



Commercial Real Estate Signage

A review of the materials commonly used in the commercial real estate market and their impact on the environment

The purpose of this report is to analyze the materials commonly used in the construction of Commercial Real Estate Signage and their affect on the environment. This report deals with the variety of substrates as well as the different methods of applying graphics to those substrates. It is understood that all products currently being used for Commercial Real Estate Signage are reused at multiple sites therefore extending their value. The value varies depending on the actual life of the product in the field. Typical outdoor life expectancy stated in this report is based on exposure to the same weather conditions - sun, rain and snow.

Sign Materials

ξ **MDO Board**

Commonly used in the industry, MDO (Medium Density Overlay) is an outdoor rated ply material that is ideal for outdoor signage. It is manufactured using plywood coated with layers of resin impregnated Kraft paper. The exterior surface is a smooth, white resin soaked paper finish, available on one side or both sides.

Common graphic applications are vinyl graphics and air dried inks.

The waste characteristics of MDO are similar to any other wood product with the exception that the use of various chemicals and resins during the manufacturing process will release Formaldehyde during the mulch, cutting or sanding process. Formaldehyde is a known hazardous chemical. Typical outdoor life is 3 to 5 years.

ξ **Styrene / Coroplast**

Styrene is created from natural gas or petroleum and is formed by a reaction between ethylene and benzene. The exterior surface can be smooth or textured.

Common graphic applications are vinyl graphics, UV cured inks and air dried inks.

Polystyrene, (styrene) can be recycled if properly treated; unfortunately the historical data shows that only 1% of the 11 billion kilograms thrown away each year is recycled.

Typical outdoor life is 2 to 4 years. Toward the end of the life span styrene will yellow and become brittle.

ξ **Aluminum**

Aluminum is a light weight metal that is extracted from bauxite ore. Bauxite ore is the only source used to create aluminum. Aluminum provides a smooth surface that creates an excellent outdoor product.

Common graphic applications are vinyl graphics, UV cured inks, air dried Inks and thermal set inks.

Aluminum is 100% recyclable. In fact, aluminum today is produced using 95% post consumer waste products and is rated as one of the most recycled items in the world.

Typical outdoor life is 25 years since aluminum cannot rust, in theory, the material could last 100 years.

ξ Steel

Steel is an alloy consisting mostly of iron with a carbon content of approximately 2.04% by weight. Steel, used in the sign industry, is coated on both sides to reduce the incidence of rust, which is a common problem with steel products. The coating is polymer based and provides a smooth clean surface.

Common graphic applications are vinyl graphics, UV cured inks, air dried inks and thermal set inks.

Steel is 100% recyclable. In fact, steel today is produced using 95% post consumer waste products and is rated as one of the most recycled items in the world.

Typical outdoor life is 10 to 12 years depending primarily on climate conditions.

Graphic Materials

ξ Vinyl Film

Vinyl refers to color impregnated vinyl with a thin adhesive coating on the reverse side. Manufacturers include but are not limited to 3M, Avery and Gerber. The primary ingredient used to create graphic vinyl film is petroleum based. Application involves cutting the graphics typically on a computer assisted plotter, weeding the graphics, applying pre mask transfer tape then physically rubbing the cut vinyl graphics into position. Each color is applied separately.

Typical outdoor life is 3 to 5 years.

Disadvantages:

- 1. Available colors do not always match specific corporate approved colors.***
- 2. If the substrate surface is not prepared properly the vinyl will not adhere properly.***

Inks

ξ Air Dried Inks

These inks are conventional solvent based products. The drying process involves evaporation of the solvent. Drying time depends on the color used, usually air dried inks are dry in 20 minutes per color. **Typical outdoor life is 2 years.**

Disadvantages:

Solvent based inks produce VOC's (Volatile Organic Compounds) which are considered dangerous to our health and the environment. The VOC rating for air dried inks is 65. Some counties will not allow the use of air dried inks in high quantities.

§ Thermal Set Inks

Thermal set inks have reduced solvents and the ink is cured or dried by utilization of heat.

The VOC rating for thermal set ink is 11. Thermal set inks are resistant to fading, cracking and peeling as well as harsh chemicals. Typical outdoor life is 10 years.

Disadvantages:

None

§ UV Inks

These inks are cured by exposure to ultraviolet light. The solvents used to create UV inks are low, reducing the VOC rating to 4.

Typical outdoor life is 2 to 3 years.

Disadvantages:

Opacity is not as good as air dried or thermal set inks and the ink can become brittle, sometimes cracking during the fabrication process.

Environmental Impact

§ Recycle Value

Both steel and aluminum have very high recycled content both reaching up to 95% post consumer waste. There is value to the product after its original function has expired.

Farmed untreated wood has equal value after its life expectancy as mulch or paper products without harmful effects to the environment.

Treated or processed wood like MDO does have some draw backs to the recycled process and its effects on the environment. As stated in the Sign Material section, MDO does produce formaldehyde when sanding, cutting or mulching the product. In addition wood dust that is exposed to carbon monoxide creates a severe fire or explosion risk. Under the proper conditions MDO board can be recycled as mulch or paper products.

Four methods can be used to create graphics on a sign:

1. **Vinyl Graphics**-Low impact on the environment, not recyclable, short outdoor life span.
2. **Air Dried Inks**-Produces high solvent and VOC's - restricted use by some government agencies and difficult to discard.
3. **Thermal Set Inks**-Low solvent and VOC rating, EPA approved, long outdoor life span.
4. **UV Cured Inks**-Very low solvent and VOC rating, EPA approved short outdoor life span.

Conclusions

Materials used in production and manufacturing of Commercial Real Estate Signage, have their own advantages as well as disadvantages. The goal is to find the best combination that does little or no harm to the environment while still addressing the needs of the client as well as the corporation involved. **The following are rated most environmentally desirable to least desirable:**

- ξ Aluminum with thermal set inks and a wood frame for rigidity.
- ξ Steel with thermal set inks and a wood frame for rigidity.
- ξ Aluminum with UV inks and a wood frame for rigidity.
- ξ Steel with UV inks and a wood frame for rigidity.
- ξ Styrene/ Coroplast with vinyl graphics
- ξ Styrene/ Coroplast with UV inks
- ξ MDO board with vinyl graphics.
- ξ MDO board with air dried inks.

Material Cost Comparisons

ξ 4mm Coroplast	\$.23 per Square Foot
ξ 26 Gage Steel	\$.54 per Square Foot
ξ .090 Styrene	\$.72 per Square Foot
ξ .030 Aluminum	\$.98 per Square Foot
ξ ¾" MDO Board	\$1.51 per Square Foot

Material Recycle Value Comparisons

ξ 4mm Coroplast	\$.15 per pound
ξ 26 GA Steel	\$.51 per pound
ξ .090 Styrene	\$.15 per pound
ξ .030 Aluminum	\$1.29 per pound
ξ ¾" MDO Board	\$.21 per pound