-iodine. Mercury tends to have a bluish cast which will sometimes change the color of the lighted area. Quartz-iodine is very close to daylight. Both lights have very even vertical and horizontal light distribution and their beam angle can be changed to cover any desired spread.

Installation and maintenance of these lights is easier than that for fluorescent tubing. Light units are usually mounted on single poles extending from the top of a sign. Mercury and quartz-iodine lights have a life span about two and one-half times longer than that of fluorescents.

In interior situations, mercury and quartz-iodine are often used as recessed top or bottom lighting. Light units are recessed into the ceiling or floor of cases which can also control the direction of light.

Fluorescent lights

Fluorescent lights can be used as floodlights though their lighting capacity does not compare to mercury or quartz-iodine. Fluorescent strip lighting ( a row of fluorescent lights mounted end to end ) is used to cover large areas.

Encased fluorescent lights (cove lighting), mounted nearly flush to the sign, must be used where building codes limit the distance a light may extend from a building.

Bottom lighting from mercury or quartz-iodine floods mounted on metal poles.

ROLLING ROCK

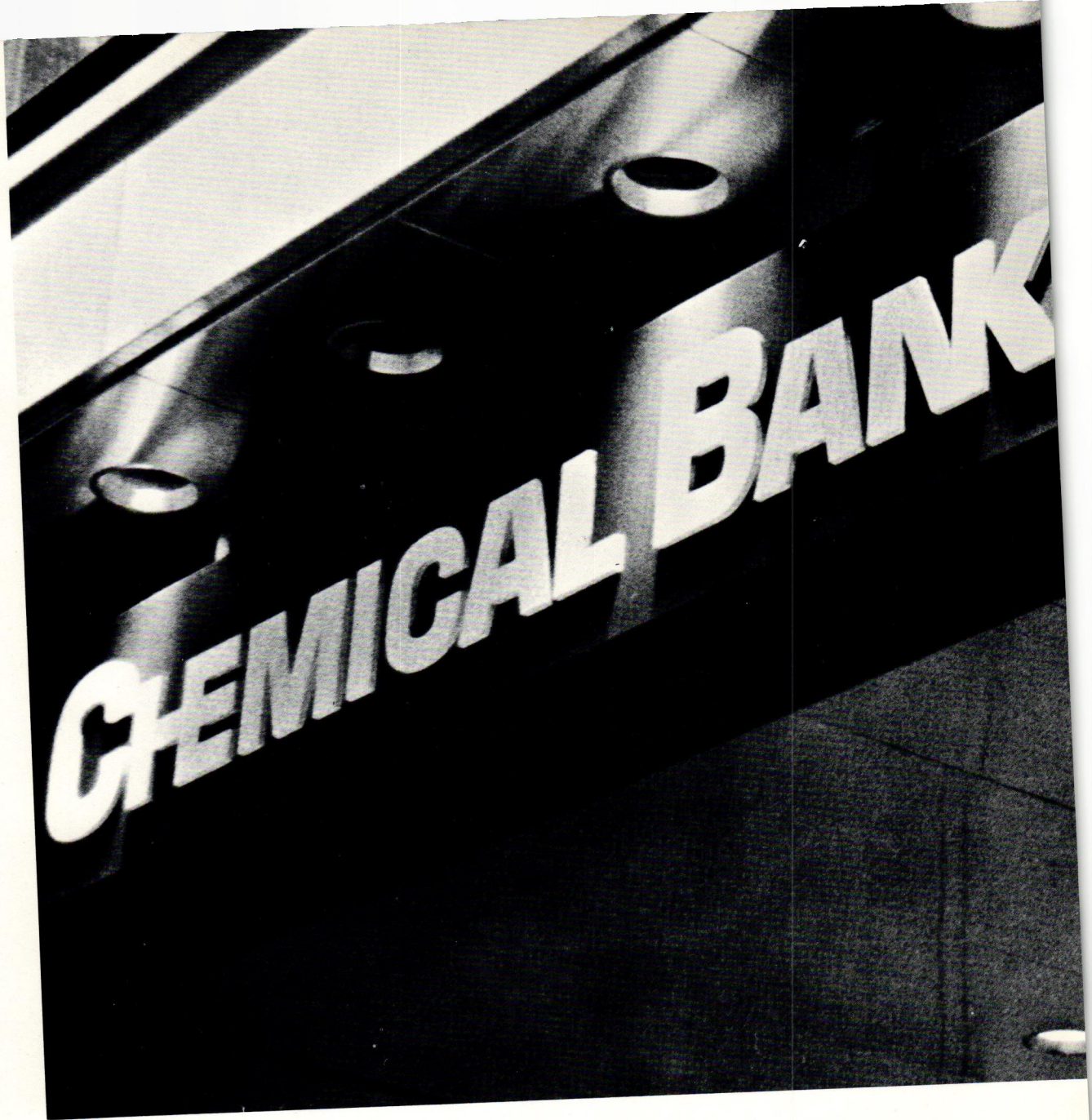
Brewed  
from  
Mountain  
Spring  
Water

ROLLING ROCK

Rolling Rock  
Premium Beer

Rolling





Recessed ceiling incandescent floodlights.

Fluorescent tubes recessed behind milk white plastic.

Incandescent spotlights.

Fluorescent strip lights reflected off white background.

Fluorescent tubes mounted on poles extended in front of sign.

Incandescent floodlights recessed in ceiling.



Thomson  
MEMBERS NEW

SYLVANIA  
HOTEL

DINING ROOM - COCKTAIL LOUNGE

MEMBERS

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# Decals

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Decals, or self-adhesive markings, are a common method of applying printing to various surfaces which would otherwise not be receptive to a printing process.

They are simple, one step applications and avoid extraneous operations such as painting, riveting or stenciling. They may of course be used in conjunction with these processes.

Decals are used for many sign requirements ranging from small scale signs to identification of fleets, oil trucks, or airplanes.

Major categories

Pressure sensitive and water activated markings.

Fabrication process

Printing and cutting.

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## Printing Processes

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Decals are printed in offset, silkscreen or a combination of the two. All printing is done on the face side of the stock which is supplied to the printer as a prepared base, with adhesive and backing paper pre-applied to the stock.

Face up markings

Printed on transparent or opaque stock.

Face down markings

Printed in mirror image on a transparent base so that the image is seen correctly through the stock.

An opaque coat serving as background is printed last.

Dual purpose markings

Designed to read from either side, the first side is printed in mirror image as a face down marking. An opaque coat is printed next which serves as background for the reverse side, which is then printed as a face up marking.

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## Cutting Processes

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Depending on size, decals are usually printed in large quantities on the same press sheet and cut after printing. They may be die-cut, kiss-cut, or square-cut.

Die-cutting

Die-cuts can be made in any shape; both stock and backing paper are cut. Die-cutting is done on a special press. The die consists of steel blades bent to the shape of the desired cut, then mounted onto a wooden board which has the approximate size of the printed sheet. Each blade is positioned precisely to cut a single decal on the press sheet. Strips of foam rubber, slightly higher than the blade are mounted on both sides of the die to push the paper off the blade after cutting is completed.

Kiss-cutting

A technique that may be used with die or square-cut decals, in which the blade cuts through the image only, just "kissing" the backing sheet.

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## Printing Stock

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Paper stock

Paper is the least expensive stock and is only used in cases where permanency is not required. The stock can be supplied with a water soluble adhesive.

Foil or metallic stock

Relatively expensive, metal stock is more difficult to print and register than paper. Metallic stock can be embossed after printing. Both materials are applicable for face up marking only.

Vinyl, mylar or vinyl laminates

Vinyl stocks are very durable and versatile. They may be used for all cutting and printing techniques. An important application is the pre-masked, die-cut, pre-spaced decal. The decal is printed, kiss-cut and all negative areas are removed. A self-adhesive mask is applied to the printed surface. When the mask is stripped from the backing, the decal comes off in registration with it. The mask holding the decal is then applied to the intended surface and burnished. The decal bonds permanently, while the weaker adhesive of the mask allows it to be removed without a trace, leaving the individual elements of the final marking that give the impression of being printed directly to the surface.

Water decals

A water-activated carrier sheet is used to make water decals. A clear lacquer coat is printed as the last run to support the decal during and after transfer to the intended surface. Water decals last almost indefinitely indoors, but only a limited time when used outside.

69A297



Pre-masked, kiss-cut, pressure sensitive vinyl.  
Silkscreened image.

Die-cut, pressure sensitive clear vinyl on glass.  
Silkscreened, face down.

*John Hanamaker*  
 WINDOW  
 4

AMERICAN

Pre-masked, kiss-cut  
 pressure sensitive vinyl  
 on glass.  
 Silkscreened, face down.

Square-cut, pressure  
 sensitive clear vinyl on glass.  
 Silkscreened.

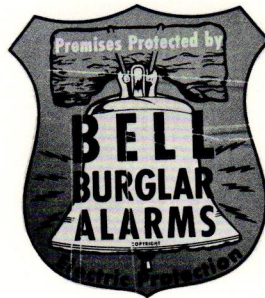
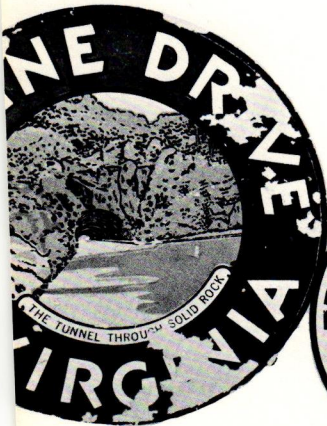
Pre-masked, kiss-cut,  
 pressure sensitive vinyl  
 on glass.  
 Silkscreened, face down.

Die-cut, pressure sensitive  
 clear vinyl on glass.  
 Silkscreened, face down.

Kiss-cut, water decal.

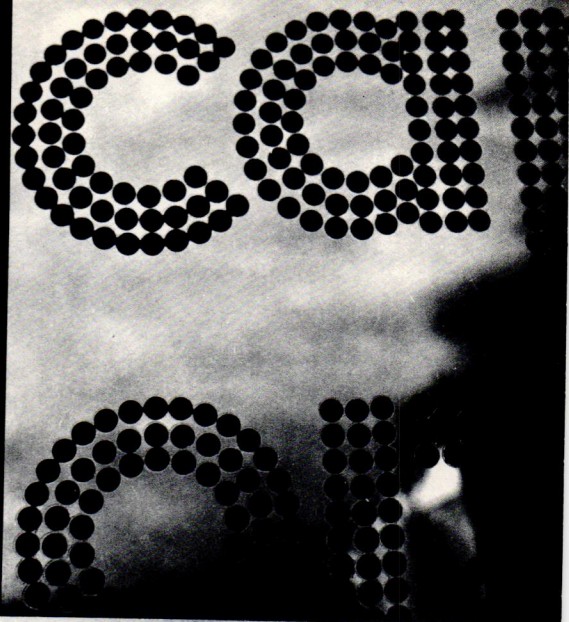
Die-cut, pressure sensitive  
 clear vinyl on glass.  
 Silkscreened, face down.

Die-cut, water decal.  
 Silkscreened.



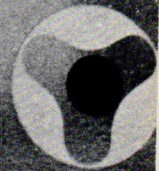
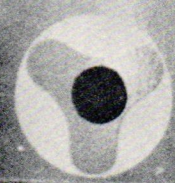
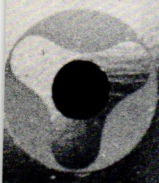
# nia

INSTITUTE OF ARCHITECTS



The Bank of Tokyo Trust Company

東京銀行信託會社



**AIR  
CONDITIONED  
INSIDE**

# Stenciled Signs

Stenciling is one of the fastest, cheapest and most versatile methods of sign making. It has the flexibility of hand painting, allows for extensive reproduction, and can be used for almost any kind of surface. All negative areas of a letterform must be connected to the outer edge of the character by the characteristic stencil "bridge."

Stenciling is widely used for package identification in industry and containerized freight and in political campaigns where communication images are short-lived.

## Cutting techniques

Tools used in the stenciling process

Stencil materials

Hand-cut, machine-cut, engraved and die-cut.

Stenciling brush, roller and spraypaint.

Pressure sensitive plastic, oilboard, mylar, brass, aluminum, copper and fiberboards or masonite.

## Existing Typefaces

EFGHIJKLMNOP

Machine-cut

Gothic  
Upper Case  
Numbers  
Small Logos  
1/8 - 6 inches

EE

Adjustable brass

Gothic  
Roman  
Upper Case  
Numbers  
1 1/2 - 12 inches

EE E E

Prepared die-cut

Gothic  
Roman  
Old English  
Showcard Italic  
Upper Case  
Lower Case  
Numbers  
1/2 - 2 inches

BROWN

Hand-cut

Open to any design

## Cutting Processes

Hand-cut stencils

Hand-cutting is a technique with an unlimited number of design possibilities. Size and typeface restrictions are minimal and letterspacing can be regulated. The image may be either drawn directly onto the material from which the stencil is cut, or transferred to the stencil by a paper pattern. Intricate designs need strong support and should be cut in copper, brass or mylar. Oilboard, heavy cardboard or paper are less durable carriers but produce clean, well defined letterforms.

Hand-cutting is a time consuming process not suited for large production and requires a considerable amount of preliminary design work to achieve fine results.

Machine-cut stencils

Stenciling machines are used to cut stencils quickly and accurately. Each machine houses a single typeface and size arranged on a circular punch and die carrier. After the oilboard or mylar is inserted into the machine each letter is dialed and punched individually. Because these stencils are not optically letter space their legibility sometimes tends to be reduced.

Machine cut stencils are limited to a range from 1/8 to six inch alphabets. Typefaces are sans serif or slab serif and include no lower case letterforms. Punch and die characters are round-edged for longer wear.



Stencil machine.

Movable alphabet is arranged on a circular plate. Dial is turned to desired character.

Engraving

Engraving is used to produce small intricate letterforms and designs which cannot be die or hand-cut. Sizes range from approximately 3/32 to eight inches. The engraved image is usually 25 to 50 percent smaller than the original to achieve sharp precise contours, but reduction may be as much as 90 percent.

The engraving process involves two steps: 1) the original design is hand engraved on a brass plate which becomes the pattern for the engraving machine; 2) the machine is equipped with two needles. The first follows the contours of the image on the engraved pattern; the second needle moves simultaneously, cutting a reduced image into a fresh plate. The degree of reduction is determined by the relative position of the two plates. Rounded corners, (from the needles rotating cutting pattern) are characteristic of engraved letterforms. Positioning of the "bridge" is usually left up to the engraver.

A stencil may be die-cut by hand for small quantities or on a press if large quantities are required. Stencil materials for the hand process include: oilboard for a small run, brass or mylar for large quantities. The die itself is a steel block, gently rounded on top with a raised cutting edge, usually in the form of a letter at the bottom. The die is hand-held and pounded with a hammer into the stencil material (mainly brass). Letters on the die are hand-engraved and range from 1/4 to 1 1/2 inches. Only standard letterforms are available. This process is used primarily for drum and shipping stencils.

Die-cutting

### Stencil Materials

Pressure sensitive plastic or paper

Used for stenciling or non-uniform surfaces, pressure sensitive materials adhere directly to a surface with minimum ink bleeding. The stencil is cut from a master die into stock which has a pressure sensitive backing. Stencils are peeled off and discarded after each use.

Oilboard

Both inexpensive and suitable for machine cutting, oilboard is the most common stencil material. It is made by treating high grade paperboards with drying oils, which make the paper surface less porous and more resistant to ink.

Mylar

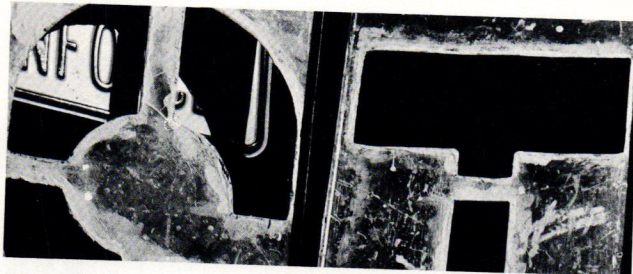
Similar in size and weight to oilboard, mylar has strength comparable to that of brass and copper.

Brass, aluminum and copper

Metal is used for delicate designs because its strength allows support of a fragile image. These materials are not suitable for machine-punching and must be cut by hand or with an engraving machine. They are the least flexible of all stencil materials and are used almost exclusively on flat surfaces. Individual letter stencils up to twelve inches high may be combined to form complete words by a simple interlock of adjustable brass. After each use, the word can be taken apart and the letters reused for another stencil.

Large stencil designs (characters over six inches high) are often made of fiberboard. Negative areas, left by the supporting bridges, are usually painted in when the stencil is removed.

Fiberboard (masonite)



Adjustable brass stencil.

### Application Processes

Ink can be applied to the surface of the sign with a stenciling brush, spray paint or by roller. Hand rollers produce the most precise image and should be used on relatively smooth surfaces. Stencil brush application is the most time consuming process and is not recommended for large quantities. It works well on rough surfaces such as concrete or burlap. Spray paint is the most commonly used method, because the ink is applied quickly and dries fast.



— TO: PRESIDENT

OPERATION AVENUE DISTRIBUTION ILLINOIS, U.S.A.

FINANCE

EXIT FIRE EX

Machine-cut, rolled on metal.	Hand-cut, rolled on painted wall.	Machine-cut, rolled on painted wall. 3 inches high
Hand-cut, rolled on metal.	Hand-cut, rolled on metal.	Hand-cut, rolled on metal.
Machine-cut, rolled on corrugated box. 1 1/2 inches high	Adjustable brass, rolled on concrete. 2 inches high	Hand-cut, rolled on paper. 8 inches high

Circular stencil used for  
identification of barrels  
or drums.

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**DUPONT**  
REG. U. S. PAT. OFF.

**NITROBENZOL**  
**TECHNICAL**

STENCILED WITH  
ROL-MARK ROLLER

**DRUM NO.**

**GROSS 509**

**TARE 59**

**GIBBSTOWN, N. J.**

RUSSE

HOPKINS G

404-2850 NJ

TRIUMPH  
BALTIMORE

L 7 2  
W 1 10  
H 3 4  
BS05

MADE IN ENGLAND

NETT 4 00 LBS

GROSS 5 60 LBS

HANDLE WITH CARE

ATE LOT  
INQUIRE

CALLOWHILL

3, 567 19391

M DATA  
EASTMAN  
SIPPAN

Machine-cut, rolled on wood  
Machine-cut, sprayed on  
metal.

ZIP CODE  
19107

HARVEY S

PPN 44

TRIUMPH ARE VALI  
 TORCING SPI  
 SUPPLY CO

PULL  
 LEVER  
 3

-COUN  
 AULING  
 9-177

NO  
 PARKING  
 DRIVEWA

Hand-cut, rolled on wood.	Hand-cut, sprayed on wood.	Machine-cut, sprayed on concrete.	Hand-cut, rolled on painted wood.
Machine-cut, rolled on cardboard. 2 inches high	Hand-cut, spray painted. 4 inches high		Hand-cut, rolled on metal. 8 inches high
Hand-cut, rolled on metal. 4 inches high	Adjustable brass, rolled on painted wood.	Hand-cut, rolled on wood.	
Hand-cut, rolled on glass. 5 inches high			

ROTH  
 ROTHERS  
 PRIVATE  
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TRAINING  
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 W

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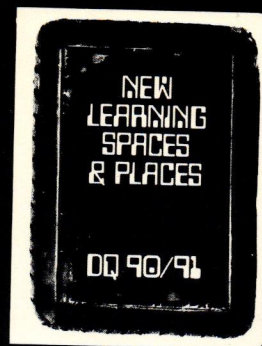
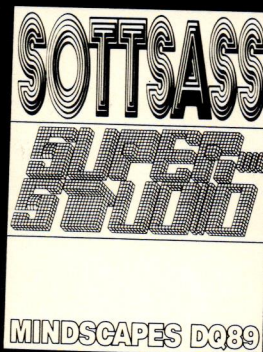
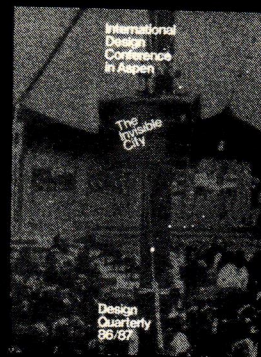
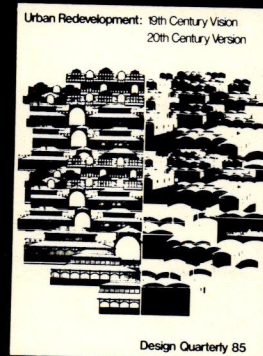
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- 72 Toward the Future
- 73 Form follows Fiction
- 74-75 Process and Imagination
- 76 Easy Come—Easy Go
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- 78-79 Conceptual Architecture
- 81 Walker Art Center 1971
- 82-83 Advocacy: A Community Planning Voice
- 85 Urban Redevelopment: 19th Century Vision 20th Century Version
- 86-87 International Design Conference in Aspen: The Invisible City
- 89 Sottsass/Superstudio: Mindscapes
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