

Value Engineering Decorative Surfaces without Compromise

Price, performance and aesthetic appeal—delighting clients with exactly the right mix.

By Kenn Busch

In times like these, the pressure's on. Now more than ever, clients want more value without sacrificing design, so designers need all the available tools—and materials—at their disposal.

When you start talking about value, it's not long before the term "value engineering" comes up. Business-y buzz phrases tend to come and go, but value engineering is a concept that's surely here to stay. Applied to interior and furniture design, it basically means specifying exactly the right material for the job, in terms of both performance and aesthetic impact—nothing more or less durable than the application calls for.

Over the last several years, the laminate industry has come to epitomize the principles of value engineering. High-pressure laminate (HPL), aka "Formica," is a material that's quite well understood, of course, but there are several other options out there that complete the picture, including TFM, 3-D laminates and printed foils (read on for definitions of these materials), all of which offer varying levels of performance price points.

The true "value" of these products comes into play in a big way with matching materials programs. There was a time when every laminate supplier wanted you to specify their materials on every surface in your project. And to be fair, this was the only choice you had if you wanted



This wall in a university center was created from TFM panels, which have many of the same performance properties as HPL, and often share the same designs.



Learning OBJECTIVES

Interiors & Sources' Continuing Education Series articles allow design practitioners to earn continuing education unit credits through the pages of the magazine. Use the following learning objectives to focus your study while reading this issue's article. To receive one hour of continuing education credit (0.1 CEU) through IIDA, or one Learning Unit (LU) through AIA, read the article and go to www.interiorsandsources.com/ceus and follow the instructions.

After reading this article, you should be able to:

- ▶ Explain the basic differences between different types of decorative surfaces
- ▶ Identify which surfaces are the proper choices for specific applications
- ▶ Determine which substrates are appropriate for different decorative surfaces
- ▶ Explain the environmental advantages of laminated surfaces

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MATERIAL INTELLIGENCE
FOR FURNITURE AND INTERIOR DESIGN



• **ABOVE AND RIGHT** HPL is the material most think of when they hear the word "laminate." It's extremely durable, easy to fabricate in the field, and can carry a wide range of designs and surface textures.

• **Compact laminate** is a very thick paper-based material with density and smoothness that rivals solid surface, although it's warmer to the touch, and fabricates with standard wood-working tools.

perfect matches throughout your project. But what ultimately happened was, high-wear materials that were "over engineered" and too expensive were used on low-wear or vertical surfaces, and lighter duty materials ended up on work surfaces where they couldn't stand up to the abuse.

Several years ago a light bulb went on, and suppliers of "competitive" materials decided that by coordinating their colors and designs they could successfully cover more surfaces in a specification, which made the difference between getting the order or losing it to another material. Now, with almost any supplier you contact, you'll be cheerfully guided toward complementary materials in the same designs.

But it's still important to have a little background on what these materials are and where they're used, beginning with the basics: design.

THE PRINTED DESIGN

All laminates begin with a design concept, interpreted and executed by décor printers. The basic "décor papers" used in HPL, TFM and paper-based foils are engineered for specific properties like absorbing the reactive resins required in the pressing stage, printability, and flexibility in the finished laminate. Solid-color papers in a natural wood tone, for example, eliminate the need for a "pad coat" of ink. The actual designs are most commonly printed on rotogravure presses in one to four stages, using primarily water-based inks.

Design concepts for laminates come from an infinite number of places, and with today's technology, the printed realizations of materials found in nature, industry, architecture, or even in the imagination, are stunningly vibrant. Special pearlescent inks can recreate the sheen of metals, or the reflective flare of a piece of finely finished wood as you turn it in your hands.

A more recent development, laser engraving

of printing cylinders, is quicker and more accurate than the traditional electro-mechanical technology. It enables greater print definition and detail in even the most subtle designs than was previously possible, as well as sharper contrasts and smoother tonal gradients for greater dimensionality and realism.

Décor printers work with artists to source raw materials (original art, veneer, stone), which are photographed or scanned and digitally manipulated for scale and "pattern repeat" to fit the finished laminate application. They also offer catalogs of "standard" patterns inspired by the latest design trends which can be specified as-is and printed in customized colorways.

Over the last several years, the technology for digital inkjet décor paper printing designs has improved in both fidelity and printing speed. Many companies have been using digital printing to produce "custom laminates" with corporate logos, retail and fast-food branding graphics, and murals. This process has also been useful for test marketing laminate designs in advance of investing in printing cylinders, and for creating small batches of custom designs or out-of-print retro patterns.

While not yet considered practical for production-speed printing, demand for digital inkjet-printed décor papers will no doubt continue to increase.

Another way laminate manufacturers bring additional design elements to a decorative laminate surface is to apply a transparent overlay embedded with fiber or particles from metals (aluminum, copper, gold), or from textiles and organic sources (e.g., coffee beans, banana fibers). The paper carrier becomes transparent in the laminate pressing stage, and the embedded elements, known as "inclusions," add an extra decorative layer over the solid color or printed décor layer.

SURFACE TEXTURE

Laminate textures have long been considered the

final frontier in decorative surface design because, no matter how realistic a printed décor layer is, the wrong choice of surface texture (heavy stippling over a fine woodgrain, for instance) will negatively impact the realism of the finished laminate. Surface textures, imparted by engraved press plates and textured release papers, have become far more realistic in the last decade. It is now possible to create the smooth, silky warmth of finished wood or the high- and low-gloss variations of granite so accurately that even experts can be fooled.

Press plates may be engineered to create textures embossed "in register" with the print design for enhanced realism in the surface. In woodgrains, for example, the grain texture aligns perfectly with the printed wood ticking. In stones, variations in gloss levels match up with the compositional details in the print. As with digital print cylinder engraving, new digital press plate engraving technologies have increased the quality and realism of the final texture, as well as the ability to replace plates with exact copies, should one get damaged during use.

THE MATERIALS

HPL

One of the most familiar and widely used decorative surfaces is high-pressure laminate (HPL), first made famous by Formica. HPL is typically constructed of several layers of kraft paper (similar to shopping bag paper), a layer of décor paper with a solid color or printed design, and topped with a protective wear layer that can also carry printed design accents and other inclusions.

The kraft layers are generally impregnated with thermosetting phenolic resins; the decorative and wear layers are saturated with thermosetting melamine resins. Because HPL sheets are pressed individually, many different designs and colors can



• Use of 3-D laminates is growing in medical interiors and other applications because of its ability to seal a panel on five of six sides, minimizing seams where bacteria collects. 3DL can also carry durable high-gloss finishes.



• The patterns and designs you see on HPL, TFM and paper foils are usually printed on décor papers in a rotogravure process. Printers track global trends and often derive their concepts from rare raw materials, delivering designs that are not otherwise commercially available.



• Press plates impart texture to laminates during manufacturing to complement a printed design, or to add an extra dimension to a solid color.

be laid in the press at once for increased economy. As mentioned earlier, textured press plates may be used to control gloss levels, or impart textures that mimic stone, wood, tile, or other surface designs.

When it was first introduced, HPL was the only kid on the laminate block, so it was used everywhere—from furniture to countertops to wall paneling. Now, you find it specified for high-use applications like counters, desktops and laminate flooring, and it's a mainstay in health care, hospitality, office furniture, retail, and other demanding commercial applications. And of course, it's still the most popular option for residential counters and tabletops.

HPL is very durable and available with special performance properties, including chemical, fire and wear resistance, as well as a markerboard finish. Special "postforming" grades are engineered for varying degrees of flexibility for wrapping around columns and curved counter fronts. HPL is also the most common carrier for custom inkjet-printed designs.

Several manufacturers offer premium HPL lines with special realistic or super durable surface finishes, and some even offer it in translucent fashion colors. It is also used in commercial-grade laminate flooring, which is becoming increasingly popular in medical offices, salons and retail applications.

In use, HPL must be laminated to a panel substrate, which can be done on-site with contact adhesives. Particleboard is the most prevalent substrate choice because of its economy and stability. A single sheet of postforming-grade HPL is capable of covering three of six exposed substrate surfaces.

▶ SOLID PHENOLIC/COMPACT LAMINATE

Some suppliers offer very thick (up to and exceeding one-half-inch) sheets of HPL known as "solid phenolic" (in the United States) or "compact

laminate" (in Europe). Solid phenolic is self-supporting and very strong, and has long been used as lab tabletops, bathroom stall dividers, and for bullet-proof panels.

It carries a decorative and wear layer just like HPL, but has a characteristic black or brown edge that can be machined to a smoothness exceeding that of solid surface material. Some office systems companies have created unique desk, conference and task table designs with these strong, thin panels.

▶ TFM PANELS

TFM (thermally fused melamine) panels utilize a melamine-impregnated printed or solid-color décor sheet similar to that used in HPL, but instead of being laminated to layers of kraft paper, it is pressed directly onto a substrate like particleboard or medium-density fiberboard (MDF). Under heat and pressure the melamine resin from the décor layer flows into the substrate to create a crosslinked thermoset bond, effectively creating a homogenous decorative panel without the use of adhesives. Some TFM products also carry the same type of wear layer as HPL, and can be embossed to mimic stone, wood and other materials.

TFM panels are very popular in residential cabinetry, laminate flooring, furniture and closet systems, and are used in similar applications in retail, health care and hospitality environments. Mid-market office furniture producers commonly use TFM. It has even been used for removable decorative wall systems in commercial and retail settings.

It has come a long way from its original introduction to North America when it was most commonly used as a cabinet interior in three not-so-exciting colors: white, almond and gray. The biggest TFM design breakthrough in the first decade was the introduction of black, for which a premium was

charged. Now, TFM is available in hundreds of colors, designs and surface textures that rival reality. It carries woodgrain designs so well that it has become an economical and durable substitute for veneered panels in many architectural projects.

TFM compares favorably to HPL in many wear and performance measurements (although HPL offers higher impact resistance and postformability). As a furniture surface, TFM panels and components require a decorative edge treatment. Substrates are commonly particleboard or MDF.

TFM panels are created on very efficient pressing lines and can be specified with or without edge and opposite-side face treatments, so they arrive at the job site ready to install. Many furniture manufacturers say that because TFM panels are essentially a homogenous product made from paper and wood fiber, they are more easily recycled.

▶ DECORATIVE METALS

Decorative metals are engineered for different levels of performance and ease of handling. Some are literally thin sheets of solid metal, while others are thin metal foils bonded to an HPL backer or directly to other rigid substrates. Available finishes are almost unlimited, including high-gloss, copper, patina, and brushed effects.

Some decorative metals carry surface finishes durable enough to withstand typical worksurface wear, and others are recommended for vertical applications only. The formability of decorative metal surfaces varies, so always be sure to follow the manufacturer's instructions.

Decorative metals are used anywhere a designer wants to add a little—or a lot—of spice to a project, and are found often in retail, hospitality, restaurants, office furniture, health care, corporate interiors, public spaces, and transportation applications.

3-D LAMINATES

3-D laminates, also known as rigid thermoformable foils (RTF), are formable overlays created from calendered PVC or polyethylene polymers. They are available in solid color, metallic, and printed designs, and can be specified in a variety of surface textures, including realistic woodgrain ticking and high-gloss. Like paper-based laminates, they are rotogravure printed, but most suppliers use solvent-based inks because they provide better fidelity on 3-D laminate surfaces. Manufacturers use thermal oxidation to eliminate solvents (volatile organic compounds), preventing them from entering the environment.

3-D laminates with enhanced wear, stain and chemical resistant properties are available from several suppliers.

What makes 3-D laminates unique is that they can be laminated to panels—primarily MDF because of its smoothness and core material consistency—with 3-D details machined into their faces, as well as unconventionally shaped panels and panel edges. Their ability to “self edge” (i.e., wrap seamlessly around the edges and interior cut-outs of a panel) reduces processing steps and helps seal the panel core from moisture and bacteria. This ability also helps create “soft” edge shapes that mimic shaped solid wood or stone.

3-D laminates are often used on panels with a TFM back in matching designs. There are many component suppliers who specialize in fabricating 3-D laminated parts to order.

The use of 3-D laminates has grown in recent years as the office furniture industry has embraced nonstandard and organic shapes for worksurfaces, and they are increasingly being specified for store fixtures and POP displays. They are also commonly found in ready-to-assemble (RTA) furniture, particularly where the design calls for soft edges and unusual shaped components, and on cabinet doors and drawers in place of lacquer finishes.

3-D laminates are finding wider acceptance in health care applications, where improved surface resistance to cleaning chemicals and their ability to seal the panel core against moisture and bacteria without seams provide a competitive advantage over other material options.

ENGINEERED VENEERS

Engineered or reconstituted veneers encompass a

range of materials—from fine veneers modified with performance backing for durability, as well as ease of handling and application, to fast-growing low-value species that are engineered to look like rare veneers or geometric designs.

Materials in the “rare veneer” category are created by slicing thin layers from low-value trees, recombining them into multi-ply panels over undulating press plates and re-sliced, resulting in veneers that convincingly mimic high-character



● HPL is used for the highest durability commercial laminate floors, and is often specified in retail stores, hair salons and medical clinics.

species like Birdseye Maple. Geometric patterns are created by slicing and dyeing veneers, laminating them back together and slicing them again at a different angle. This process may be repeated several times to create very complex designs.

Some engineered veneers are prefinished and bonded to an HPL-style backer in which case they can be applied in much the same way HPL is, with one caveat: they are still wood veneers, so they must be handled and specified as you would any other veneer.

Engineered veneers are specified anywhere traditional veneers are used, including retail environments, hospitality, office furniture, etc.

PRINTED PAPER FOILS

Printed paper foils, also known as light basis weight papers, are printed or solid-color décor papers saturated with a blend of resins engineered for the final application of the paper. They may also receive a thin top or a “finish” resin coat for additional performance characteristics. Printed paper foils are capable of providing very high print fidelity and realism for woodgrains, in particular.

Decorative foils are glued to substrates like particleboard or MDF by specialized machines on the production line. They are very thin, which means they can “telegraph” any imperfections in the substrate surface. MDF generally has a smoother surface than particleboard, although filler materials can be used to give particleboard a finer finish.

Some printed paper foils can be pressed onto panels machined with 3-D surface details to give the effect, for example, of a raised-panel kitchen cabinet door.


Printed paper foils are widely used in closet systems, RTA and home office furniture, often in combination with other materials like TFM and HPL, which are capable of higher wear and impact resistance. They are also used on ceiling panels, cabinet interiors, and on drawer components.

VALUE ENGINEERING IN PRACTICE

Every project presents unique challenges when it comes to matching the performance of the materials with the aesthetic vision of the client. When costs are under the microscope (and when aren't they?) it's important to know that some of the lower-cost options are not necessarily a compromise. In fact, they often offer hidden value—not only in performance, but in color and design consistency, product

availability, and customizability.

And don't forget environmental impact: the substrates these materials use—particleboard and MDF—are made from recovered wood fiber that would otherwise be burned or landfilled, and HPL, for example, is nearly 90 percent paper fiber, much of which is from industrial scrap. Our natural world also breathes a sigh of relief each time a stone or woodgrain surface design comes out of a printing plant rather than out of the ground.

When it comes to design, it seems, “value engineering” has less to do with engineering and more to do with the value you bring to the project, the client, and the environment. 

An Unlimited Resource for Designers

Schattdecor's supply of fine and rare woodgrains have a guilt-free guarantee



Samples of the printed papers that make up the decorative layer of HPL and TFM laminates.

schattdecor

From gentle, sophisticated walnuts, to distressed vintage barn lumber, to exotic grains and colors, many of our floors, furniture, fixtures and millwork are made from a dwindling supply of one of nature's most varied and beautiful resources.

"We must be careful with the species we have, because we may not have them forever," says Mark Smith, manager of North American design for Schattdecor.

Schattdecor prints the décor papers used in laminates and laminate flooring. Design teams from the company's facilities around the world constantly survey furniture and design exhibitions, and collect materials that may inspire new designs.

"Our job is to give people access to fine and rare species without having to cut down so many trees," says Smith, who once managed design for Steelcase. "We have also captured samples of 1,400-year-old bog oak, beams from sunken sailing ships, and trees twisted by wind on mountain peaks – woods you can't get anywhere, at any price."

Printed laminate designs offer unlimited potential for value engineering because the same design can be used on incredibly durable materials like HPL, TFM, or produced on lightweight printed papers perfect for lower-wear applications like architectural walls.

"Although advances in printing fidelity and finish textures are producing laminates almost indiscernible from wood even to the trained eye, we're not trying to replace wood," Smith says. "We're just trying to offer excellent wood designs that are more durable, consistent and environmentally responsible."

Schattdecor's catalog of designs also includes stones, metals, textiles, and abstracts. For more information please visit www.schattdecor.com. Schattdecor is a sponsor of the *Interiors & Sources'* Materials Pavilion at NeoCon.

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Value Engineering, Easier than Ever

Roseburg: North America's most diverse selection of decorative architectural panels



TFM panels offer superior durability, design consistency and value in commercial interiors and furniture.

R O S E B U R G

When it comes to specifying durable interior finishes that make the most efficient use of raw materials and manufacturing technology, it's hard to beat thermally fused melamine (TFM) panels.

TFM's particleboard or MDF substrates use wood fiber recovered from other manufacturing processes, material that would otherwise be landfilled or incinerated. Its surface designs are printed on paper and bonded directly to the board to create a homogenous decorative panel, ready for fabrication or site installation.

Designing with and matching materials to TFM is a breeze. The Synergistic Partners Collection of Duramine TFM panels from Roseburg offers more than 800 of the world's leading designs, from Wilsonart, Formica and other suppliers, as well as in the company's own Debut Series.

"Our Duramine 'Designed-To-Match System' features a comprehensive cross-reference chart of matching HPL, 3-D laminates and decorative edge treatments, which saves time when searching for matching components to value engineer your project," says Roseburg product manager Rick Troxel. "You can also specify printed paper foils, vinyls and 100 percent solid UV-cured painted surfaces on our standard and green substrates."

Roseburg's Hardwood Panels are produced domestically from the finest hardwood veneers, from Anegre to Zebra wood, as well as a complete selection of engineered veneers.

"Our SkyBlend and SkyPly cores can be specified FSC-certified and with no-added urea-formaldehyde (NAUF), and can help achieve LEED points. In addition, the California Air Resources Board (CARB) has approved Roseburg as an Ultra Low Emitting Formaldehyde (ULEF) manufacturer of Hardwood Plywood."

For more information on Roseburg's nationwide distribution and sustainably managed forests, visit www.roseburg.com.

The Color(s) of Optimism

Wilsonart's new launch energizes design for health care, education and retail



A sampling of Wilsonart's Go Wavy collection.

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L A M I N A T E

We wanted to introduce a fresh interpretation of colors, and a much-needed shot of optimism - maybe even whimsy - coming out of this difficult period."

Gwen Petter, director of product design for Wilsonart Int'l., says the contract market is ready to refocus on the brighter side of design. Wilsonart is happy to oblige, with two new collections: Go Wavy, and Go Straight.

"Designed for education, health care, retail, food markets, hair salons and other specialty stores, both collections include 'complex brights,'" says Petter. "These aren't your traditional primary colors. They're influenced by pigments taken from Earth's natural bright colors, and other global influences.

"They're worldly, in every sense of the word."

The colors in Go Wavy evoke a visit to a farmer's market - Pomegranate, Eggplant, Sweet Corn - and a vibrant, natural healthy lifestyle. From across the room, its subtle wavy patterns become energetically organic.

Surface texture design plays a major role in the Go Straight collection, giving classic solid colors a new twist, says Petter.

"Our linearity texture is a response to the geometry of straight-grained wood, brushed metal, and the weave of fabric. We've neutralized this effect into a form that works on various designs, and creates a new way to use solid colors. And with our AEON surface technology, even high gloss laminates can handle commercial applications.

"This launch brings some of the fun back into designing with laminates, and coordinates easily with existing Wilsonart designs, textiles, and sheet flooring used in education and health care."

For more information, visit www.wilsonartcontract.com. Wilsonart is helping Material Intelligence sponsor the *Interiors & Sources*' Materials Pavilion, 8th floor, NeoCon 2010.

Visit www.interiorsandsources.com/freeinfo

Toward More Durable, Beautiful Health Care Interiors

3-D laminates from SSI create high-performance designer walls and casework



DIRTT's exhibit at IDEX 2009 features matching SSI 3-D laminates on wall tiles and casework by Wahu.

Few environments are more demanding than health care interiors. They're in business 24/7, are under constant attack by moving equipment, carts and germs, and must endure extensive cleaning on a daily basis.

DIRTT Environmental Solutions and Wahu Caseworks have found that 3-D laminates are the perfect cure for damaged, dingy health care walls and casework. DIRTT, which stands for Doing It Right This Time, supplies wall tiles and systems. Wahu, which is short for "wall-hung," supplies modular casework and fixtures compatible with DIRTT systems as well as conventional construction.

Because 3-D laminates are thermoplastic materials they can be formed around edge and surface details machined into MDF panels to create spill-proof channels, cup holders, unusual shapes and soft curves and edge profiles.

"There are no visible seams, unlike with standard laminates," says Kristin Moore, who heads up DIRTT's health care business. "This is a big deal from an infection prevention standpoint. The potential for damage is also dramatically reduced because there aren't any square edges getting caught on equipment.

"We source our 3-D laminates from SSI because they have excellent designs that are tough enough for our clients."

DIRTT and Wahu use the same SSI 3-D laminates for perfect design matches.

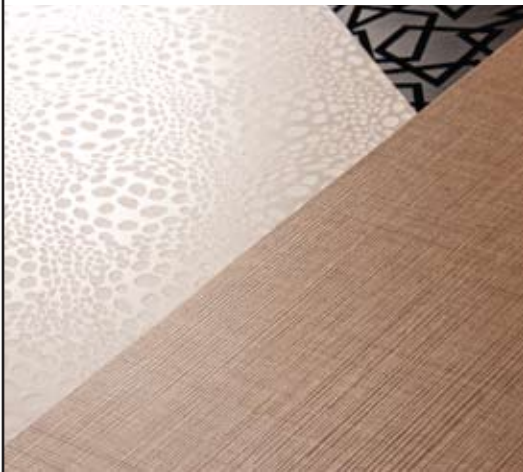
"We love working with 3-D laminates because they take away the ugly black seams, making our modular millwork impossible to chip and impervious to moisture," says Chris Matus, president of Wahu. "And designers love the great colors and woodgrains we get from SSI."

SSI is the exclusive North American supplier of Klöckner Pentaplast 3DL. For more information, visit www.ssinorthamerica.com. See SSI's materials at the *Interiors & Sources*' Materials Pavilion at NeoCon.

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Texture, the Final Frontier

SESA may change the way you feel (about) laminates



Linen, fantasy and matte/gloss textures for HPL and TFM.



People like to touch things. It's a large part of how we understand and interact with our world. Woods, stones, textiles, plaster, lacquer, glass—they all have unique haptic signatures that make them easy to identify, even with your eyes closed.

So do laminates. Or do they?

Early laminates had a silky but delicate furniture finish, which soon evolved toward a far more durable matte surface. Then, laminate flooring changed everything.

"To sell in the flooring market, laminate surfaces had to be much more realistic," says Brian Jones, of SESA Press Plates. SESA, based in northern Italy, makes the engraved steel plates that impart texture to laminates and other materials.

"We created surfaces that feel and look like raw and finished woods, rustic and sculpted lumber, granite and slate, and even textures perfectly aligned with printed woodgrains and stones. It was only natural to turn our eye toward refreshing textures for furniture and interior laminates."

The results are changing how people feel about these materials, says Jones.

"HPL and thermally fused melamine [TFM] producers can now offer textures that feel very much like any kind of wood, stone, or other kind of material. But the impact of texture goes beyond just 'touch.' The way materials catch the light sends subconscious visual cues to people, and that ubiquitous matte finish basically screamed 'laminate.' These new finishes read much more like the real materials."

SESA's offerings also include a wide range of abstract and fantasy textures. For more information, visit www.sesaplates.com, or contact Brian Jones at (207) 310-8814 or bcjones@sesaplates.com.

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87