

A GUIDE TO MATERIALS FOR INTERPRETIVE SIGN FABRICATION

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There are advantages and disadvantages of each material available or adapted for use as an interpretive sign. As per their physical characteristics, some will do a more effective job in a chosen location and application than others. Some materials have outstanding capability of graphic resolution and color. Others may aesthetically complement a site because of their earth based or "rustic" appearance. Some materials can withstand degrees of abuse better than others. Others serve as a low cost, but adequate investment and can be replaced easily as needed or ordered in duplicates. The basic differences of sign materials are visual appearance, graphic and text resolution capability, durability, resistance to vandalism and graffiti, and cost of fabrication.

What is the best material to use for an interpretive sign? Is there such a thing? To bring things into perspective lets consider the premise: *There is no panacea of a sign material for all applications. All materials are susceptible to a degree of weathering over time and they can be destroyed or damaged if someone really intends to do so.*

EVALUATION:

The choice of which sign material for your specific site and message should be a **result of the consideration and analysis** of a number of factors which should include, but not be limited to:

- **Graphic resolution, and/or full-color.** What is the capability of the sign medium to convey the story? Will the copy and graphics be clear and crisp, easy to read, and catch the interest of the visitor? Professional graphic design is always important but the sign material choice is also a vital factor. (E.g. the use of color would be vital in designing a sign about wild flowers. Materials such as digital print and porcelain enamel would do the subject justice, while anodized aluminum or sandblasted wood are very limited.)
- **Level of development of the recreation facilities in the area?** Is it along a classified scenic byway, or is the site in a remote location accessed by a gravel road? Is the site a semi-primitive, rustic setting or is it an urban area? Will it reflect or complement a stated architectural theme or regional character of the area? How will the material complement or contrast with the aesthetics of the site.

- Estimated **maintenance** required for the material in the future and the approximate **life expectancy** in serviceable condition. Is the right choice a high quality/cost material where it may serve for a number of years, or would it be more practical and effective to use a cheaper replaceable format? What is the estimated life of the sign material on this site and how often do you plan to replace the sign in the future (E.g., over a 25 year period a \$400 screened wood sign will cost more than a \$2400 porcelain enamel sign if you have to refurbish it every five years.)
- **Types and amount of visitors.** Is the potential site for the sign in an area of major attraction for visitation? What are the modes of travel, etc.? Have you considered the demographics and the visitor expectations? How are they using the site today? How will they likely use the future site with this improvement? What this is pointing to is that **audience and site analysis** is **vital** to selection of a material that will perform and meet your criteria and expectations
- **Resistance to UV (sunlight) deterioration, sandblasting, and weatherability.** The ability of the material to withstand the elements over time. Will it stand up in full sun or does it need to be placed in partial or full shade? Is there occasion of strong windstorms that may carry sand or grit?
- **How well can the sign material convey the story topic,** overall theme, and objectives of your interpretive plan? (E.g. If a site is an ancient Puebloan cultural site built with rock or into a cliff, then stone etched or ceramic materials may be an excellent sign material that would blend effectively and complement the site.)
- Amount of **historic vandalism.** What is the amount of public **presence** or agency **patrol** of the site? Remote sites receive more abuse and vandalism. The presence of people tends to minimize vandalism. If the agency or program is unpopular with the locals and vandalism rates are traditionally high consider a replaceable format where the sign can be replaced economically and quickly. If this or other efforts do not work, then maybe a sign might not be the right choice for interpreting the site or the resource. Consider the **best medium** to interpret the area. Perhaps a brochure, web page, or personal interpreter is a better method?
- **Value provided, and drawbacks** for the investment. Cost vs. Benefit. How long do you desire the exhibit to be in serviceable condition for the dollars you intend to spend? What is your ability to replace the signs?

Signs don't pick up garbage, smile, enforce laws, or run away when people try to vandalize them. On the other hand, they do communicate with more people than all other interpretive programs combined. They are always on the job, day or night, rain or shine, They do not need to be turned on, they are on duty 24 hours a day, 365 days a year. They are one of the major contributors in creating an agency image and identity (professional or home-made), and are always courteous (if designed that way).

They are relatively cheap in comparison to other media choices for interpretation. You can work in-house or with contracted exhibit companies, but remember to get solid interpretive planning and professional design before you go into the fabrication stage.

Compare the success of well-planned and designed exhibit to four-legged table.

- One leg is **planning**. Ideally an interpretive sign is a media selection of a well thought out interpretive plan complete with goals, objectives, thematic statements and topics. Remember that audience and site analysis is vital to the selection of a material that will perform and meet your expectation.
- Another leg is the **layout and graphic design** of the exhibit that presents an attractive mix of illustrations, and photographs, typography, and colors produced by a qualified designer. A professional graphic designer is the best choice for these tasks
- The third leg is exhibit or **sign support/base**. Sign bases or stanchions that serve to support and complement the site, area theme, or buildings, related to the site where the sign is to be located. This element is as important as the sign material itself.
- The fourth and final leg is the exhibit **material choice**. A poor choice here can make the table tip easily and cause the contents to slide off and be lost.

All legs should be well executed and developed for the table to stand level, solid and sturdy. The sign should catch and hold the attention of the visitor, effectively communicate the intended message and fit aesthetically into a site. Often, one or more of these legs has had a poor or inadequate effort and analysis expended which has resulted in an inferior exhibit being located in the field. When this happens it reflects badly on a management unit or agency and will not do justice to the resource interpreted. Designed well, a sign will be effective in catching the attention of the public and pulling them into read the message.

COSTS:

Research and evaluate the capability as well as the limitations of a material before making a decision. For example, you would not want to use an anodized aluminum sign in a very remote area with a history of vandalism. Likewise you would not want to use corrugated polypropylene, or wood routed sign for an exhibit in a visitor center or in a "primo" showcase overlook or high use area.

The cost of the material should not be the only criteria. A more expensive material may be the best application in some of your applications as it may last for eight or ten times as long as a cheaper material and offer low maintenance costs. As mentioned above, in a highly abused and vandalized area consider a replaceable format (a program where duplicates of the original sign can be ordered and replaced as needed). Consider the relative importance of the site or interpretation. Is the site going to be a major "showcase" for the agency or park? If so, choose the material accordingly. If you are trying to provide a showcase and do not have the budget to use the appropriate material, wait until the necessary budget funds are available and keep your exhibits consistent with the rest of the development level. Phasing may be another alternative. Too often, a quick fix of a temporary sign becomes permanent.

Price Ranges

Below are materials that are organized as per their fabrication characteristics. Material costs change constantly so the figure indicated is relative to this writing. The estimates are based on a single 24" x 36" (864 sq.in.) sign.

Material costs are shown in three general ranges:

High Range \$1200 + (**H**),

Middle Range \$600 - \$1200 (**M**),

Low Range \$below \$600 (**L**).

The **H** = High, **M** = Medium, and **L** = Low, would be a general indicator of the price. For screened signs a price range would apply for three surface (spot) colors on a one-color base in a simple layout, no photos or support mount. Full color photography in screened materials, usually drives the price up two to three times in some materials. The parentheses would show closer to what the sign would usually run in a 5-6 spot color layout design or a four-color separation. This is for the materials of porcelain enamel, back screened Lexan, screened paper fiberglass embedment, and wood laminates. The exception to this is digital technology, which will allow one to print

almost unlimited color at no extra cost. If the manufacture “scan” the images, costs are more than lower resolution materials. There can be multiple copies (duplicates) ordered in some materials and the unit cost will go down with the quantity ordered.

-IMAGE IMPREGNATED MATERIALS-

Porcelain Enamel - H. \$1600 - \$3200, (\$2400-\$3600)
Screened Paper Fiberglass Embedment -H \$1600 - \$2200 (\$1800-\$3200)
Anodized Aluminum -H \$1600 - \$2400 (N/A)
Digital Fiber Glass - M \$450- \$700
Digital Laminate Composite - L \$250 - \$350
Digital Vinyl /Expanded PVC - L \$150 - \$250
Expanded PVC – L \$300

-SCREENED SURFACE IMAGE MATERIALS-

Back-Screened Lexan - M \$950- 1200
Vinyl Film on Aluminum - L \$400-500
High Impact Styrene - L \$300
Silk-Screened Metal - L \$300+
Screened HDO/MED-EX. - L \$500-800
Screened Masonite - L \$150+
Corrugated Polypropylene - L \$75-150
Polyethylene/Rigid Vinyl - L \$75-150
Polycarbonate - L \$75 - \$150
PVC – L - \$100 -300

-ROUTED MATERIALS

Routed Wood, High Density Urethane, Foamed PVC– M-H \$750 +
Sand Blasted - H \$1000+ (in Wood or High Density Urethane)
Routed Plastics - M \$500 +

-MISC. MATERIALS

Ceramic - H \$800+ for 8" x 8"
Melamine Plastic (raised image) - H \$1600+
Cast Metal/ Bronze Plaques - H \$3000 - \$6000+
Stone Imagery - H \$1200- 1800+

MATERIAL OVERVIEWS:

The following are descriptions of different types of sign materials and some sources of supply and fabrication. Within the parentheses is the relative COST (H/M/L). STAR PERFORMERS are noted with an " * ". Materials that have been most popular for most wayside exhibits in the last three years (1998-2001) are porcelain enamel, embedded fiberglass, and digital laminate signs.

For a detailed comparison of sign materials and how they respond to varied performance factors, refer to Appendix A, "A Comparative Matrix of 20 Sign Materials."

-IMAGE IMPREGNATED MATERIALS-

Porcelain Enamel: (H) *

In this process a mixture of mineral content glass and inorganic pigments are fused to a steel substrate at very high temperatures creating a molecular bond between the glass and steel forming a permanent coating. Same surface as your kitchen stove. *No medium can match the quality of photo or graphic resolution of Porcelain.* It produces beautiful photos (including half-tones of historic photos) and vivid, unlimited colors. (An exception however is in the use of magenta and pink/purple combinations) Possible tactile elements can be added. Gloss, pebbled, or mottled finishes are available. Completely weather proof, and guaranteed 50 years +. Highly resistant to scratching but can chip and even shatter hit with a hammer or if gunshot which usually requires replacement. Can be rebaked. Minor chips can be repaired to a degree with automotive touch up paint, but not to original condition. Do not use where there is a history of vandalism or at remote locations. Also is limited in its performance where high humidity prevails, as along coastline exhibits. Rusting is a problem in these locations. Fits nicely with commercial NPS type sign bases. Price has become very competitive with many high-end materials. A misconception is that it is the 'most' expensive signing material. This is true only when full color photos are used which requires four color separations that can triple the price. It can be cost efficient when two or three surface colors are used. Auto wax can help to maintain the crisp appearance of the surface. Best application for showcase exhibits and can be used in a variety of projects such as byway waysides, unique feature, zoos, parks, and self guided trails. (ROS...Roaded Natural - Urban)

Screened and Digital Fiberglass Embedment: (H)*

This material has been popular since the 1980s'. It has been used extensively in National Park Service waysides. Currently there are three variations of what is defined as fiberglass embedment or fiberglass encapsulation:

Fiberglass: with Screened Paper Print

Fiberglass: with Digital Paper Print

ZED Embedded Digital

In digital paper printing the fabricator uses resin-resistant ink, fabricators silk-screen or digital transfer your design onto paper, which is embedded (sandwiched) in a .030" to 1/4" layer of clear reinforced fiberglass resin which results in paper and fiberglass become one, leaving no room for moisture to penetrate. An unlimited spectrum of color can be used.

In a screened paper application full color graphics can be used but generally the greater the area of full color, the greater the separation costs. You can use half tones or full 4-color separation photography. Print quality is good but is susceptible to scratching, impacts from thrown objects, and gunshots. Scratches don't affect graphics, which aren't on surface, but can mar the surface if gouged deep enough which in turn initiates deterioration if seal is compromised. Tends to dry and yellow over time and become brittle. If gun shot, may be still serviceable as bullets pass through without shattering but fiberglass strands will still be evident. May cloud or fade with age. Recommended location is in shade and partial shade as with any material containing color but can perform in full sun with a somewhat a shorter life span. Specify UV resistant ink and fiberglass for all outdoor applications. Average life is 8 to 10 years. Order several back-up paper copies, which can be fiber glassed economically at a later date.

A new introduction to this category is the Zed product, which uses polyester based print media, which claims to be better for color reproduction and more stable than paper.

Possible tactile elements can be to anyone which is expensive but can give a great effect. Compare to digital products when looking at this process as an option. Application has been for waysides and self guided trails, (ROS... Roaded Natural - Urban)

Anodized Aluminum: (H)

An electrochemical process imprints text and graphics (including half tone photos) onto a thin and flexible or thick and strong aluminum panel. Choose from 10 available colors (black, earth tones, metallic, and vivid blue, green and red) to create clear, attractive graphics in one color on a one color background. Graphic capability is limited to line art executed in two colors. Can use half tone photography. Be careful of negative ghosts (graphic reverse) in the line art. Impervious to full sun and weather, never fades or rusts. However it is susceptible to scratching. If shot, it usually needs to be replaced. The material is difficult to repair. Some scratches can be partly hidden with an eyeliner pencil, and scratches once done, are permanent. To avoid scratching, cover with Lexan, 1/8"-1/4" from surface of metal for moisture drain. Dirt and dust can be a problem over time if Lexan is not replaced periodically. Thick signs (1/2" +) can stand by themselves with only supporting legs attached, and thin signs (1/16"- 1/4") are easy to mount in kiosks or on walls.

A very formal appearing material very popular in the 70s and 80s but application has become more specialized with the advent of newer materials. Application is best in visitor centers, monument plaques, nature trails, and locations having patrol and/or significant public presence. (ROS...Rural - Urban)

Digital Laminate Composite (L) *

A recent development in sign technology is the use of **digital output**. It has been a star performer for many applications since its advent in the mid 1990s. Much cheaper than the color separation on paper. The process reduces fabrication costs by imaging directly from a computer files in unlimited colors, thus being able to bypass number of fabrication steps and producing savings. Products are usually printed in either inkjet or electrostatic printers. Inkjet having a higher resolution (600, 720, 1440, and even 4000 dpi for ZED) uses a die or pigmented ink and is the most popular printing format. The electrostatic printer use a heavy solvent based ink, which is very durable, and color stable but allows only 400 dpi of resolution, which is more than adequate for most applications. Prints are layered between sheets of translucent Phenolic resin to desired thickness and pressed into sheets. The subject print is transformed into the Warranty of 10 years average should make this an attractive choice for many projects, especially in light of its initial cost. Can take moderate marring and scratching and if shot can still be somewhat serviceable as bullets pass through without shattering the surface.

The digital materials for outdoor signing are generally offered in four different products:

- 1). *Digital vinyl sheets* that can be adhered to a number of surfaces by the adhesive backing. We see this today as “super graphics” being applied all the way from airliners and buses, to billboards. Application for interpretation is limited as the appearance is that of a temporary product. Does have a good application for interior exhibits.
- 2). *Digital PVC / Aluminum*. Examples of the vinyl sheet application that is heated at high temperature and fused to flat sheets of PVC. A cost effective product but lacks the permanent appearance and durability of higher end materials. Does not withstand scratching unless a clear sheet of Lexan or other translucent material is used for a covering.
- 3). *Digital High Pressure Phenolic Resin Laminate*. * High-pressure solid composite thermoset plastic and phenolic resin impregnated paper are surfaced with layers or melamine overlays that form the panel in varying thickness. One variation includes two sheets of sandwiched aluminum metal. This material has proved to be an exceptional material for the investment and has become a very popular choice with interpretive planners and designers. They have brilliant color presentation. Popular variations of this

are Folia, i-Zone (Wilsonart-Formica), and CellEx. The appearance is that of kitchen countertops and somewhat similar to the look and feel of screened embedded fiberglass. Comes in thickness of 1/16th", to self supporting at 1/2" to 1". A very cost effective and strong performing choice and is becoming increasingly popular. Applications are the same as all higher end materials for waysides, trails, and feature interpretation.

4). *Digital Fiberglass Embedment / ZED*. Essential as described above in Fiberglass Embedment but uses digital vinyl instead of paper for embedment. This adds another surface over the mother material and can add to the life of the exhibit.

(ROS...Roaded Natural - Urban)

Back-Screened Plastics... Polycarbonate, Lexan: (L-M) *

Fabricators silk-screen your image, reversed, onto the back of a piece of clear polycarbonate like Lexan or Tuffak, which you can then mount on a variety of backgrounds. Fabricators can also apply vinyl graphics with adhesive surfaces. Several colors and textures are available. Don't use Plexiglas as it clouds, shatters, cracks, scratches and becomes brittle with age. Polycarbonates (Lexan) resolve these problems and can be ordered with UV inhibitors. Ask for a mat velvet finish (gloss finish scratches and is highly reflective) available up to 20 mil. Looks great for the cost. You can use HDO / MDO / MEDEX, metal, Masonite, fiberglass, etc. for backing. Lexan can be ordered in 3/16" - 1/8". For a more sturdy sign use in a commercial base or frame. Another version called screened Lexan / aluminum - Acronyl laminates a .020 sheet of Lexan onto a .063 aluminum panel. Looks and feels like fiberglass embedment, but is cheaper. Very durable outdoors. (ROS...Roaded Natural - Urban)

-SCREENED SURFACE MATERIALS-

Silk-Screened Metal: (M)

Fabricators silk-screen on industrial enamel (car paint) on .40 - .80 baked enamel aluminum. Thin lines and half tone photos don't work well as resolution is limited Has a commercial sign appearance. Signs can be scratched and bullets can go through but usually need to be replaced. May be re-coated with a clear coat if they start to oxidize. Can also be sanded and redone. A popular medium for commercial sign painters. Graphic capability is limited to screen size. Interpretive sign application is limited. Has a life span of 10 years + -. (ROS...Rural - Urban)

Silk-Screened Wood Composites HDO/ MDO/ MEDEX: (M)

A silk-screen company can silk-screen your image onto a piece of wood substrate or composite. A somewhat labor-tech process that has been adapted for interpretive signing. Fabricators can also apply computer-cut vinyl graphics with adhesive backing, available in a myriad of colors. Find MDO / HDO at lumber stores in 4' x 8' sheets (about \$45 - \$50), which make three 24" x 36" signs. MEDEX is a fiberboard and usually has to be special ordered from a commercial signs but is the best material for this application. MEDEX is best suited for exterior applications. A close

variation of this is MEDF, which does not hold up as well if fully exposed to the elements but can be used under a shelter or enclosure. Comes in 49"x 97" sheets and are very heavy. These two materials have superior surface for screening. Panels should be primed and background color painted with industrial or commercial quality Latex enamel before silk-screening. Screen inks should also be professional exterior quality. MDF & MEDEX should have 2-3 coats of Masonite sealer applied first before final coats of paint are applied. Colors are applied as spot or layered colors. Airbrush can be used for special effects. Graphics are in the form of line art but half tones can be used for photography, however does not produce the resolution as the higher end materials such as porcelain. Can do half tone B/W photos but not full color photos. Can use Lexan cover and UV stabilized ink to increase outdoor durability. Multiple copies can be done in the initial screening step and save setup costs for extra. Very low cost for a sign kiosk or panel system. Can be mistaken with exterior CDX plywood. *Author's Note: Do not use exterior CDX plywood for a screening surface interpretive sign.* (ROS...Semi-Primitive, Non Roaded Natural, Roaded Natural, Rural)

Foam Boards, and Corrugated Polypropylene: (L)

A number of products available, some of which are not suitable for exterior use (Foam-Core, Foam-X, Gillman-CIII, Fasad, Gatorboard FRP, Ryno HD2). Good graphics and colors for displaying master plans at open houses, etc. Photos must be hand-adhered to the panels. Other heavy duty Foam Boards or Corrugated Polypropylene (KAPA, GatorFoam, COR-X CoroPlast, Foam Blanks) can perform for varying periods as they are UV stabilized, but still are best applied as temporary or seasonal type applications. Good for 18 months outdoor in the shade, may hold up 3 years in total shade, adhered to sign board like MDO. Flimsy and vulnerable to vandalism. Attach with #3 grommet and 3/8" anti-theft lag bolt or 3M commercial adhesive. A cheap, relatively durable material good for "Pardon Our Dust" project information or varied temporary use. Can be applied to a sign backing or support. Very cheap and quick to fabricate material, you can silk-screen or apply vinyl graphics on the face then apply to a backing. (ROS...Rural-Urban)

PolyPlate/Fibre Brite/: (L)

Poly Plate is a heavy fiber glass/plastic composite popular in directional signing for MUTC (Hwy. Signing applications) Usually includes a layer of reflectorized material. Could be used for temporary types signing and is heavier than COR-X. Will last for 5-10 years. Interpretive application is limited.

Silk-Screened Masonite: (L)

Like screened MDO, except cheaper, less weather / vandal proof, and half as thick (1/4"). Needs non-permeable covering and shady location outdoor. Best for interior use in displays or cabinets. (ROS...Roaded Natural-Urban)

Polyethylene and Rigid Vinyl: (L)

One variation is called Poly-Print. Silk-screen or vinyl graphics application on 1/16" or 1/8" durable polyethylene signboard. Very cheap in multiple orders.

Good for temporary use. Silk-screen or vinyl graphics application on 10, 20, or 30-mil vinyl board. Indoor use (cracks and warps in weather). Very vulnerable to weather and vandalism. Loses image in direct sun--order UV stabilized inks. Surface image can be scratched off easily. Selection of colors .(ROS...Rural-Urban)

Expanded and Solid PVC (Sintra, Celtec, Ultra White): (M)

A rigid substrate (poly/vinyl/chloride -PVC) is good for moderate type outdoor application. Can withstand moderate abuse. Bullets pass through and hammers leave only dents. Reasonable in cost and can produce an unlimited choice of colors that costs much more in other products. Recommended use in a commercial sign support. .A newer PVC product Ultra White, claims durability up to eight times the life of other PVCs on the market. If covered with a digital sheet edges are susceptible to de-lamination. Does not have the quality in the appearance as the digital composites. (ROS...Roaded Natural - Urban)

High Impact Styrene: (L- M)

Styrene is much like SINTRA, only lower density. Fabricators silk-screen or apply vinyl graphics to these opaque, foamed closed-cell PVC boards for a colorful, durable product. Both stand up well to interior use, but boards may yellow with age and image can be scratched off surface. Temperature and weather tolerant for traveling exhibits (protect with polycarbonate surfacing). Signs can be very large. (ROS...Roaded Natural - Urban)

-ROUTED MATERIALS-

Raised Lettering/Image...Melamine and Molded Plastic: (M-H)

Melamine is a styrene type of material that is engraved via a sandblasting type of process that leaves the artwork and copy raised. Very durable for exterior use. It is attractive for application for the visually impaired or Braille dots. Graphic layout should as a result be done very bold as fine line art does not translate. Application is best for facilities specially designed for the visually impaired population (ROS...Rural-Urban)

Routed or Sandblasted Wood: (H)

Fabricators rout, sandblast, hand carve, or laser-etch text and graphics into a smooth, thickness of Douglas fir, redwood, etc. Laser etching may require hardwood. Note laminate redwood tends to crack in dry climates of the West. Limited graphics (unless laser-etched and hand painted) but can be very attractive and may be appropriate in a showcase or site where rustic theme is vital. New computer routers are adding significantly better graphic capability, some which are hand painted to add color). A favorite for more primitive site signing in the FS / BLM / and NPS. Can be scratched, carved, shot or cracked, life of service varies, 6-8 years. High maintenance and labor

intensive, takes regular oiling, staining, and cleaning. Works best with a roof over it. Large signs with more than about 60 words may feel oppressive and limit effective communication. (ROS...Primitive to Roaded Natural)

High Density Urethane: (M)

This material is a great answer to applications where sandblasted wood is desired. It does not crack, check, warp, decay or decompose as wood does. It is virtually permanent and waterproof. The final sign is stained or painted. Routed letters can be filled in with various vinyl or specialized paint for desired effect. One product TC Resin, offers a wide variety of colors and is very durable. If designed and fabricated properly a casual observer will never guess it is not wood. Its logical use is for site and facility identification. It is used heavily in the advertising industry. Large format signs would need to have a backing of re-enforcement. Values of the material are the minimal amount of future maintenance and the economic initial cost. (ROS...Primitive – Rural)

Extruded High Density Polyethylene (PolyCarve) (M)

Originally developed for the marine industry, the material is extremely durable as compared to wood alternative and offers virtually 0 maintenance. Up to three layers of polyethylene are bonded through an extrusion process called "A/B/A" format. The surface ("A") being one color with the contrasting core ("B") underneath. The blank can be routed out to expose a color underneath or the surface material can be routed away leaving a raised surface (letters or simple images) in another color. The logical and best application is for site and facility identification as well as travel management and trail markers. The material can accept blows and scratching over time without usually affecting readability of the sign. It will not crack, warp, oxidize, or suffer UV deterioration. Withstands temperatures as low as – 40degrees F and has the ability to repel graffiti. It has some flexible characteristics and as such may require metal or wood reinforcement for proper support. Plastic Lumber (posts) may be used for the support as well. A full set of International Recreation Logos is offered for varied applications. (ROS... Rural and Urban)

-MISCELLANEOUS MATERIALS-

Ceramic: (H)

Fabricators silk-screen or glaze and fire, or hand-paint graphics onto surface.

Comes in clay, marble, porcelain or other finishes and can include tactile elements. Typical sizes include 4" x 4", 6" x 6", 6" x 9", or 8" x 8", but can reach to 18" x 18". Can set into wood, metal, or other various bases. May not be practical as a standard exhibit material, but excellent as a fine showpiece, plaque or tactile tile. Exhibits can be designed using number of tiles for a very unique effect. Hard to mount and easy to break, risk of having to redo as hand-done artwork fires differently every time. Unique and special!

(ROS...Semi Primitive Natural - Urban)

Cast Metal:(VH)

Good for commemorative plaques, title plaques, and historical markers. Provides tactile lettering accessible to people with limited vision. Fabricators make a mold of your design and fill it with molten aluminum, bronze, or iron to create a thick plate with raised letters and pictures. Can create textured backgrounds, fancy borders. Graphics limited to large letters and simple line drawings and limited color choices and as such is generally not a good choice for interpretive signing. Very costly, but durable, weatherproof, and vandal resistant. When cost is a factor and the effect of a plaque is still desired there are a number of plastic simulated bronze alternatives that may serve the purpose if properly protected. (ROS...Rural-Urban)

Stone Imagery (H)

Fabricators carve, etch, or sandblast marble, limestone, granite or other stone. Chemical etching requires a softer stone. Low contrast lettering, graphics are limited to line art and half tones. Moderately hard to mount. Usually needs of commercial sign application. Very durable, resisting all influences except geologic time. Good subtle, native material for a short message. Great tactile elements for audience appeal and accessibility. Can use to aid in a tight architectural theme applications e.g. an Ancient Puebloan site in the Southwest or a battle field park. A beautiful material that can set a strong identity for a site or facility and also has a great application for trailside labels for plants, features, or geology ID. (ROS...Semi Primitive-Urban)

A Few Sources for Interpretive Signs and Sign Base Fabrication:

-IMAGE IMPREGNATED MATERIALS-

Winsor Graphics, LLC - Porcelain Enamel Signs

312 Columbia Street Northwest

Olympia, WA 98501-1031

800-824-7506, FAX 360-786-6631

Joyce Piodone info@winsorgraphics.com www.winsorgraphics.com

Folia - High Pressure Digital Laminate (digital phenolic resin signs)

1748 Hancett Ave, San Jose CA 95128

408-280-5030, West Coast - 888-333-4403 Fax 408-280-5120

Diane Dulmage - diane_dulmage@email.msn.com

iZONE/ Wilsonart - High Pressure Digital Laminate (WILSONART)

2400 Wilson Place,

Temple TX. 76503

1-888-464-9663, FAX 254-207-3562

Micheal MacEachern, Scott McCallum -www.maccalls@wilsonart.com

Sea Reach Ltd. - Fiberglass /Porcelain Enamel. / Digital Laminate

Rose Lodge, OR 97372

(541) 994-6903 FAX 541-994-6393

Brian O' Callaghan

Crystal Plastics - Embedded Screened Paper Fiber Glass, Embedded Digital Vinyl

3902 Corporex Park Drive, Suite 550,

Tampa, FL 33619 - 1132

888-757-7644 FAX 813-664-8681

Mike Brown sales@embedments.com www.embedments.com

Artcraft - Digital Aluminum, Embedded Polycarb, Baked Epoxy (metal)

3623 E, 4th Ave.

Vancouver, B.C. Canada V5M 1M2

1-800-994-9451, FAX 291-1265

David Mah www.artcraft.com

KVO Industries - Porcelain Enamel / Embed. Digital (ZED) .
/Digital Laminate /(RhinoCore-interior applications)
4724 Prospect Ave.
Santa Rosa, CA 95409
707-537-8447, FAX 707-537-8445
Steve VanDyk, Keith Keeler: keith@kvoindustries.com

Photo Tech - Porcelain/ Anodized Aluminum
3830 E. 37th St. Tucson, AZ 85713
(520) 748-0517 FAX 520-745-1054
Ned Echols

Enameltech LTD - Porcelain
Ontario, CAN
(800) 663-8543 FAX 905-873-9617
Jennifer or Donna

The Porcelain Co. - Porcelain / Ceramic
Bainbridge Island, WA
(206) 842-6210 FAX same as tele#, call to arrange
Dave Bierfield

Bureau of Land Management Sign Shop - High Temperature Vinyl Laminate/ Routed Wood
P.O. Box 2407, 1300 North Third Street
Rawlins, WY
307-328-4234
Dave Wolf / Loraine Howieson

Interpretive Graphics - Anodized Aluminum /Fiber Glass /Porcelain
3590 Summerhill Drive, SLC, UT 84121
(801) 942-5812, FAX 801-943-6008
Jim Peters www.interpretivegraphics.com

Fossil Graphics Corporation - Fossil Digital Laminate
44 Jefryn Boulevard
Deer Park, NY 11729
1800-244-9809
Colleen Rhatigen www.fossilgraphics.com

GS Images (Graphic Solutions) - Screen Prints, Fiber Glass Embedded
355 South Potomac St., P.O. Box 1288
Hagerstown, MD 21741-1288
(301) 791-6920 (800) 223-6920, FAX 301-733-5379
Doug Wright

Pannier Graphics Division - Fiber Glass Embedded, Digital Embedment
345 Oak Road
Gibsonia, PA 15044-9805
(800) 544-8428 FAX 1-724-265-4300
Jeff & Robin Haddaeus, Ralph DePalma rad@pannier.com

Genesis Graphics - (Back) Screened Lexan - Aluminum/Acryl
Escanaba, MI
(800) 659-7734 FAX (906) 786-0614
Mike Olson

Grand Visuals - High Pressure Digital Laminate (CellEx), Digital Sheet PVC
7332 S Alton Way, Building 13, Suite F
Englewood, CO 80112
303-221-3860 Fax 303-221-6756
Tom Hicks, Denien Bloxham wwwgrandvisuals.com

-SCREENED SURFACE IMAGE MATERIALS-

Any major Silk-Screening / Sign Company
Any major silk-screener can fabricate many of these products.
Check locally or in larger cities.

Utah Correctional Industries - Wood Composites HDO/MDO/ Metal MUTC
Draper, UT
(877) 246-7446
Brian Morse

Shenango Screen Printing - Corex/ Polyethyl /PolyPlate
Coeur d'Alene, ID
(208) 667-1406
Gene O'Meara

Vycom (material supplier) – Solid PVC (Celtec, Ultra White PVC)
801 Corey St.
Moosic, PA 18507
Tel 570-346-8254
FAX 570-346-4122
www.cpg-vycom.com
Bruce Merklingshaus infoj@cpg-vycom.com

J.L. Darling Co. - Vinyl/Polyethylene/ Poly- Dura / DuraLite / PolyTag
Tacoma, WA
(206) 383-1722

-ROUTED MATERIALS

Wood Product Signs - Wood Routed, Acrylic Fiberglass. Recycled Plastic.
4890 County Road 76
Parlin, CO
(970) 641-1675, FAX.970-641-3608
Deb or Mike Hefner

Hand-Crafted Cedar Signs - Wood Routed, Hand Carved, Sand Blasted
Stevens Point, WI
(715) 346-4992
Ron Zimmerman

P & M Signs, INC - Wood Routed, Screened Surface
P.O. Box 567
Mountainair NM 87036 – 0567
Cheryl Holden, Ameer Watts 505-847-2850
FAX 505-847-0007

Vycom (material supplier) - Coextruded High Density Polyethylene (PolyCarve)
(See Above)
FAX 570-346-4122
www.cpg-vycom.com
Bruce Merklingshaus

Bureau of Land Management Sign Shop- High Temperature Vinyl Laminate
P.O. Box 2407, 1300 North Third Street
Rawlins, WY 307-328-4234 Dave Wolf / Loraine Howieson

The Plastic Lumber Company, INC.-Coextruded High Density Polyethelene (PolyCarve type)
540 South Main Street, Building #7
Akron, Ohio 44311-1010
330-762-8989
FAX 800-762-4741
sales@plasticlumber.com

-MISC. SIGN MATERIALS

Healy Brothers Foundry -Cast Bronze Plaques
Manville, Rhode Island
401-765-7600

Arapaho Sign Art - Bronze & Aluminum Plaques
1135 W. Mississippi Ave.
Denver, CO 80223
Al Lenzi, John Neilson 303 - 937-1915
FAX 303-937-7711

Best Manufacturing Sign Systems - Raised Image-Copy Signing
Montrose CO
303-249-2378
FAX 303-249-9916

Stone Imagery - "Stone" Engraving and Imaging
3546 Highland Drive
Carlsbad, CA 92008
619-434-4493 FAX 619-720-0847
Paul Riha www.stoneimagery.com

IMS Industries - Polycarbonate, screened plastics
1501 Wyo,
El Paso TX
Karen Magers 915-542-0033, FAX 915-542-0092

- SIGN BASES AND FRAMES-

Hopewell Mfg. Inc. - Metal Sign Bases
11311 Hopewell Road
Hagerstown, MD 21740
Paul Kramer (801) 582-2343

Sea Reach Ltd. - Metal Sign Bases
Rose Lodge, OR 97372
(503) 994-6903 FAX 541-994-6393
Brian O' Callaghan

Cook and Company, Sign Makers - Sign Bases
Tucson, AZ
(520) 327-1295
Jude Cook

Pannier Graphics Division - Fiberglass Embedded, Digital Embedment
345 Oak Road
Gibsonia, PA 15044-9805
(800) 544-8428 FAX 1-724-265-4300
Jeff & Robin Haddaeus, Ralph DePalma rad@pannier.com

Howard Industries - Sign Frames and Supports
6400 Howard Drive
Fairview, PA 16415
800-840- 9568 FAX 814/838-0011
Thomas A. Pontillo

-PLANNING & DESIGN CONSULTANTS-

ECOS

Boulder, CO
(970) 444-ECOS (3267)
Chip or Jill Isenhart

Condit Exhibits

500 Tennessee Ave.
Denver, CO 80223-2812
(303) 744-71667

Lisa Brochu, Certified Interpretive Planner

2668 FM 1704
Elgin TX 78621
512-285-4105

The Resource Connection

16040 So. Ridge Rd
Confer CO
303-697-1340

John A. Veverka & Asso.

P.O. Box 189
Laingsburg, MI 48848
517-651-5441

Interpretive Exhibits

1865 Beach Ave. NE
Salem, OR 97303
Bill Clark
505-371-9411 FAX 503-371-9402

Exhibit Design Associates

30907 Isenburg Lane
Evergreen, CO 80439
Russ Peterson 303-674-2670, rcns.peterson@att.net

Inside Outside

205 Shuswap Court
Red Feather Lakes, CO 80545
877-881-2900

Sea Reach Ltd. Fiberglass. /Porcl. Enamel. / Sign Bases / accessible interp.
Rose Lodge, OR
Brian O'Callaghan (503) 994-6903

Interpretive Graphics
7258 So. 3685 East.
SLC, UT 84121
Jim Peters (801) 942-5812

KLB Exhibits / Design and Production
440 Short St., Missoula MT
406-721-5410 FAX 406-721-7475 ws@klbexhibis.com

Interpretive Design
1911 North Main
Durango, CO 81301
970-375-7992, FAX 970-375-7993
Mark Franklin, Krista Harris id@fronteir.net

Dahn Design
9131 California Ave. SW #4
Seattle, WA 98136-2551
206-923-2853
www.dahndesign.com

The Sibbett Group
39 Natoma St.
San Francisco, CA 94105
415-777-3988 FAX 415-777-3240
dsibbett@sibbettgroup.com www.sibbettgroup.com

Government

Center of Design and Interpretation
USDA- Forest Service
P.O. Box 25127
Lakewood CO 80225-0127
303-275-5177
<http://fsweb.r2.fs.us/eng/cdi/index/html>

Heritage Interpretations/ Forest Service Interpretive Products Team
Colville National Forest
765 S. Main
Colville WA 99114
509-684-7280
Daniel Mattson

Harpers Ferry / National Park Service - Service Center
PO Box 50, Harpers Ferry WV 25425 304-535-6211

USDA Design Center
U.S. Department of Agriculture
14th & Independence Ave. SW
Washington DC 20250
202-720-2267 / 202-682-9530
Eva Cuevas

References:

Interpretive Project Guidebook

USDA Forest Service, Pacific Northwest Region
P.O. Box 3623
Portland, OR 97208

Signs, Trails, and Wayside Exhibits

Suzanne Trapp, Michael Gross, and Ron Zimmerman
UW-SP Foundation Press, Inc.
University of Wisconsin--Stevens Point, WI
Stevens Point, WI 54481

Wayside Exhibit Guidelines

The ABC's of Planning, Design, and Fabrication
Recreation Resources Assistance Division - Interpretive Design Center
National Park Service - National Scenic and Historic Trails Division

Sign Sense

Richard F. Ostergaard
Center for Design and Interpretation
USDA -Forest Service Denver CO
(Home Unit) 15 Burnett Court
Durango, CO 81301
970-385-1229 dostergaard@fs.fed.us

Are You Ready to Order an Interpretive Sign?

Interpretive Exhibits Inc.
1865 Beach Ave. NE
Salem, OR 97303

Basics of Interpretive Signage

Graphic Solutions
P.O. Box 1288
Hagerstown, MD 21741

Recommended Revisions to:

A Guide to Materials for Interpretive Sign Fabrication

Pannier

345 Oak Road
Gibsonia, PA 15044-9805

Vycom

801 Corey St.
Moosic, PA 18507

Folia/ Diane Dulmage

1748 Hancett Ave
San Jose CA, 95128

KVO Industries

4724 Prosspect Ave.
Santa Rosa CA, 95409

Interpretive Design

1911 Main Ave Suite 236
Durango, CO 81301

Lisa Brochu

2668 FM 1704
Elgin TZ 78621

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Keith Thirlkill, Interpretive Services, USFS, MT

Neal Haggerdorn, Recreation USFS, AK

Nancy Brunswick USFS and Nat'l Scenic Byways Resource Center, Duluth, MN

Mari Jilbert, Landscape Architect, USFWS. OR

Janet A Zeller, Accessibility Program Mgr, Washington DC