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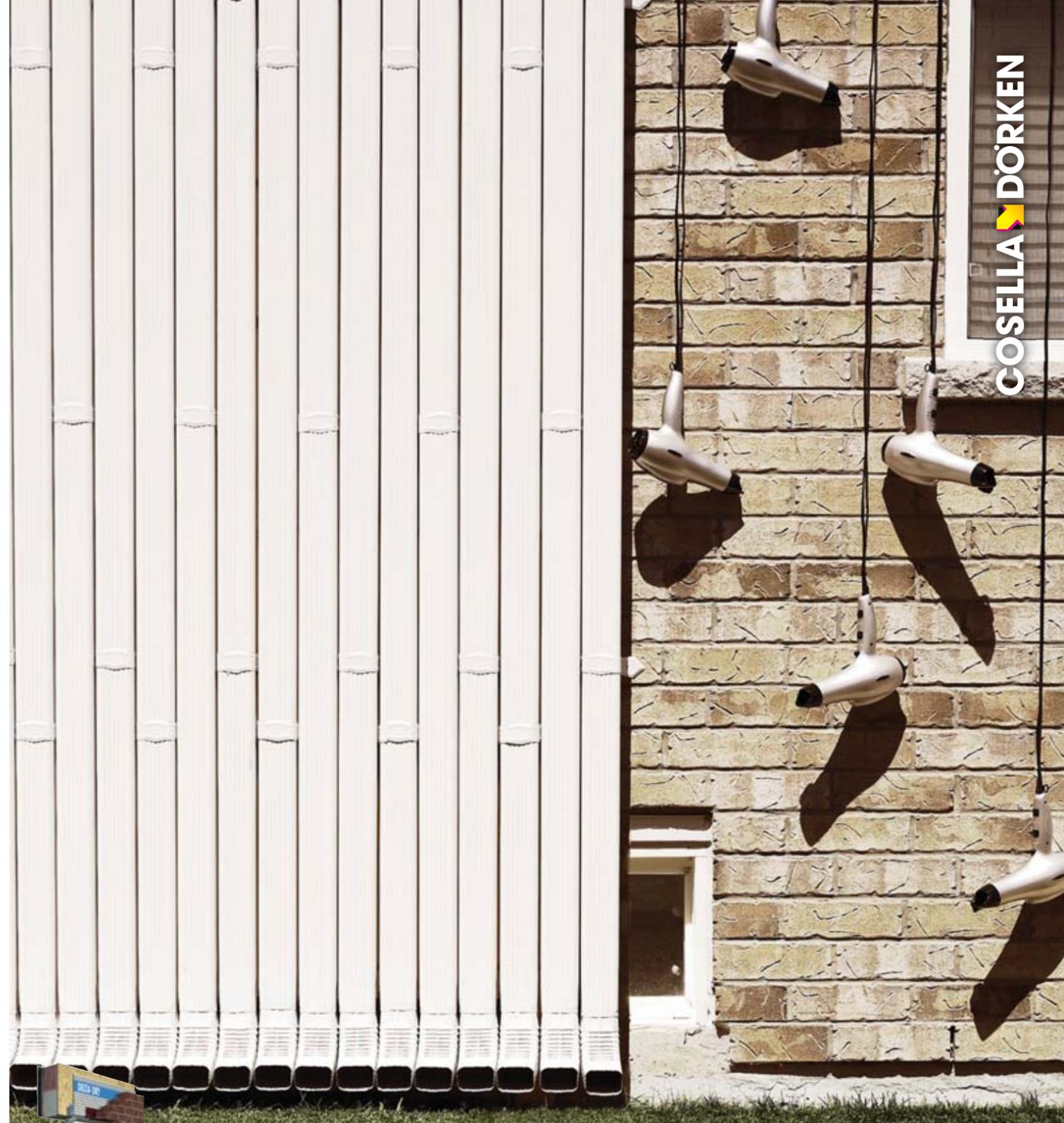
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Subscription Rate

Ultimate Home Design™ is published bimonthly (six times a year) by Ultimate Home Design, Inc., 27645 Commerce Center Drive, Temecula, California 92590.

• \$30.00 six issues (U.S.), \$37.00 (Canada/Mexico), \$50.00 (International Air Mail), Newsstand \$5.95 (U.S.) & \$7.50 (Canada)

• Back Issues: \$6.00 (U.S.), \$8.00 (Canada/Mexico), \$10.00 (Outside North America).

• Special Editions: \$10.00 (U.S.), \$12.00 (Canada/Mexico) \$20.00 (Outside North America) Newsstand \$9.95 (U.S.) & \$13.50 (Canada)

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The mission of *Ultimate Home Design* is to serve as a catalyst for homeowners to create demand for architects, designers, and builders to adopt the concepts and building practices that define human-centered, optimum-performance home design. *Ultimate Home Design* is aimed at broadening the segment of the American population that is paying closer attention to the products they buy, looking beyond price and branding to focus on other elements of the production and value chain. Increasingly homeowners want to support sustainable building practices that result in a higher living standard. *Ultimate Home Design* is for those homeowners who want to promote a broader shift in patterns of production and consumption by encouraging practices that better reflect their personal values. We are advocates for using products that reduce energy and use renewable, recycled content or otherwise environmentally preferable materials. An important part of our mission is to promote building practices that result in a substantial reduction in energy use for space conditioning, water heating, lighting, and appliance operation. Another important aspect of our mission is to promote construction practices that improve the indoor environment and reduce the risk of building-related illness. This translates to improved occupant health and comfort by improving thermal comfort; natural lighting and electric illumination; and controlling humidity, odor, noise, and vibration.

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POSTMASTER: Send address changes to *Ultimate Home Design*, 27645 Commerce Center Drive, Temecula, CA 92590.

Retailer distribution, circulation, and advertising inquiries should be directed to the publisher.

Send subscription orders, address changes, adjustments, back issue requests, correspondence, and inquiries to *Ultimate Home Design's* Temecula office.

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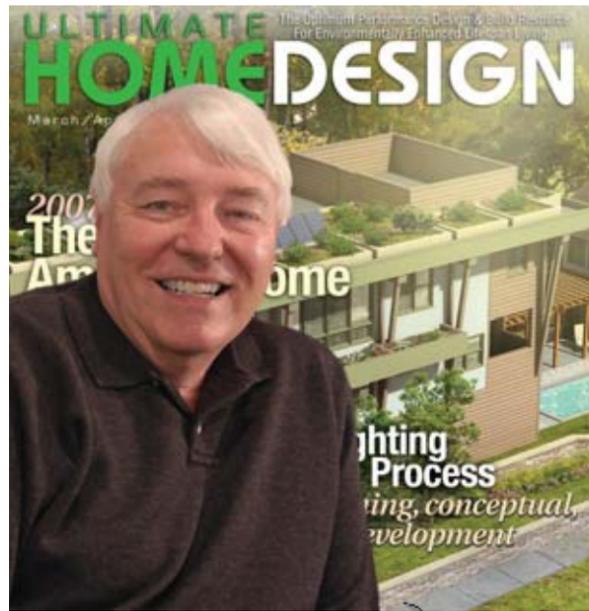


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Green Building Guidelines

At the National Association of Home Builders' (NAHB) Green Building Conference in St. Louis in late March, the Sustainable Buildings Industry Council (SBIC) released the Fifth Edition of the *Green Building Guidelines: Meeting The Demand For Low-Energy, Resource-Efficient Homes* (see www.SBICouncil.org).

Both the U.S. Department of Energy's Office of Building Technology, State and Community Programs, and the National Renewable Energy Laboratory (NREL) provide support to produce this valuable document. The Building America Program (www.buildingamerica.gov) is re-engineering the American home for energy efficiency and affordability. Building America works with the residential building industry to develop and implement innovative building processes and technologies—innovations that save builders and homeowners million of dollars in construction and energy costs. This industry-led, cost-sharing partnership program uses a systems engineering approach to reduce construction time and waste, as well as increase energy efficiency and use of renewable energy.

During the last six-year period since the SBIC started working on the initial version of the *Green Building Guidelines*, the green phenomenon has taken firm hold nationally, touching many aspects of our lives: from everyday purchases such as organic foods and hybrid cars to the more heady concept proposed by economists and environmentalists to quantify the U.S. green Gross National Product.

In concert, the construction and home building sectors, propelled by the green home building movement, is applying environmentally sensitive design and construction techniques to reduce energy and water consumption and improve residential comfort and safety. As part of the growing movement, in 2005 the NAHB published the *Model Green Home Building Guidelines* and the accompanying *Green Home Building Checklist* designed as a tool kit for local associations that wanted to create their own customized green home building programs. As evident in St. Louis, NAHB's goal to move environmentally friendly home building concepts further into the mainstream marketplace continues to be a high priority.

The U.S. Green Building Council (USGBC) also launched a residential program to complement its suite of assessment tools and is now pilot testing LEED® for Homes (Leadership in Energy and Environmental Design). This voluntary rating system, targeted to reach the top 25 percent of homes with best practices and environmental features, is expected to be formerly released in late 2007.

At last count, more than 60 local green building programs had been established by home builder associations, utilities, local governments, and non-profit groups across the U.S., and there are many more ready to launch.

The Green Building Initiative™ (GBI) has launched two groundbreaking Web-based tools to accelerate the adoption of sustainable construction practices across the country. The tools include an interactive pilot version of the NAHB *Model Green Building Guidelines* and a support module for Home Builder Associations (HBAs) developing local or state green building programs based on the guidelines.

The new online system is designed to serve as an easy-to-use environmental assessment and rating tool for the residential industry. The interactive NAHB portal will guide builders through a logical sequence of questions combined with recommendations for integrating important elements of sustainability. Responses to a series of "yes" or "no" questions trigger tip boxes as well as links to secondary information that educates users on green building principles and ensures that projects include the desired amount of sustainable features. Once the questionnaire is complete, the points are tallied and a report is generated distinguishing the home as having met a Gold, Silver, or Bronze level of achievement. The tool is available at www.greenbuildingguidelinesonline.org.

The GBI Green Building Program Support Module is designed for city, state, and regional HBAs interested in developing and populating locally relevant green building programs. Accessible via the GBI Web site (www.thegbi.org), the module provides a variety of resources for support, including comprehensive research, training and marketing materials, and program management tools.

SBIC's Green Building Guidelines was the first national

green home building resource written by builders for builders. While it is still primarily a builder's guide, the information will be valuable to anyone who wants to learn more about the various aspects that make up green home design. For example, homeowners may find it a valuable resource when working with a builder. The Table of Contents is organized by the Sustainability Principles (optimize site design, save energy and water, improve indoor environmental quality, use green products and systems, and optimize operation and maintenance). There is also a Builder's Matrix, organized by the stages of a project (land development, construction and waste management, foundations, framing, exterior finishing, HVAC, interior finishing, landscaping, etc.).

Just how green to be is a decision made by builders, often with their clients, during the design and development stages of each project. Use the helpful tools in the Green Building Guidelines while in discussions with architects, builders, suppliers, contractors, and subcontractors. They can serve to ensure that you end up with the best green built home that you can afford.

Inside This Issue

Part IX continues as a case study of the design and building of the first Optimum Performance Home™, a Platinum-level LEED® for Homes project. In this part, I cover much of the products and materials to be used in the home, including kitchen appliances

and bath fixtures, fireplaces, wine cellar, garages, sauna, and outdoor courtyard features.

Our cover story is an article by architect Paula Baker-Laporte entitled, "Building Healthy Homes." The building approach described is a centuries-old building technique that combines timber and clay to create durable homes in New Mexico.

Another article discusses how central vacuum systems can enhance the interior air quality of a home.

And an informative article by Huck DeVenio describes framing considerations for long-term performance in "Beauty Beyond Skin-Depth."

Thank you for your continued support. **UHD**

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New to the neighborhood

Sarah Scaglione

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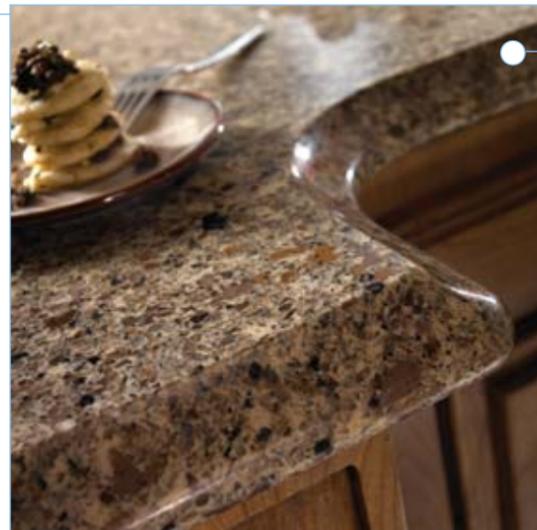
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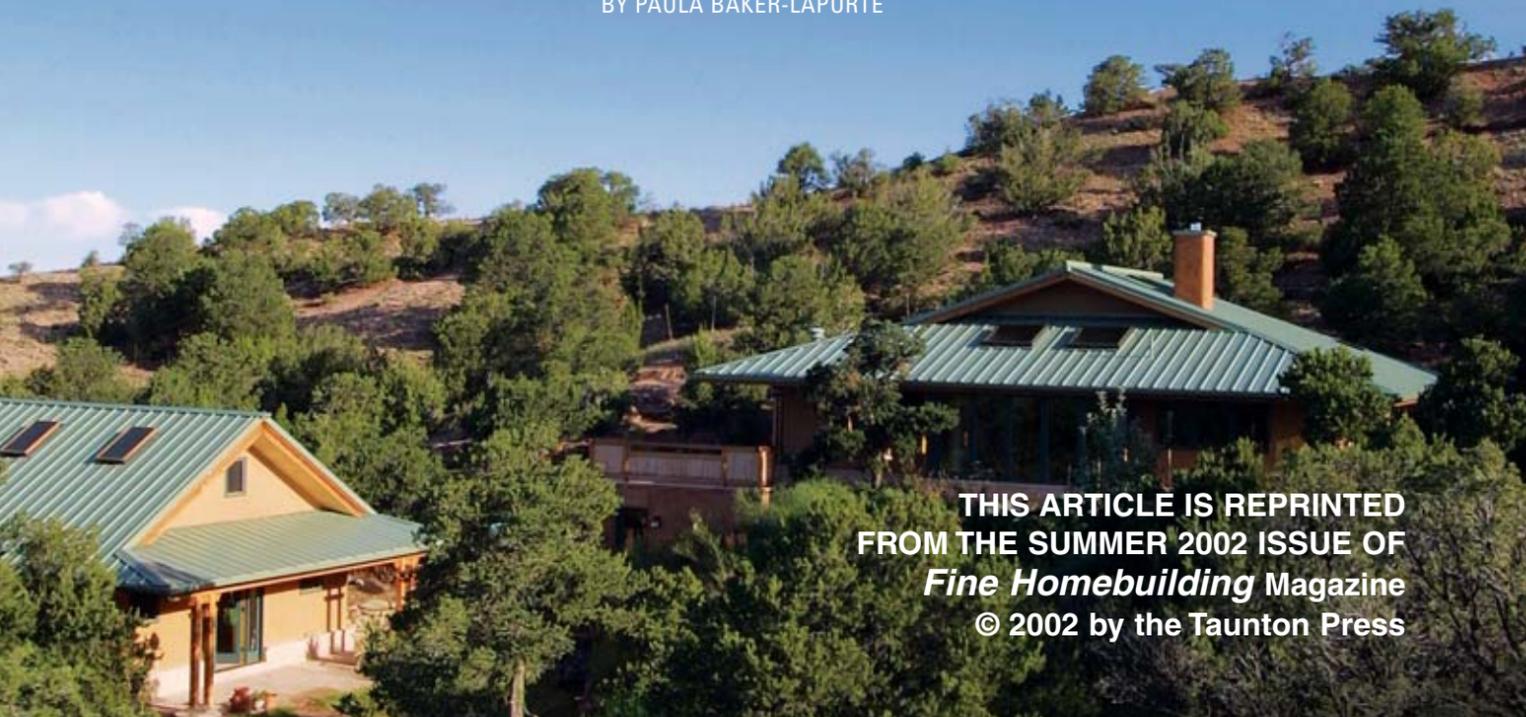


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Building Healthful Homes

A centuries-old building technique combines timber and clay to create durable homes in New Mexico

BY PAULA BAKER-LAPORTE



THIS ARTICLE IS REPRINTED
FROM THE SUMMER 2002 ISSUE OF
Fine Homebuilding Magazine
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In 1993, after 20 years of architectural work, my career took a dramatic turn. A seemingly unrelated barrage of symptoms, including muscle pain, brain fog, and extreme fatigue, was increasingly disabling me. After a frustrating series of misdiagnosis, I finally discovered that my symptoms were caused by multiple chemical sensitivities (MCS; see sidebar). I was like a pro golfer who realized she was allergic to grass. Because of the rampant use of petrochemical toxins in construction materials, my own building sites were making me sick.

It was my friend and physician, Erica Elliott, who finally diagnosed my medical condition, but only after she developed the same problems, thanks to poor

indoor air quality at a clinic where she worked. I originally had become ill from living in a brand-new mobile home. The Department of Housing and Urban Development (HUD) now regulates formaldehyde levels in new mobile homes, but at that time, the levels were unregulated. The initial overexposure to formaldehyde and other petrochemical toxins had left me with chemical hypersensitivity.

Once the cause of my own illness became clear to me, I realized that I was not an isolated case; rather, I was one more contribution to a growing body of evidence that standard building practices and materials can be harmful to human health. Seeking out

better solutions in my work became a matter of professional ethics. So I set new goals for my architecture practice. The buildings my firm designed in the future would promote good health for those who live in them; use construction materials and techniques with low environmental impact, and work in harmony with nature by making use of sun, wind, vegetation, and water to reduce energy consumption and pollution.

What's Wrong With How We Build Most Houses?

It is possible to build a healthful, ecologically sound house using conventional stick-frame construction; however,



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many practices must be reconsidered. In my experience, toxic chemicals, mold, carbon-monoxide exposure, and pesticide use are amongst the most common causes of MCS in homes. Toxic chemicals, such as formaldehyde, are frequently found in new building materials. For example, many standard dry-wall joint compounds contain formaldehyde, and standard paints can contain several toxic chemicals, including toluene and formaldehyde. New carpeting, glues, insulation, plywood, furniture, stains, and varnishes can also outgas a plethora of toxic chemicals. These pose the most serious health threat while the home is new. The good news is that healthful substitutes for all these problematic materials are becoming more readily available (see sidebar, page 21). Other problems become more evident as the home ages. Vapor barriers meant to stop the travel of moisture through a wall often trap moisture, resulting in mold and rot over time. Homes that are not carefully detailed to prevent insect infestation may be subject to harmful pesticide applications when infestations occur. Long-term exposure to low levels of carbon monoxide or other combustion bi-products can create a state of general malaise in occupants, who never suspect that their home might be the cause of their illness.

In New Mexico, Building Inspectors Are Used To Mud

In my search for building methods that were ecologically sound and could avoid the use of petrochemical toxins, I read an article about Robert Laporte, who taught workshops about building homes with timber, straw, and clay. Attending Robert's workshop was inspiring. I learned about a building system that met all the ecological standards I had come to believe in, and I felt as if I had found a focus for my

work. Now, 12 years later, we are husband and wife, and we head up The EcoNest design-build Company in Santa Fe.

Santa Fe is a special place. The climate is dry and relatively mild. The sun shines at least 330 days a year. We don't even have mosquitoes. But most important for our work, there is a tradition of natural building here and generations of skilled craftspeople to carry the tradition forward.

Consequently, building inspectors understand and appreciate traditional, non-conventional building techniques.

Our homes consist of a timber-frame structure, straw/clay walls, earthen plasters, and natural nontoxic finish materials. And each home we produce is an opportunity to teach others about ecological building through hands-on workshops (sidebar, page 19).

A Timber-Frame Skeleton Enhances An Open Floor Plan

Wood is a renewable resource, but we must use it wisely. Our timber frames are made of sustainably harvested white fir from a local forester who runs a sawmill. Even more important, these structures are built to last hundreds of years. The surrounding straw/clay walls protect the frame from the elements, and, in turn, a large roof overhang protects the walls.

As an architectural element, the timber frame is a beautiful way to create spatial definition, as well as a sense of openness. This approach allows a small footprint to feel and act like a larger one. For example, our own home is less than 1,500 square feet but feels much more spacious. Because the timber-frame structure takes all the roof-load and because no load-bearing walls are required, the rooms are open to one another (above photo) while the timbers, and different ceiling heights



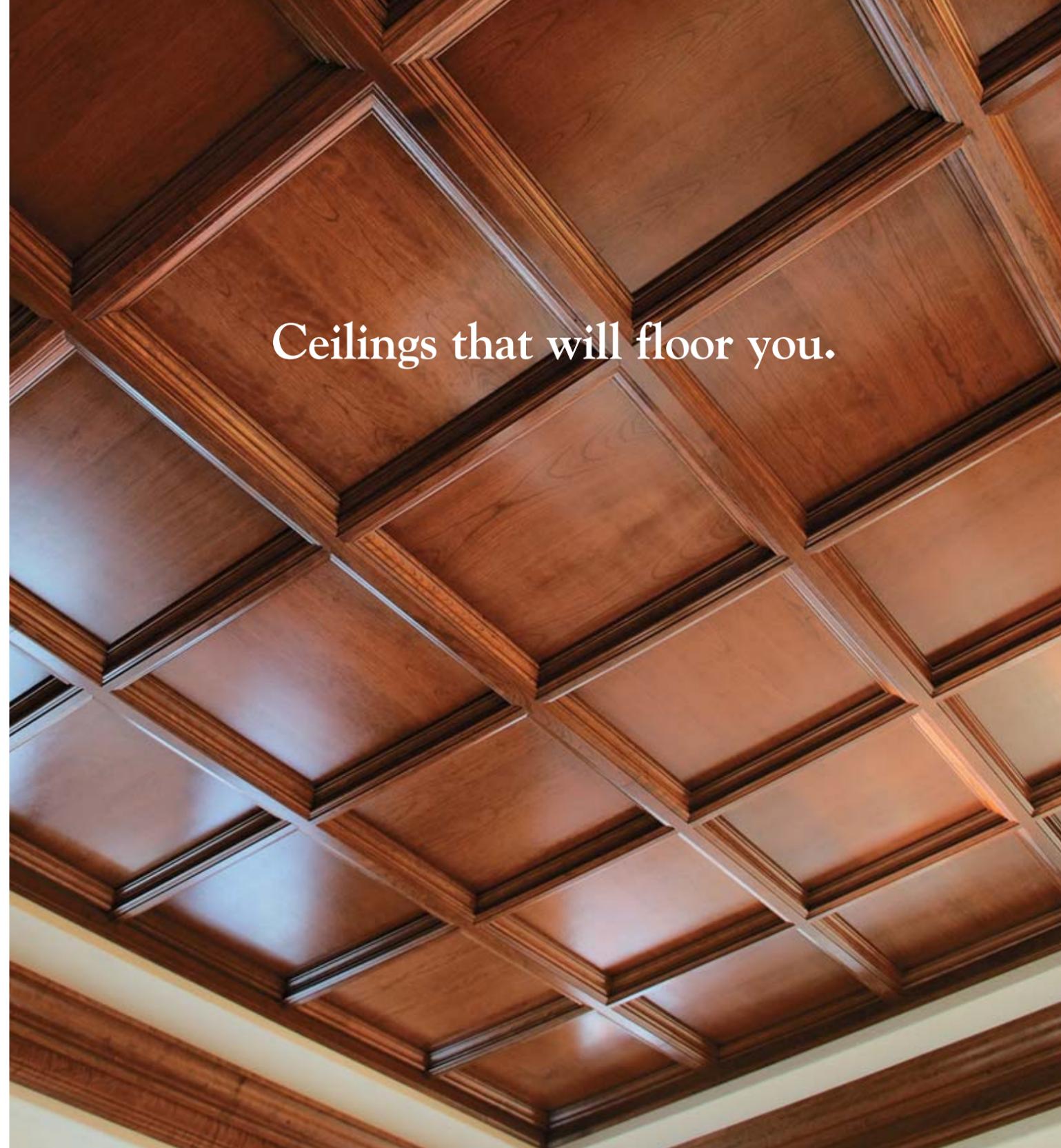
Long views, small house. Inside, the open floor plan helps this 1,400 square foot house to feel larger, while the timber-frame structure defines the spaces. Outside (page 14), the house sits on a southern slope overlooking the author's architecture studio.

and materials give each room a sense of place.

Straw/Clay Walls Have Been Used For Centuries In Europe

A straw/clay wall is a marriage between straw-bale and adobe construction, with the insulation properties of straw and the mass storage capacity of earth. The 12-inch thick walls weigh approximately 50 pounds per cubic feet and have an insulation value of approximately R-23. Working with straw/clay, we avoid many indoor air-quality problems associated with conventional construction. This material also has the advantage of being local, abundant, nontoxic, and renewable. But its utility isn't limited to the Southwest. The balance of mass and insulation is an appropriate climate response throughout the temperate zone. In fact, Robert has built straw/clay buildings in 17 states, as

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GET YOUR HANDS DIRTY: ON-SITE WORKSHOPS FOCUS ATTENTION ON ECOLOGICAL BUILDING TECHNIQUES



Paula Baker-Laporte and her husband, Robert Laporte, see every new home they build as an opportunity to teach others. The EcoNest Company offers regular natural-building hands-on workshops and seminars on timber-framing, straw/clay walls building, and on the process of creating an ecological home. The days are filled with hands-on building, and the evenings provide time for lectures and discussion on green building. For more information, visit their Web site www.econest.com

Tumbler combines straw, clay, and water. Built from a length of culvert pipe and mounted on its own trailer, the mixer receives the straw and clay on one end, tumbles them together and delivers the blended mixture out the other end.

The walls are filled by hand. The straw/clay mixture is placed into the formwork in four 4-inch lifts and tamped into place with sticks and feet. Strips of plywood, screwed to the inside and the outside of the frame, serve as temporary forms.



Mud plaster is troweled on. New straw/clay walls contain so much moisture that they sprout grass. When the grass dies, it's a sign that the walls have dried enough for plastering to begin.

well as in Denmark, Norway, and Sweden.

Straw/clay evolved in Germany from heavier clay construction known as wattle and daub, which was commonly used as infill between timbers throughout Europe. Examples of wattle-and-daub construction dating back 800 years remain in use today. In the 1930s, the Germans first began lightening the clay infill by adding more straw, thus increasing the insulation value.

Robert's own contribution to the evolution of straw/clay lays in the formwork system he has invented, which allows the clay/straw material to wrap around the outside of the structure as a monolithic wall mass, rather than simply filling between timbers. This creates a much more energy-efficient envelope than traditional infill systems, which have a tendency to shrink away from the structure, leaving gaps.

Choosing Finishes For Health

The first rule for finishing any home is obvious: avoid using toxic substances.

If you read product labels or study material-safety data sheets, you quickly discover that many products going into our homes contain ingredients that are known to be harmful to human health, including carcinogens. Until I became ill, I assumed that the Environmental Protection Agency (EPA) protected us from really harmful things. In fact, the EPA can barely keep up with labeling things. It's up to us to read the labels and be informed consumers.

Although natural materials still can contain caustic or irritating substances, they are generally far more benign than their petrochemical-based counterparts. Here, in Santa Fe, we have a large variety of natural materials from which to choose. Natural mud flooring and earthen plasters, for example, are a living tradition here.

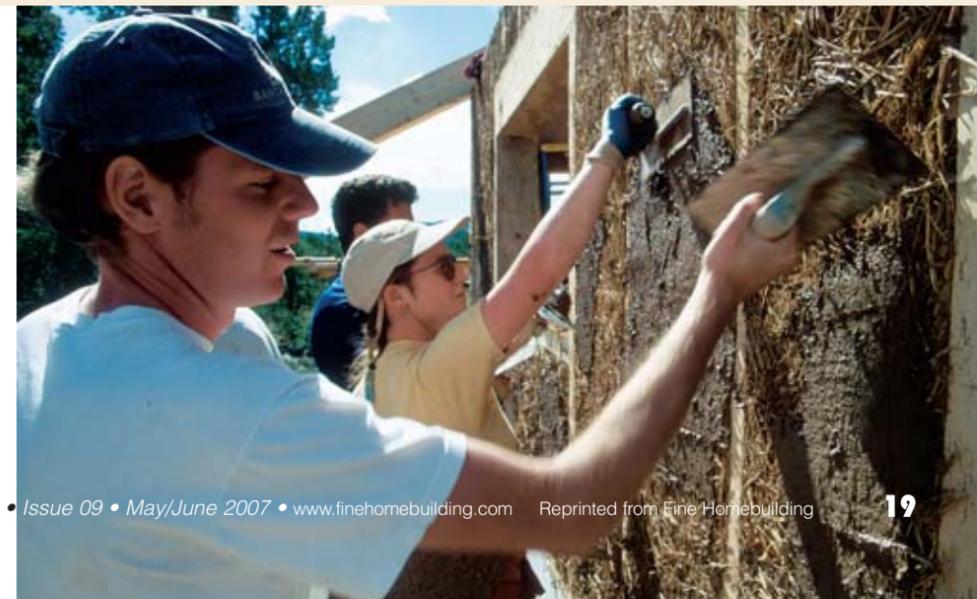
Although the concept of a mud floor conjures images of dust and dirt for those who have never experienced one, a good mud floor, when properly finished is, in fact, a durable solution. Mud floors have a sensual quality, comparable to walking barefoot on leather.

Traditionally, mud floors were created using ox blood (a good coagulant) to give them hardness. We prefer to make use of a vegetarian version containing clay, sand, chopped straw, and wallpaper paste. The carefully troweled floor, once dry, is saturated with several layers of natural oils and then is finished with beeswax.

Our walls are covered inside and out with brown, clay-based plaster. The outside stays brown (photo, top left, page 20), but inside a finish coat of

white silica sand, white kaolin clay, mica, and natural pigments can create a large palette of color and texture.

Wherever possible, we use adobe bricks for interior partitions, sometimes plastered, sometimes unplastered (photo, right). These natural materials not only create beautiful earthy finishes, they also make for quiet rooms and add mass to the interior of the homes. Mass is an important strategy for low-tech climate control.





A different house, but the same ecological consciousness. Unlike the author's own home, which is strongly influenced by Japanese architecture, this house has a more traditional Southwestern look (as well as a second-floor master bedroom). Unplastered adobe bricks have been laid up to form interior walls, eliminating the need for drywall, joint compounds, and paint.



Heating And Cooling Strategies For Health And Energy Efficiency

Central heating and cooling with instant comfort at the touch of a dial, once an unimaginable luxury, is now standard residential equipment. Yet most methods are neither healthful nor energy wise. Forced-air systems create dry air and circulate dust. Ductwork can harbor and distribute mold. Various indoor air quality problems also are associated with radiators, including dry air and pollution from burned dust particles. Electric baseboard heaters create high electromagnetic fields. And most systems are inefficient in their consumption

of fossil fuels.

Americans use a lot more energy than Europeans, due mostly to the limited temperature range we tolerate. Studies have shown that it is more healthful for people to be exposed to a broad range of seasonal temperatures, yet the concept of central heating and cooling promotes constant comfort at the expense of health and energy efficiency.

Our designs employ several natural climate-control strategies, reducing the need for mechanical heating and cooling. First, we orient our homes for solar gain. And we include solar-collecting greenhouses on the south side of our houses, whenever possible. Roof overhangs prevent overheating in the summer.

For heating our own home, we invested in a wood-fired Tulikivi masonry heater (www.tulikivi.com), which is made of 5,000 pounds of soapstone. Although we installed gas-fired hot-water radiant-floor heating throughout our home, only the bathroom zones are regularly activated.

Summers in the high-desert climate of Santa Fe can become hot and dry with daytime temperatures soaring into the high 90s and low 100s. Large roof overhangs, good cross ventilation, and extra interior mass keep our homes comfortable throughout the summer. Temperatures inside our own home peak below 80 degrees Fahrenheit in the heat of the summer.

The Cost Of A Healthful Home

The degree of craftsmanship and intensity of labor required to create a good natural home make it a more expensive proposition than a standard stick wood-frame home of the same size. However, the timber frame and straw/clay walls constitute less than 15 percent of the overall cost of construction, and clients wanting one of our homes are encouraged to build a slightly smaller, more efficient home with fewer bells and whistles to meet the same budget they had allocated for standard construction.

It's also important to consider hidden costs, such as health and well-being. In my case, I calculated that the 900-square foot formaldehyde-filled new home from which my illness resulted cost me no less than \$30 per square foot in lost work and doctor's bills alone, over a five-year period. Unfortunately, my experience is not an isolated case. According to recent statistics, 15 percent of the population suffers from chemical sensitivities, mainly due to poor indoor environmental quality. After years of working on my health, I am happy to say that I am once again very well. It has been a long journey, and one of the biggest assets in my

Healthful Building Materials

Listed below are some of the author's favorites. For additional sources, see her books "Prescriptions For A Healthy House" (co-written with Erica Elliott and John Banta, New Society Publishers, 2001) or "EcoNest: Creating Sustainable Sanctuaries Of Clay, Straw And Timber" (co-written with Robert Laporte, Gibbs Smith Publishers, 2005)

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own recovery has been the blessing of a healthy home to live in.

The Author

Paula Baker-Laporte, A.I.A., is an architect in Santa Fe, NM. Photos by Kevin Ireton, except where noted.

What Does It Mean To Suffer From Multiple Chemical Sensitivities?

by Erica Elliott, M. D.

Multiple chemical sensitivities (MCS), often referred to as environmental illness, is an immune and nervous-system disorder that involves severe reactions to many everyday chemicals and products. For some people, MCS occurs with dramatic onset, precipitated by a major chemical exposure or industrial accident. For most people, however, the condition

develops gradually as a result of the cumulative exposures of daily life.

The symptoms of MCS are diverse and unique to each person and can involve any organ of the body. Symptoms range from mild to disabling, and sometimes, they can be life threatening. These symptoms include headaches, fatigue, sleep disturbances, depression, panic attacks, emotional outbursts, difficulty in concentration, short-term memory loss,

dizziness, heart palpitations, diarrhea, constipation, shortness of breath, asthma, rashes, flu-like symptoms, and seizures. Symptoms often are triggered by low levels of exposure, including levels lower than permissible as established by the government.

Although MCS is a rapidly growing problem, health-care workers know little about the subject. And unlike diabetes or hypertension, no simple medical test can be used to make a

diagnosis. One of the most important aspects of treatment is to avoid toxic-chemical exposures as much as possible. People with MCS need a sanctuary of peace and well-being amid a world saturated with toxic chemicals.

—Erica Elliott, M. D., practices family and environmental medicine in Santa Fe, New Mexico.

Beauty Beyond Skin-Depth

For Long-Term Performance, Consider Your Framing



Huck DeVenzio



(Dricon framing, top) The tragic results of fire can be reduced by installation of fire retardant treated (FRT) wood, such as Dricon® FRT wood which also resists wood-destroying organisms.

(FG framing, bottom) Mold-resistant wood can reduce the growth of mold spores and aid indoor air quality. The green material shown here is FrameGuard® lumber and OSB coated for resistance to mold, termites, and fungal decay.

When building a home, there is a compelling temptation to concentrate on visible design features and decorative materials. However, as a physician might advise an appearance-fixated patient, our performance and health can be affected even more by unseen, internal elements, such as organs, muscles, and our skeletons.

Such advice also applies to homes. Their well-being can be greatly influenced by their skeletons, to which nearly all else is attached. The underappreciated skeleton of a house entails framing and other structural components. Such substantial parts of a home are now being offered in a surprising variety of options.

The National Association of Home Builders (NAHB) says that new single-family homes average 2,300 square feet, which translates into over 20,000 board feet of lumber and more than 7,000 square feet of structural wood panels per home. Studs continue to be made largely from pre-cut spruce/pine/fir material. They are textbook commodity products, serving an unseen utilitarian purpose and sold at the lowest competitive price.

Over recent years, though, there have been innovations in framing. These include wood I-beams, structural insulated

panels (SIP), different truss configurations, finger-jointed studs, and steel studs. These choices provide beneficial features. Now a new group of framing options—treated woods with differing properties and features—is also entering the market.

Termite And Decay Resistance

The granddaddy of treated framing options is probably borate pressure-treated wood, which has existed for many years although not been widely used. Borates are effective



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Tyvek.

preservatives, recognized in the standards of the American Wood-Preservers' Association and accepted by model building codes for interior applications. They provide resistance to damage from termites and fungal decay, and a study published in the Forest Products Journal suggests that they may also repel non-wood-destroying pests.

Borate-treated wood is routinely used for sill plate, but has been installed for more than a decade for whole-house framing in Hawaii, where potential termite damage necessitates treated wood. It has been promoted for total structure protection in the continental U.S., particularly in the Southeast where the need is greatest. Though a number of homes have been built with borate-treated framing, the whole-house idea has not progressed as rapidly as had been envisioned.

To identify borate-treated wood, producers typically add a blue dye to the treating solution. This allows contractors and building inspectors to differentiate borate-treated components from untreated wood.

One reputable brand worth checking is SillBor® borate-treated wood.

Fire Retardance

Fire retardant treated (FRT)-wood has been used for decades, mandated by building codes attempting to limit the spread of fire and reduce smoke generation in commercial and institutional buildings and in multi-family housing. These codes do not apply to single-family residences, but FRT framing can be equally valuable in slowing the destruction of a home's structural system, giving occupants additional time to escape.

This fire performance is most welcome in homes built in crowded urban areas and in wildland areas remote from fire-protection services.

A popular brand of FRT wood, Dricon®, has an added benefit: in addition to its fire retardance, it has EPA-registered resistance to termites and fungal decay. With this framing, the homeowner gets a benefit even if a fire never occurs, as homeowners hope will be the case.

Incidentally, fire performance is also available for exposed applications by specification of products such as FRX® exterior or FRT wood.

Mold Resistance

Of high current interest is mold prevention, or, at least, mold management. Homeowners have mold concerns, and contractors worry about mold liability. It has been reported that 10,000 mold lawsuits are pending in the U.S.

Mold-resistant framing, such as FrameGuard® wood, can

help minimize the growth of mold and the likelihood of liability claims. To this end, manufacturers have recently introduced anti-mold coatings for framing lumber, trusses, and engineered wood products. The best of these are applied by spray or dip at central locations where the coverage can be controlled and quality monitored, rather than being applied at each jobsite.

As with borate treatment, mold-resistant coatings usually contain a dye, either green or blue, for identification during construction.

The Ultimate Stud?

The ultimate wood stud may be lumber that is pressure-treated with a fire retardant and then coated with an anti-mold solution. In a recent survey conducted by *Good Housekeeping*, nearly a quarter of 1,200 respondents said they would "definitely" pay four to seven percent more for a house with framing that resists fire, produces less smoke, and fights termites and mold. Another 60 percent answered by saying they "probably" would.

A demonstration house in Baton Rouge, the Louisiana House, includes three of the above options: borate pressure-treated lumber for framing, fire retardant-treated plywood around a fireplace, and SIPs with OSB (oriented strand board) skins coated with an anti-mold product. The house also features "optimum-engineered framing," designed to handle high wind loads. More information is available at www.louisiana-house.org. A video tour on CD can be obtained free from Arch Wood Protection, 1955 Lake Park Drive, Suite 100, Smyrna, Georgia 30080.

All of the treatments described are factory-applied; they are not remedial fixes for existing structures. Thus, except for room additions, homeowners have only one opportunity to protect their homes' skeleton—when the homes are built. If builders do not mention framing options, home buyers should ask about them.

Although it offers no conspicuous curb appeal, upgraded framing is a bit of skeletal fitness that could pay off over the life and resale of a home. Treatment can add to the longevity of wood and to the security of inhabitants, which is beauty to the bone. **UHD**

The Author

Huck DeVenio is Manager of Product Information at Arch Wood Protection. He has been involved with pressure-treated wood for three decades, during which time he has written more than 50 feature articles on the subject. Huck says that his exterior may have begun deteriorating but, like good framing, his structural system remains solid.



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The First Optimum Performance Home™



interior design—kitchen, bath & home fixtures part IX

Gary Reber

Architectural Illustration By Ronald Devesa

synopsis

- The kitchen design is functional and features KitchenAid® Architect® Series II stainless steel appliances, which complement the universal design attributes of the kitchen.
- The Whirlpool® laundry emphasizes a universal design layout, efficient and functional in design, to provide easy operability with easy reach and accessible appliances and fixtures.
- The Silestone® quartz countertops throughout the home provide a cleaner, safer surface with built-in Microban® antimicrobial protection.
- The bathrooms emphasize universal design and feature low-consumption, water-efficient Kohler® plumbing fixtures and faucets, and bath and shower assemblies that provide easy access that respond to the growing needs of an aging population.
- Fireplaces are wood-burning and electric and gas with on-demand control for efficient energy use.
- Lighting system products are architectural grade and universal design-friendly.

Introduction

This is the ninth article in the series documenting the design and construction of the first Optimum Performance Home™. The project has been selected by the U.S. Green Building Council (USGBC) for inclusion in the national Leadership In Energy & Environmental Design (LEED®) for Homes pilot program, their new green build certification initiative, and the goal is Platinum certification.

The home will be built at The Sea Ranch, located in Sonoma County, along the Northern California coastline of the Pacific Ocean, approximately 110 miles north of San Francisco.

The showcase project is exemplary of the "Ultimate Home Design™" concept, which integrates age-friendly universal design with the best sustainable building practices, while exerting minimal impact on the environment. Universal design is the inclusive, non-discriminatory design of products, buildings, environments, and urban infrastructure, as well as information technologies that are accessible to and useable by (almost) all. With respect to home design, the idea is to design and build homes that have no physical barriers, thus sustaining people of all ages and all capabilities in a functional, comfortable, and aesthetic lifestyle.

A building science systems approach to home building is the cornerstone of the project, with emphasis on the relationship between the home's components and the envelope they create. Also paramount is good stewardship—proper regard

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and respect for the rights of neighboring homeowners and the surrounding natural setting, and resource efficiency. The goal is to optimize occupant health, comfort, and safety; maximize energy efficiency and structural durability; and minimize environmental impact. In addition, the aim is toward providing a nurturing home environment to support independent living and sustainable lifestyles.

Part I of this case study series appeared in Issue 1, January/February 2006. The introductory article extensively covered the project scope. Thereafter, each issue has contained a part of the continuing series working through site planning and preparation; Low-Impact Development (LID); further refinements to the site plan and drainage design; The Sea Ranch Design Committee approval of the architectural/structural and grading/drainage submittals with conditions that translated to clarifications on certain building components and material finishes; particular aspects of the home's mechanical plan; structural aspects of foundations, structural walls incorporating Insulating Concrete Forms (ICFs) and Structural Insulated Panels (SIPs), and roofing; the acoustical design of the dedicated Optimum Performance Home Theatre™ and rear-projection room; and interior design approaches and materials.

A Final Approval letter for The Sea Ranch Association Construction Performance Permit was issued on October 11, 2006, which is required by Sonoma County to obtain a county building permit.

The necessary work to obtain the building permit, including further refinement of the structural and mechanical plans, has been completed. Final construction plans are now in the review process with the Sonoma County Building Department. Assuming no further delays, the issuance of permits, the commencement of construction, site grading, foundation, and mechanical infrastructure is anticipated to start in June 2007.

"The Optimum Performance Home meets the guidelines and qualifications of LEED for Homes®, the EPA's ENERGY STAR® and WaterSense, and American Lung Association® Health House® programs, and other sustainable green building programs."



The Sea Ranch, Sonoma County, California
Aerial Photo Courtesy Scott Simpson

In this segment, the focus will be on kitchen and laundry appliances, bath fixtures, fireplaces, wine cellar, spa, sauna, and courtyard features.

Design Concept

As previously noted in this series, the home design integrates all of the concepts advocated in *Ultimate Home Design*. The goal is to demonstrate how today's products and building methods can make life safer, more comfortable, and more enjoyable. The science of optimum performance homes is about building structures that use less energy, are quieter and more comfortable, have fewer problems with material degradation, provide clean air and water, and do less damage to the environment. As an integrated holistic design, the house will serve as a home for many people and serve in many phases of one's life.

The high-performance building systems that will be employed exceed what the building codes require, and are able to resist natural disasters more effectively than a code-minimum house. Greater home safety—and thus, homeowner peace of mind—is possible when building with stronger building materials and techniques. The Optimum Performance Home qualifies for the Fortified...For Safer Living® program of the Institute for Business & Home Safety (www.ibhs.org/business_protection). This program specifies construction, design, and landscaping guidelines to increase a new home's resistance to natural disaster from the ground up.

The home will also meet the guidelines and qualifications for the U.S. Department of Environmental Protection's ENERGY STAR®, the EPA's (Environmental Protection Agency) WaterSense, and the American Lung Association® Health House® programs. As well, the home will meet the National Association of Home Builders' (NAHB) Model Green Home Building Guidelines, the Sustainable Buildings Industry Council

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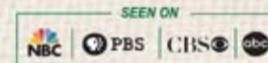


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- KitchenAid® Architect® Series II ovens, microwave ovens, warming drawer, refrigeration, dishwasher, and kitchen hoods will be featured in the main residence kitchen, guest bedroom nook, home office nook, and outdoor courtyard kitchen.



Kohler® Verity® Farmers Sink & HiRise™ Pot Filler

- The sink will be a 33-inch-wide Kohler® Verity® 18-gauge type 304 stainless steel under-counter apron-front farmers sink (K-3086) fitted with a Kohler Avatar® kitchen faucet featuring an ergonomically designed single-control front lever handle and pullout sprayhead with an aerator in stainless steel (K-6350-VS).
- On the sidewall next to the KitchenAir Dual Fuel convection range will be a Kohler HiRise™ (K-7322-4-BS) wall-mount pot filler.



KitchenAid® Architect® Series Hood Liner & ABBAKA Hood Vent

- A KitchenAid® Architect® Series 48-inch-wide hood liner with internal blower motor and 1,200 CFM exhaust flow capacity (KHLU182MSS) will be integrated with a custom designed ABBAKA stainless hood vent stack for a seamless integration with the canopy hood liner.



(SBIC) *Green Building Guidelines*, and the “Green Points” program now being considered for adoption by Sonoma County and The Sea Ranch Association.

Kitchen Design

Main Residence Kitchen

The all-KitchenAid® appliance-equipped ENERGY STAR kitchen is the heart of the Optimum Performance Home.

KitchenAid Architect® Series II stainless steel appliances will be featured throughout the kitchen in the Optimum Performance Home. Each element of the series complements the universal design attributes of the kitchen. Ovens feature larger windows; handles are easier to grip, even while wearing an oven mitt; and beveled, seamless edges make cleaning easy.

The KitchenAid Architect Series II built-in ovens feature exclusive Steam Assist technology and convection technology. This unique cooking system automatically provides just the right amount of steam to enhance every dish. The natural flavor and moisture of food, from roasts to cheesecake, is locked in while convection perfectly heats and browns.

The kitchen will feature one 30-inch-wide built-in microwave combination oven with Steam Assist technology in the convection oven (KEHU309S). A Series II 30-inch-wide warming drawer (KEWS105S) features an exclusive slow-cook function to slowly cook food at a low temperature.

The kitchen will feature a professional style Architect Series freestanding 36-inch-wide stainless steel Dual Fuel convection range with Steam Assist (KDRP767RSS). Dual Fuel features an electric convection oven and a propane gas cooktop. The six-burner professional BTU cooktop is universal-design friendly with large controls on the front of the range for easy access. The built-in water reservoir used to create

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functionality and convenience by alleviating the need to lean over the cooking area. Double quarter-turn ceramic disc valves ensure reliable on/off operation.

A KitchenAid Architect Series II ENERGY STAR-qualified 24-inch-wide dishwasher (KUDU03ST) features a Whisper Quiet Ultima™ sound insulation system and built-in food disposer.

The kitchen will feature an ENERGY STAR-qualified KitchenAid Architect Series II 48-inch-wide built-in refrigerator (KSSC48QT) with exclusive ExtendFresh™ temperature management system and ingredient care centers, and AquaSense™ in-door water and ice-dispensing system.

Additionally, the kitchen will be equipped with an automatic ice maker (KUIC15NR). A Sylvan Source M-600 four-stage steam-distilled water purification unit (see Issue 05, September/October 2006) will serve as the ultra-pure water source for the refrigerator, ice maker, and kitchen faucets.

A Series II 15-inch-wide trash compactor (KUCS03CT) with a 5:1 compaction ratio also will be installed.

The kitchen island will include a Series II 27-inch-wide built-in double-drawer refrigerator (KDDC27TTS) with independently controlled drawers and an ExtendFresh pantry system. Also featured will be a Series II 24-inch-wide wine cellar (KUWS24RS) with 46-bottle capacity and dual temperature zones.

The sink will be a 33-inch-wide Kohler Verity® (K-3086 Type 304) 18-gauge stainless steel under-counter apron-front farmhouse sink fitted with an integral (K-8801-CP) DuoStrainer® and Kohler Avatar® (K-6350-VS) kitchen faucet, featuring an ergonomically designed single-control front lever handle and pullout sprayhead with a water-saving aerator in stainless steel.

The highly durable stain- and corrosion-resistant Verity compartment measures 29-1/2 inches wide x 15-3/4 inches deep with an eight-inch compartment depth. Kohler's exclusive sound-absorption SilentShield™ construction reduces disposal noise and vibration from dishes and running water for quiet performance. Accessories include a stainless steel bottom basin rack (K-3141-ST) and stainless steel wire rinse basket (K-6510-ST).

The KitchenAid under-counter continuous-feed food disposer (KCDS250X), rated at one HP, has a 42-ounce chamber capacity.

A low-profile Japanese Teppan-Yaki-style 36-

inch-wide stainless steel griddle made by the Wolf Range Company (AGM36) will be a feature of the kitchen. The one-inch-thick polished steel griddle plate provides infinite propane-fired heat control per 12 inches of width. The griddle will be used for exhibition cooking when entertaining guests.

While not in use, a custom Ultra Premium Butcher Block by John Boos & Co. will rest atop the Wolf griddle. The 36- x 24-inch, 1-1/2-inch-thick block will be crafted from North American hard rock maple and oiled to a rich hue to complement the cabinetry stain. Hard rock maple is desirable for all slicing, dicing, and chopping duties. Bakers choose it for preparation and rolling dough. No other countertop surface offers the functional advantages of butcher block. Rails are cut, selected, and matched for appearance, thus assuring the uniformly rich and clean appearance that is desired by many discriminating customers. The full-length rails that comprise the top provide an unbroken appearance over the length of the product. The hard maple with its penetrating oil finish is durable and renewable for a long service life.

A KitchenAid Architect Series 48-inch-wide hood liner with internal blower motor and 1,200 CFM exhaust flow capacity (KHLU182MSS) is specified for an integrated look with the rest of the KitchenAid appliances. The hood liner features halogen lighting and hidden variable exhaust fan speed controls.

San Francisco-based ABBAKA is the leader in handcrafted range hoods of copper, hammered copper, stainless steel, aged bronze, and

brass. They have been selected to fabricate a custom stainless hood vent stack for a seamless integration with the canopy hood liner.

Next to the griddle will be a Kohler Undertone™ small rounded under-counter 5-1/2-inch-deep kitchen sink (K-3338) equipped with a Kohler DuoStrainer (K-8801) and a Kohler Avatar single-control kitchen faucet with pullout sprayhead in stainless steel (K-6350-VS).

Integrated into the kitchen island countertop will be a slim, battery-operated Franke® electronic scale (LKS-01). The stainless steel scale features an easy-to-read LCD window with readout in measurement increments of 1/8 ounce, increasing to increments of 1/4 ounce, to a maximum of 11 pounds. Also integrated into the island countertop will be a Franke waste bin with a stainless steel lid (AE E17). The stainless steel container volume (AE81) is two gallons and is removable.

KitchenAid accessories for the kitchen will include a KitchenAid Professional 600™ Series Bowl-Lift Stand Mixer (KP26M1X), KitchenAid Custom Metallic® Series 5-Speed Blender (KSB580), KitchenAid 2-Quart Brushed Stainless

the steam is conveniently located up front, eliminating the need for an additional water line. The 5.1-cubic-foot oven capacity features a 2,000-watt bake element, a four-pass 3,000-watt broiler element, a 1,600-watt convection element, and a 1,300-watt steam boiler element. This True convection cooking system with a Third Hidden Element (T.H.E.™ system) utilizes both a rear element and a rear fan to circulate preheated air around the large oven cavity for faster and more even cooking results than conventional cooking. The CleanBake™ Hidden Element provides more evenly balanced heat distribution by warming both the bottom and the sides of the oven cavity, resulting in better baking performance.

A KitchenAid Architect Series 36-inch Canopy Range Hood (KHTU165R) with internal blower and 600-cubic-foot-per-minute (CFM) exhaust capacity will serve as the exhaust hood for the Dual Fuel convection range (KDRP767RSS). The hood features halogen lighting and a three-speed exhaust fan. Mesh grease filters can be placed inside the KitchenAid dishwasher for cleaning. The range hood's simple lines will complement the design of the kitchen.

On the side wall next to the Dual Fuel convection range will be a Kohler® HiRise™ (K-7322-4-BS) wall-mount pot filler in brushed stainless steel. Its articulated design and up to 24-inch overall reach enhance



Steel Tea Kettle (50585C), Pro Line® 12-Cup Coffeemaker (KPCM050), Pro Line Espresso Machine (KPES100PM), Pro Line Burr Coffee Mill (KPCG100), KitchenAid 9-Cup Food Processor (KFP740), KitchenAid Ultra Power Plus™ 7-Speed Hand Mixer (KHM7TOB), KitchenAid 7-Quart Slow Cooker (KSC700SS), KitchenAid 4-Slice Metal Toaster (KMTT400SS), and Pro Line Waffle Baker. Additionally, a host of KitchenAid Professional and Cook's Series heavy-duty carbon steel SlideEase® non-stick coated cookie sheets and cake, muffin, loaf, and baking pans; meat loaf pan, cooling racks; pizza crispener; roaster, and Gourmet Excellence™ and Gourmet Distinctions® cookware are specified. Finally, an assortment of extraordinary KitchenAid kitchen gadgets will be included.

Guest Bedroom Alcove Nook

The guest bedroom hallway entertainment alcove will feature a KitchenAid Architect Series II ENERGY STAR-qualified 24-inch-wide under-counter refrigerator (KURS24RS) and a 30-inch-wide built-in microwave oven (KBMS1454S) with Optimawave™ technology. The sink will be a Kohler Undertone small rounded under-counter kitchen sink (K-3338) equipped with a Kohler DuoStrainer (K-8801) and a Kohler Clairette® ergonomic single-control swivel pulldown sprayhead spout faucet in stainless steel (K-692).

A Lance Larkin Brew Express® built-in 12-cup automatic coffeemaker will be mounted into the alcove's wall. The stainless steel unit is

self-filling and brews directly into a thermal carafe that can be removed during brewing. The unit shuts off automatically if the carafe is not replaced within five minutes. This easy-to-use appliance will connect directly to the home's ultrapure water source for perfectly brewed coffee. And because of its built-in design, counter space will be gained.

Home Office Nook

The same KitchenAid Architect Series II under-counter refrigerator and built-in microwave oven to be installed in the guest bedroom alcove will be featured in the home office, along with a Series II 15-inch-wide automatic ice maker (KUIIC15NR) with a 28-pound storage capacity. The single rounded under-counter sink and swivel spout faucet will be the Kohler Undertone (K-3338) and the Kohler Clairette (K-692), respectively.

As with the guest bedroom alcove, a Brew Express built-in 12-cup automatic coffeemaker will be mounted into the wall.

Outdoor Courtyard Kitchen

The fully equipped outdoor courtyard kitchen

will feature KitchenAid 304 stainless steel construction appliances. The 36-inch-wide built-in grill (KBNU367TSS) features a 23K BTU infrared sear burner, two 22.5K BTU U-shaped stainless steel main burners, and a 15K BTU infrared rotisserie burner and 36-inch wide rotisserie. Next to the grill will be a 13-inch-wide built-in double side-burner (KBZU122TSS), front to back, with two 15K BTU burners. Under the grill will be a 24-inch-wide built-in warming drawer with slow-cook functionality.

A KitchenAid 30-inch-wide built-in refreshment center (KBFU271TSS) with integrated stainless steel sink and single-control faucet will be featured along with a 24-inch-wide built-in 6.0 cubic foot refrigerator (KRCA06XPSS). There will also be a 15-inch-wide built-in automatic ice maker with a 28-pound storage capacity (KUIO15NNLS).

A KitchenAid 27-inch-wide wheeled serving cart (KFBS170LSS) will be included in the outdoor entertainment package along with a 24-inch-wide built-in double utility drawer unit (KBUE142TSS) and a 14-inch-wide built-in trash drawer (KBTU141TSS).



Lance Larkin Brew Express®

- A Lance Larkin Brew Express® built-in 12-cup automatic coffeemaker will be mounted into the guest bedroom and home office wall alcoves. The stainless steel unit is self-filling and brews directly into a thermal carafe that can be removed during brewing.



Kohler® Undertone™ Sink & Clairette® Faucet

- A Kohler Undertone™ small rounded under-counter kitchen sink (K-3338) equipped with a Kohler Clairette® single-control swivel pulldown sprayhead spout faucet will be featured in the guest bedroom alcove nook, home office nook, and wine cellar.

Positioned over the built-in Series II refreshment center will be SunBriteTV's all-weather outdoor LCD television (Model 3210HD). Designed for outdoor installation, this super-bright 32-inch-diagonal widescreen flat-paneled LCD TV is built with an environmental enclosure that protects the TV from rain, dirt, insects, scratches, and other outdoor elements. To address extreme weather issues, the TV is designed with a baffled and filtered dual-fan airflow system that quietly keeps the unit cool in temperatures up to 124 degrees Fahrenheit, and an internal thermostatically controlled heater that activates automatically when the TV's internal temperature dips to 32 degrees Fahrenheit. The TV is

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Wolf Range Company Griddle

- A low-profile Japanese Teppan-Yaki-style 36-inch-wide stainless steel griddle (AGM36) made by the Wolf Range Company will be a feature of the kitchen. The one-inch-thick polished steel griddle plate provides infinite heat control per 12 inches of width. The griddle will be used for exhibition cooking when entertaining guests.



UltraGlas®

- A custom-designed UltraGlas® architectural counter will be integrated into the kitchen island and serve as the eating surface for the counter space below the Wolf Range Company Japanese Teppan-Yaki-style griddle.



Silestone® Leather™ Countertops

- The food preparation countertops throughout the Optimum Performance Home in the kitchen, guest bedroom alcove, home office, wine cellar, and outdoor courtyard will be Silestone® Tigris Sand Leather™ Quartz by Cosentino.



KitchenAid® Outdoor Courtyard Kitchen Appliances

- The fully equipped outdoor kitchen features exclusive KitchenAid® stainless steel-constructed appliances.



SunBriteTV®

- Positioned over the built-in Series II refreshment center will be SunBriteTV®'s all-weather outdoor LCD television with integral stereo loudspeakers, water-resistant remote control, and outdoor nylon dust cover (Model 3210HD).



equipped with a universal wireless water-resistant remote control, and it will be mounted on SunBriteTV's weather-resistant articulating wall mount.

The display will be powered off the wall outlet through an Alpha-Core Goertz BP Power System.

Silestone® Quartz Gemstone Food Preparation Countertops

The food preparation countertops throughout the Optimum Performance Home in the kitchen, guest bedroom alcove, home office, wine cellar, and outdoor courtyard will be Silestone® Tigris Sand Leather™ by Cosentino. Multi-dimensional functionality and built-in Microban® antimicrobial

protection make Silestone Quartz a cleaner, safer surface that actually prevents the growth of microbes such as odor-causing and damaging bacteria and mold and mildew, and makes the countertop easier to clean and keep clean. Silestone has certification under the National Sanitation Foundation (NSF 51) for usage in commercial food preparation areas and is GREENGUARD Environmental Institute Indoor Air Quality certified. Thus, Silestone Quartz is a safer surface for areas where food preparation takes place, while protecting the quality of the indoor environment. A Silestone non-porous countertop is resistant to scratches, scorching, and impacts, and requires nothing but simple soap and water for cleaning. Its extraordinary strength and durability make it an essentially maintenance-free green countertop.

UltraGlas® Counter

A custom-designed UltraGlas® architectural counter will be integrated into the kitchen island and serve as the eating surface for the counter space below the Wolf Range Company Japanese Teppan-Yaki-style griddle. The decorative and functional thick kiln-formed embossed glass counter and backsplash will follow the contour of the island from end to end. Six adults will be able to sit comfortably at the counter and enjoy the ambiance of the kitchen activity—another universal design touch. Underneath the counter are cupboards, which hold special affair dishes and other kitchen items not needed on a day-to-day basis.

UltraGlas textures create natural diffusion and may be specified with standard textures and designs in any of 12 glass colors, or finished in virtually any specified color or combination of colors. Decorative finishes also may be appliquéd fully or selectively to UltraGlas, as well as special shapes and decorative edge treatments.

The glass in UltraGlas is a sustainable and renewable resource made from a minimum of 15 to 30 percent recycled glass (cullet). Upon request, 100 percent recycled glass is used, as in the application in the Optimum Performance Home. The company purchases scrap glass from local suppliers and recycles it into beautiful, functional objects of art. Since UltraGlas is formed by heat (not abrasion), it is non-porous, non-absorbent, and non-abrasive—thus it conceals soiling and requires very little maintenance. UltraGlas is also hygienic and permanent, and meets or exceeds codes for safety glass.

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Laundry Design

The Optimum Performance Home's laundry emphasizes a universal design layout. Efficient and functional in design, the laundry provides for easy operability with easy reach and accessible appliances and fixtures.

The Whirlpool® Duet® HT® (High-Temperature) Fabric Care Family front-loader washer and dryer will handle the heavy-duty laundry chores. Large waterdrop-shaped doors provide for easier loading of bulky items. The sleek new design features an LED control panel with intuitive controls. The washer uses Dynamic Stability Control software that can sense the load position and adjust its distribution in the drum. It also features a six-point suspension system that absorbs and stabilizes drum movement. The Clean Washer Cycle is extremely water efficient. The pair uses half the water and energy of a top-load washer. It can save up to 70 percent more energy and uses 70 percent less water than top-load washers. The Duet HT system is ENERGY STAR qualified.

Both the washer and dryer will be topped with an uninterrupted five-foot-wide scratch- and chemical-resistant matted work surface to provide convenient counter space to sort and fold up to four loads at once. The workspace features three rear channel supply trays with a backguard to provide small item storage at arm's length. Both the washer and dryer feature 15.5-inch pedestals, an ergonomic solution to help reduce bending, stooping, or arching. The pedestal doubles as a storage drawer with a convenient sliding shelf to support a laundry basket. A Whirlpool laundry tower will also be featured. This fixture features a convenient retractable hanging rod for an at-hand drying solution for freshly washed items or clothes right out of the dryer. Two drawers accommodate wholesale-size detergent bottles and boxes, along with other small items such as stain sticks, dryer sheets, and cleaning supplies. Also included is a pullout supply tray in which to store everything from bleach pens to pocket change.

Finally, the laundry will be equipped with an Iron-A-Way® Universal Design hideaway ironing station (Model AL-42). This professionally designed center will adapt to everyone in the household. Product features comfortably meet the needs of the person who prefers to stand while



Whirlpool® Duet® HT® Washer And Dryer And Fabric Freshener

- The Whirlpool® Duet® HT® (High Temperature) Fabric Care Family front-loader washer and dryer will handle the heavy-duty laundry chores. A Fabric Freshener will remove odors and relax wrinkles without chemicals or detergents.



Iron-A-Way® Universal Design Ironing Station

- The laundry will be equipped with an Iron-A-Way® Universal Design hideaway ironing station (Model AL-42). This professionally designed center will adapt to everyone in the household and exemplifies the possible changing needs of the homeowner over the course of a lifetime.



Dryerbox®

- The Whirlpool Duet dryer will be connected to The Dryerbox® by In-O-Vate Technologies. The Dryerbox is a vent connection receptacle that saves space, saves energy, improves dryer efficiency, prevents the flex transition hose from getting "squished," and reduces a common household fire hazard.



Kohler® Bayview™ Laundry Room Utility Sink

- The laundry sink will be a 25-inch-wide Kohler Bayview™ white utility sink with a black painted underside (K-6608-1P). This large, extra-deep single-basin design features an acid-resistant enamel finish. A Kohler Fairfax single-control kitchen sink faucet in polished chrome will be fitted to the sink (K-12177).

ironing. Yet features are installed to meet the accessible reach requirements for someone who will be seated. The result is a product that exemplifies the possible changing needs of the homeowner over the course of a lifetime. A Whirlpool Fabric Freshener (LRF4001RY), a portable appliance that removes odors and relaxes wrinkles without chemicals or detergents, also will be included.

The Whirlpool Duet dryer will be connected to The Dryerbox® by In-O-Vate Technologies. The Dryerbox is a vent connection receptacle that saves space and energy, improves dryer efficiency, prevents the flex transition hose from getting "squished," and reduces a common household fire hazard. The Dryerbox will allow the clothes dryer to be pushed back against the wall of the laundry room without the fear of kinking the exhaust hose.

The laundry sink will be a 25-inch-wide Kohler Bayview™ (K-6608-1P) white utility sink with black painted underside. This large, extra-deep single-basin design features an integral DuoStrainer (K-8801), wood grate (K-6027), and bottom stainless steel basin rack (K-6034), which snugly fits in the bottom of the sink basin. The self-rimming model features an acid-resistant enamel finish. A Kohler Fairfax single-control kitchen sink

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Eldorado Stone®

- The underground wine cellar's concrete walls will be finished with beautiful Eldorado Stone® Veneto Fieldledge architectural stone veneer, pierced with solid oak highlights.



Natural Cork®

- A Natural Cork® 100 percent high-density floating cork floor will enhance the ambiance. The Santiago style is treated with five coats of UV-cured acrylic finish, which contains no volatile organic compounds (VOC).



VELUX Sun Tunnel™

- Accentuated by the natural stone walls and vaulted ceiling, an integrated VELUX Sun Tunnel™ will project natural daylight into the wine cellar.



Wine Master Cellars VintageView® Wine Racks

- VintageView® wine storage by Wine Master Cellars will be featured. The Platinum Series modular three-bottle-deep label-forward design will create a spectacular wine gallery, showcasing over 600 bottles of wine from the Alexander, Annapolis, Napa, and Sonoma wine regions located nearby.



Perlick® Beer Dispenser Cabinet

- Perlick® all stainless-steel beer dispenser cabinet (HRT-S) with quarter barrel or two pony barrels keg capacity.



faucet in polished chrome (K-12177) will be fitted to the sink. The pullout spray features an easy-to-clean anti-hard water sprayface that resists hard water buildup. The sink will be fitted to a Bayview hardwood sink stand (K-6618) with Bayview hardwood grate/shelf (K-6608).

Wine Cellar

The majestic wine cellar is designed to be a fortified concrete underground structure. The natural temperature of the 10 x 10-foot room will be approximately 57 degrees Fahrenheit. The concrete walls will be finished with beautiful Eldorado Stone® Veneto Fieldledge architectural stone veneer, pierced with solid oak highlights. A Natural Cork® 100 percent high-density floating cork floor will enhance the ambiance. The Santiago style is treated with five coats of UV-cured acrylic finish, which contains no volatile organic compounds (VOC). The wine cellar is designed to be a sanctuary for storing wine at an

optimum temperature, while enjoying a glass of wine, a draft beer, or other beverages along with a selection of cheeses among family and friends in an intimate environment.

Accentuated by the natural stone walls and vaulted ceiling with integrated VELUX Sun Tunnel® skylight, VintageView® wine storage by Denver-based Wine Master Cellars will be featured. The Platinum Series modular three-bottle-deep label-forward design will create a spectacular wine gallery, showcasing over 600 bottles of wine from the Alexander, Annapolis, Napa, and Sonoma wine regions, all located within 15 to 90 minutes of The Sea Ranch.

KitchenAid Architect Series II refrigeration equipment will include a 24-inch-wide built-in under-counter refrigerator (KURS24RS), a 15-inch-wide automatic ice maker (KUIC15NR), a 24-inch-wide beverage center (KBCS24RS), and a Perlick® all-stainless-steel 24-inch-wide beer dispenser cabinet (HRT-S), with quarter-barrel or two pony barrels keg capacity.

Also featured will be a KitchenAid Architect Series II 30-inch-wide microwave oven (KBHS109S) and a Series II single drawer dishwasher (KUDD01SSPA). A Kohler Undertone small rounded under-counter kitchen sink (K-3338) equipped with a Kohler DuoStrainer (K-8801) and a Kohler Clairette single-control swivel pulldown sprayhead spout faucet (K-692) in stainless steel will complement the appliances.

Garages

Gladiator® GarageWorks

To meet the garage organizational needs, Gladiator® GarageWorks cabinets, workbenches, and refrigeration will be featured. The GarageWorks system will include wall, floor-standing and rolling GearBoxes, hard maple-top Workbench, Gear Drawers, Garage Trash Compactor, and 19-cubic-foot Chillerator® Garage Refrigerator. The garage walls will be surfaced with heavy-duty double-channel Gladiator Gearwall® Panels to maximize wall storage. The Workbenches will be equipped with integrated Powerstrips. The floors will be covered in thick Gladiator roll floor covering with a non-porous surface with a slip-resistant Tread Plate pattern. The material is treated to deter mold, fungus, and bacterial growth. A host of Gladiator accessories will include wire baskets, small item bins, a shoe rack, and a variety of hooks (tool, deep, utility, scoop, and wheelbarrow).

Oceanview™ Utility Sink

A Kohler Oceanview™ tile-in cast iron white utility sink (K-6606) will be located in the garage and serve as a “wet room” in-floor basin. Additional accessories will include two Oceanview hardwood grates (K-6024), which will cover the sink completely and provide a work space, and two Harborview™ stainless steel bottom basin racks (K-6028L/R).

The Oceanview will be fitted with a Kohler Fairfax single-control kitchen sink faucet in polished chrome (K-12177). The pullout spray features an easy-to-clean anti-hard water sprayface that resists hard water buildup.

Wayne-Dalton® Garage Door Opener

Wayne-Dalton® HomeSettings prodrive™ garage door openers are specified for the two-car and single-boat garages. This ceiling-mounted drive is quiet and reliable. It features Z-Wave™ operability that is integrated into the whole-house wireless automation network. A multi-function garage door wall station will be wall mounted in each garage to control the Wayne-Dalton prodrives. Both a wireless keyless entry and in-vehicle remote control will be included.

Courtyard Spa

A Dimension One Spas® Chairman II spa will be featured in the courtyard area. The D1 Chairman II is an ultimate performance and comfort spa that is renowned for energy efficiency and reliability. It features the UltraPure® Water Management System, the most sophisticated water-management system in the industry. The system provides 100 percent filtration and ozonation, killing bacteria on contact while maintaining water quality that is sparkling clean and soft feeling. The water source will be filtered rain-water harvested off the Evergreen slate roofs (see Issue 06, November/December 2006). The UltraLife® Spa shell is fade- and slip-resistant (an important universal design feature), and the outside EnviroTect™ housing is rugged and durable and requires virtually no maintenance. The interior construction is 100 percent foam insulated. The EPA-compliant polyurethane foam insulation provides maximum heat retention for the lowest possible energy costs.

The D1 spa will be sunken into an area of the courtyard so that the spa's ledge is at a seating height for easier accessibility. Users simply sit on



Gladiator® GarageWorks

- To meet the garage organizational needs, Gladiator® GarageWorks cabinets, workbenches, and refrigeration will be featured. The GarageWorks system will include wall, floor-standing, and rolling GearBoxes; hard maple-top Workbench; Gear Drawers; Garage Trash Compactor; and a 19-cubic-foot Chillerator® Garage Refrigerator. The garage walls will be surfaced with heavy-duty Gladiator Gearwall® Panels to maximize wall storage.



Kohler® Oceanview™ Garage Utility Sink

- A Kohler Oceanview™ tile-in cast-iron white utility sink (K-6606) will be located in the garage and serve as a “wet room” in-floor basin. The Oceanview will be fitted with a Kohler Fairfax single-control kitchen sink faucet with pullout spray (K-12177).



Wayne-Dalton® prodrive™ Garage Door Opener

- A Wayne-Dalton® HomeSettings prodrive™ garage door opener is specified for the two-car and single-boat garage doors by Carriage House Doors. This ceiling-mounted drive is quiet and reliable. It features Z-Wave™ operability that is integrated into the whole-house wireless automation network.

the spa's wraparound IPE deck seating and slide over into the spa. The spa area design complies with the universal design accessibility standards for the home.

The complementary outdoor shower will service the D1 spa and the Finnleo® Finnish sauna. The shower assembly will be the Kohler BodySpa Ten-Jet Tower (K-1000-H2) with separate Kohler Master-Shower® Rite-Temp® valve trim, cylinder handle (K-T9492-7), and Kohler MasterShower Hotel Handshower Kit (K-8520). The BodySpa Tower is made from tough anodized aluminum for durability in the outdoors. It features ten-jet system waterfall and chromatherapy lighting, electronic jet selection control, remote control, and variable water flow control. A separate wall-mount Kohler Roman Bath Diverter Spout (K-6881) also will be installed.

The shower walls will be surfaced with Moving Color™ Northern Lights 4 x 4 glass tiles. These innovative waterproof glass tiles are manufactured using the “color infinity,” enabling the glass tiles to change hue dynamically, responding to applied heat. The tiles appear black at room temperature and move through the color spectrum when temperature (warm water, radiant heat, etc.) is applied. The moving color is dynamic to the temperature of the heating agent.

Finnleo® Finnish Sauna

A Finnleo® Custom-Cut Sauna will be a featured experience in the Optimum Performance Home. The authentic Finnish sauna features

Dimension One Spas® Chairman II

- A Dimension One Spas® Chairman II spa will be featured in the courtyard area. The D1 Chairman II is an ultimate performance and comfort spa that is renown for energy-efficiency and reliability.



Kohler® BodySpa Ten-Jet Tower

- The complementary outdoor shower will service the D1® spa and the Finnleo® Finnish sauna. The shower assembly will be the Kohler BodySpa Ten-Jet Tower (K-1000-H2) with separate Kohler MasterShower® Rite-Temp® valve trim with cylinder handle (K-T9492-7) and Kohler MasterShower Hotel Handshower Kit (K-8520).



Finnleo® Custom-Cut Finnish Sauna

- A Finnleo® Custom-Cut Sauna with a floor-standing Maxi 6 kW heater (FSO-60SC) has been specified with 70 pounds of Finnish Vulcanite rock. The authentic Finnish sauna features European styling with a striking touch of elegance in a healthy environment that provides traditional soft dry heat.



Moving Color™ Glass Tiles

- The shower walls will be surfaced with Moving Color™ Northern Lights 4 x 4 glass tiles. These innovative waterproof glass tiles are manufactured using the "color infinity," enabling the glass tiles to change hue dynamically, responding to applied heat.



European styling with a striking touch of elegance in a healthy environment that provides traditional soft dry heat that can be enjoyed wet or dry. Every Finnleo sauna is handmade using the highest quality sustainable Nordic White Spruce for the tongue-and-groove walls and ceiling, and Abachi for the benches, backrests, headrests, duckboards, and heater guard. The benches are assembled from the bottom with stainless steel screws. Abachi is used extensively throughout, as it remains comfortable to the touch even at high temperatures. The clear Abachi wood is an ideal match for a Nordic Whitewood sauna and the premium wood of choice for sauna benches worldwide.

Finnleo's exclusively designed heaters are the heart of the sauna bathing experience. A wall mount Maxi FSO-60SC 6 kW heater and separate FSC-9 controls have been specified with 70 pounds of Finnish Vulcanite rock for a soft, even-temperature heat and a soft steam rising from the rocks. The Maxi Soft Heat series, with its sleek symmetrical design, exemplifies the sauna experience.

The FSC-9 control features a nine-hour preset function along with a 60-minute run time, thermostat control, heat indicator light, and room light switch. Set the sauna in the evening before bedtime, and wake up

to the start of the day with a healthful sauna bathing experience at the perfect temperature.

The sauna measures seven-feet-wide by five-feet-deep and will be fitted with a Douglas fir 36-inch-wide door with a 26- x 65-inch double-pane tempered insulated glass window to meet the energy-saving and universal and biophilic design criteria for the home. The floor will be an extension of the Evergreen slate flooring in the courtyard, with a no-barrier entry.

Various Finnleo sauna accessories are specified, including a one-gallon copper water bucket, copper ladle, 15-minute sand timer, vapor-proof sauna wall light and lampshade, headrests, beech and aluminum frame hygrometer, wooden vent grill and ventilation valve, four-peg clothes hanger, pair of Nordic Pine handles, and Abachi wood sauna sign with a green border.

Bathrooms

According to the American Water Works Association, 60 percent of total water use in the home is attributed to indoor plumbing fixtures such as toilets, showerheads, and faucets. Water conservation is one of the critical issues facing our world today, and a home should be designed and built to conserve this precious resource.

Throughout the home, the bathrooms will use water-conserving products and techniques and feature low-consumption, water-efficient Kohler plumbing fixtures and faucets that don't sacrifice quality, style, or performance. Kohler, a global leader in kitchen and bath design and technology, is a member of the Alliance for Sustainable Built Environments. All of the Kohler water-conserving products selected for the Optimum Performance Home will provide water efficiencies, including pressure-assist toilets, faucet aerators for various flows down to 0.5 gallons per minute (gpm), and low-flow showerheads.

The toilet, which accounts for 26 percent of indoor water use according to the American Waste Water Association (AWWA), represents one of the best opportunities to save water by installing newer models that use less than the industry 1.6 gallons per flush (gpf) standard. Kohler toilets with Pressure Lite® technology save 2,000 to 5,000 gallons of water per year by a typical family of four, as compared to a traditional 1.6 gpf toilet. Pressure Lite toilets raise the bar for exceptional bulk flushing

performance and quiet performance. Pressure Assist technology uses compressed air within a large 10- x 12-inch surface reservoir to propel water to the rim and siphon jet for robust flushing power.

Because of the paramount role the shower plays in family lives, consumers are leery of low-flow showering products. In the past, most consumers equated low-flow showerheads to mean less water coverage and less water pressure, making it difficult to completely rinse shampoo suds from one's hair. Kohler puts these false assumptions to rest by offering a low-flow showerhead and handshower that provides opportunities to conserve water without compromising performance. The Kohler MasterShower® Ecoefficient™ showerhead and handshower with 2.0 gpm sprayheads reduce water flow by up to 20 percent over traditional 2.5 gpm sprayheads.

Low-flow aerators will be installed on faucets throughout the home. Kohler low-flow aerators feature a 1.5 gpm flow rate, which represents a 30 percent reduction over 2.2 gpm models.

As part of a larger program to offer beautiful universal design products that respond to the growing needs of an aging population, Kohler offers a series of compliant ADA and ANSI standards grab bars that provide both a sense of security and a sense of style. Kohler grab bars are ideal for homeowners wanting to add an extra degree of safety in bathrooms, not just the elderly or those with physical limitations. They are there to offer security when climbing into a bathtub or shower and will keep the bather steady while he or she uses a hand-held shower or reaches for the shampoo. They provide aid when getting on and off the toilet and can prevent one from slipping on wet tile floors. In addition, for those users who do need a little extra assistance and support, grab bars can help them maintain a valuable measure of independence. For the millions of people who want to avoid accidents in their bathrooms, grab bars are a simple, easy way to provide a level of comfort and confidence. Grab bars are integrated into the design of all of the Optimum Performance Home's bathrooms, the outdoor shower, and sauna.

Master Bathroom Suite

The Optimum Performance Home's master bathroom suite will feature a universal design wet room with integrated walk-in/roll-in shower and massage bath, as well as a Comfort Height™

Kohler® Escale™ Bathroom Suite



- The Kohler® Escale™ Suite 48-inch vanity with cutout in Engineered Wenge (K-18598-F29) and Escale vanity top/basin in white (K-19034-1-0) with Escale mirrors in Engineered Wenge (K-18595-F29) will be the centerpiece of this bathroom. A Kohler Symbol™ single-control faucet in polished chrome (K-19480-4-CP) will complement the organic design elements of this beautiful and aesthetic suite of bathroom fixtures. Also featured is an Escale makeup vanity (K-18597-F29) and a bench in Engineered Wenge (K-18596-F29).



Kohler® Highline™ Pressure Lite™ Toilet

- The Kohler® Highline™ Pressure Lite™ (K-3519-T) 1.1 gpf two-piece toilet features an elongated bowl with a generous water surface and a Comfort Height™ design providing standard, chair-height seating, which complies with ADA height requirements.



Kohler® C3™-200 Bidet Toilet Seat

- A Kohler® elongated toilet seat with bidet functionality and in-line heater (K-4709 C3™-200) will be fitted to the Highline™ Pressure Lite™ toilet (K-3519-T). C3 toilet seats use the naturally soothing quality of water as a refreshing, hygienic alternative to toilet tissue, and offer cleanliness, comfort, and convenience for all users.



Runtal Fain Towel Warmer Radiator

- On the wall opposite the Kohler® Highline™ Pressure Lite™ toilet (K-3519-T) will be a wall-mounted solid stainless steel hydronic Runtal Fain Towel Warmer Radiator with thermostatic sensor to automatically maintain temperature.



Kohler® Escale® BubbleMassage Bath

- The bath featured in the master bedroom suite will be a Kohler® Escale® BubbleMassage™ bath with chromatherapy (K-11343-GCR).

Kohler® Symbol® Bath Filler & Shower Assemblies



- A Kohler® Symbol® Roman bath filler, handshower, and rise tubes in polished chrome (K-18486-4 CP/K-18492-CP) will complement the Yubone soak tub.
- The shower installation will feature two Kohler® Symbol® Rite-Temp™ valve trims (K-T18489-4 CP/K-306-KS-NA) and two

Symbol 5-1/2-inch diameter single-function showerheads (K-18493-CP), plus an overhead, oversized Vivacia Rain showerhead (K-10121-CP/K-7396-CP) will be fitted to the shower ceiling.

Kohler toilet and vanity. The Kohler bath and powder room fixtures and faucets are more than simply functional necessities—they are fundamental components of the overall aesthetic of any well-designed environment.

The Kohler Escale™ Suite 48-inch vanity with cutout in Engineered Wenge (K-18598-F29), and Escale vanity top/basin in white (K-19034-1-0) with Escale mirror in Engineered Wenge (K-18595-F29) will be the centerpiece of this bathroom. A Kohler Symbol™ single-control faucet in polished chrome (K-19480-4-CP) will complement the organic design elements of this beautiful and aesthetic suite of bathroom fixtures. Also featured is an Escale makeup vanity (K-18597-F29) and a bench in Engineered Wenge (K-18596-F29).

A Kohler Highline™ Pressure Lite™ (K-3519-T) 1.1 gpf two-piece toilet is specified for this bathroom. The toilet features an elongated bowl with a generous water surface and a Comfort Height design providing standard, chair-height seating, which complies with ADA height requirements. This toilet delivers the full benefits of water conservation, qualifies for water rebate programs, and contributes to LEED credits. An optimized 1.1-gallon flush setting reduces water consumption by more than 30 percent over 1.6-gallon toilets, offering a water savings of more than 5,000 gallons of water per year. The pressure-assist flushing system is engineered for exceptional single-flush bulk flushing and quiet flushing.

A Kohler elongated toilet seat with bidet functionality and in-line heater (K-4709 C3™-200) will be fitted to the Highline Pressure Lite toilet (K-3519-T). C3 toilet seats use the naturally soothing quality of water as a refreshing, hygienic alternative to toilet tissue, and offer cleanliness, comfort, and convenience for all users. The seat features two separate water nozzles for the anterior and posterior that spray the user with warm aerated water. A user sensor ensures someone is sitting on the seat before the functions are activated. The seat is heated with three different temperature settings provided by an in-line water heater. Warm air is controlled with three temperature and fan speed settings. The toilet seat features Quiet-Close Quick-Release, and a remote control provides user-friendly function controls with user presets, which store to memory the control settings for two users. A lighted bowl eliminates the need to turn on a light at night. An energy-save mode reduces energy consumption when the seat is not in use.

On the wall opposite the Kohler Highline Pressure Lite toilet (K-3519-T) will be a wall-mounted solid stainless steel hydronic Runtal Fain Towel Warmer Radiator with thermostatic sensor to automatically maintain temperature. The Omnipanel Programmable Controller regulates temperature of a branch of the home's closed-loop forced-hot-water Uponor radiant heating system. The Runtal towel radiator will help reduce mold and mildew and keep towels fresh between laundering.

The bath featured in the master bedroom suite will be Kohler's Escale BubbleMassage™ bath with chromatherapy (K-11343-GCR). A variable-speed motor with an integral heater delivers a range of water treatments, from light bubbling to revitalizing massage, while 122 innovative air jets are precisely positioned to completely embrace the bather with bubbling water. Zones of control at both ends and the mid-section of the bath allow complete control of the massage location, and chromatherapy lighting relaxes mind and body with a full spectrum of color that washes over the bather. When the bath is drained, sensors activate an automatic cycle to purge any residual water from the air channels; for added convenience, a manual purge cycle can be activated with the touch of a button. A remote control allows the bather to control features or adjust massage levels without changing position. The acrylic-formed Escale will be built-in so that the tub's ledge is at a seating comfort height to make it easier to slide over and enter the tub. A collapsible seat will abut the tub's ledge to facilitate this universal design feature.

A Kohler Symbol Roman bath filler, handshower, and rise tubes in polished chrome (K-18486-4 CP/K-18492-CP) will complement the BubbleMassage bath.

The shower installation will feature two Kohler Symbol Rite-Temp™ valve trims (K-T18489-4 CP/K-306-KS-NA) and two Symbol 5-1/2-inch diameter single-function showerheads K-18493-CP). An overhead, oversized Vivacia Rain showerhead (K-10121-CP/K-7396-CP), with contemporary design in polished chrome, will be fitted to the shower ceiling. The MasterClean™ 2.5-gallons-per-minute flow rate sprayface resists mineral buildup and ensures reliable long-term performance. A K-306-KS-NA Rite-Temp valve trim in polished chrome (K-306-KS-NA) will control the Rain showerhead. A Kohler Symbol coordinated handshower (K-18495-CP) features a MasterShower® 72-inch metal shower hose (K-8593), a Stillness® wall-mount supply elbow (K-976), and a Stillness adjustable wall-mount bracket (K-975). The ergonomic spray head pivots for targeted hydromassage or for rinsing the shower enclosure. A four-function spray engine delivers wide coverage, a water-saving eco spray, and a soft aerated and vigorous massage.

A ThermaSol® FFM Venus oval in-shower fog-free mirror will be installed in the shower.

The Master Bathroom Suite will be complemented with Kohler Purist® minimal design accessories including 30-inch towel bar (K-14437), towel ring (K-14441-CP), glass shelf (K-14440-CP), toilet tissue holder (K-14444-CP), soap dish (K-14445-CP), tumbler and holder (K-14447-CP), and two robe hooks (K-14443-CP).

The shower room wall surface will showcase a dimensionally

functional UltraGlas architectural embossed decorative glass interior and will be highlighted with Moving Color Northern Lights 4 x 4 glass tiles. The UltraGlas CobbleStone ArchiTexture™ and Moving Color combination will be striking.

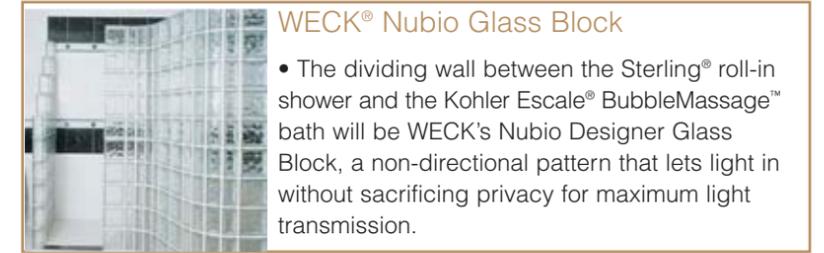
The dividing wall between the roll-in shower and the Kohler Escale BubbleMassage bath will be composed of a combination of UltraGlas CobbleStone ArchiTexture and WECK® Nubio glass block patterns. In such a translucent application, UltraGlas ArchiTexture provides diffusion, thus creating privacy, but without sacrificing the feeling of spaciousness, because it retains great light transmission. The distinctive, tactile, three-dimensional qualities of UltraGlas provide a truly unique lens through which natural and artificial light comes to life and transforms environmental ambiance like never before.

WECK defines world standards for crisp, hard, real glass block with the depths, shapes, patterns, colors, and highlights that distinguish it from all others. Elegant Eurocolors provide colorful accents to soften light and transform room atmosphere as sunlight shifts through the day. The Nubio WECKEnd and DoubleEnd Designer Shape patterns are a non-directional pattern that lets light in without sacrificing privacy for maximum light transmission. Palm Desert, California-based Glass Block Products, Inc. will implement the design. Glass Block Products offer the ultimate in design flexibility, durability, and perfected performance.

The dividing wall between the Kohler Escale vanity and the Kohler Highline Pressure Lite toilet will be composed of UltraGlas CobbleStone ArchiTexture to allow filtered light from the VELUX skylight to penetrate the vanity area.

Guest Vestibule Vanity Bathroom

The guest vanity bathroom in the glass-covered Lindal-designed vestibule and walkway (see Issue 8, March/April 2007) will feature a one-piece Sterling/Kohler OC-S-63 Series 6206 (62060103) roll-in shower module in lightly textured swirl-gloss white. Made from solid Vikrell® material for strength, durability, and lasting beauty, the module is designed with a low-profile threshold for easy wheelchair access. The ADA-compliant roll-in shower meets the home's universal design and adaptability design requirements. Included are integrated structurally reinforced, factory-installed stainless steel grab bars, fold-down seat, and lightly



WECK® Nubio Glass Block

- The dividing wall between the Sterling® roll-in shower and the Kohler Escale® BubbleMassage™ bath will be WECK's Nubio Designer Glass Block, a non-directional pattern that lets light in without sacrificing privacy for maximum light transmission.

pebbled, slip-resistant bottom for better traction and secure footing. A Sterling custom silver frameless shower door with two outward-opening doors in Pebbled textured glass will be fitted to the shower module.

The shower assembly will be the Kohler Fairfax® Essentials Performance Showering Package in polished chrome (K-10826-4). The package includes a Rite-Temp® pressure-balancing valve (K-304-K) to prevent scalding and freezing for a safe, comfortable water supply; Revival® three-way relaxing handshower (K-16162); MasterShower® showerarm and diverter (K-9511); MasterShower 60-inch metal shower hose (K-9514); Fairfax Rite-Temp pressure-balancing valve trim with ergonomic lever handle and single-control operation (K-T12021-4); Fairfax multifunction showerhead (K-12009); 30-inch slide bar (K-8524); and Forté®/Bancroft™ slide bar trim kit (K-349).

The toilet fixtures will be a Kohler Wellworth® Pressure Lite elongated 1.1 gpf toilet (K-3531) and Kohler elongated toilet seat with bidet functionality and tank heater K-4711 C3-100, in white. The two-piece elongated toilet is specifically engineered to deliver one-flush, no-plug performance. The C3-100 features bidet functionality and tank heater with side arm control to provide user-friendly function controls.

As with the Highline toilet, the Wellworth incorporates the latest in pressure vessel technology. Water consumption is reduced by more than 30 percent over 1.6-gallon toilets with the optimized 1.1-gallon flush setting, offering a water savings of more than 5,000 gallons of water per year. The pressure-assist flushing system is engineered for exceptional single-flush bulk flushing and quiet flushing.

The Wellworth Comfort Height 1.1 gpf toilet offers the same amenities as other select Kohler toilets, such as comfortable, chair-height seating for people of all ages and stature.

A coordinated white Wellworth Pedestal Lavatory (K-2293) and Fairfax single-control lavatory faucet in polished chrome (K-12183-CP) will complement the Wellworth toilet. Other accessories in the Fairfax style are the 30-inch towel rack (K-12152-CP), small towel bar (K-12155-CP), towel ring (K-12165-CW), glass shelf (K-12158-CP), toilet tissue holder (K-12157-CW), soap dish (K-12162-CP), tumbler and holder (K-12161-CP), and double robe hook (C-12153-CW)—all in polished chrome.

Guest Bedroom Bathroom

The second-story guest bedroom bathroom fixtures are all Kohler/ Sterling. A universal design Sterling Accord™ barrier-free whirlpool bath with 15-inch apron (76141110-LH) and an Accord shower module in white solid Vikrell® material with integral Kohler showerhead (71144113) and Kohler diverter bath spout (K-389-CP) will be featured. The Accord whirlpool bath and shower module features stainless steel grab

bars and a slip-resistant floor, making it ADA-compliant for bathing and showering ease. Also included are integrated and recessed corner shelves for generous storage space. The Accord is crafted of Vikrell for strength, durability, and lasting beauty. The high-gloss glazed tile design realistically simulates the texture and grain appearance of authentic grout lines and provides a smooth, shiny surface that is easy to clean.

The Kohler whirlpool technology creates a sensory sanctuary in which to relax, rejuvenate, and renew. A 1.5-horsepower, variable-speed pump with 18 settings powers the Flexjet™ six-jet whirlpool (K-9696) to provide an individually adjustable hydro-massage to relieve aching muscles. The Flexjet features a lighted keypad and remote control (K-1703). An in-line, 1.5-kW heater keeps the water at the desired temperature.

The bath assembly will include a polished chrome Kohler Devonshire® Rite-Temp® pressure-balancing valve trim with matching lever handle (K-T8228-4). The integral HiFlow Rite-Temp pressure-balancing valve (K-306-KS) works behind the scenes to prevent scalding and freezing for a safe, comfortable water supply. A high-temperature limit stop allows a comfortable maximum temperature to be preset to eliminate scalding.

The shower assembly will feature the Devonshire Essentials Performance Showering Package (K-10825-4) consisting of a showerarm and flange (K-7395), MasterShower 60-inch metal shower hose (K-9514), Devonshire Rite-Temp pressure-balancing valve trim (K-T397-4-CP/K-304-K-NA), Bancroft™ K-10591 multifunction showerhead with an array of water coverages and intensities, Devonshire transfer valve trim (K-T376-4), 30-inch basic slide bar (K-8524), Forté®/Bancroft slide bar trim kit (K-349), Bancroft handshower (K-10597), and Bancroft supply elbow (K-10574).

A Devonshire Comfort Height white elongated 1.28 gpf High-Efficiency Toilet (HET) with Class Five™ EST EcoSmart™ flushing technology (K-3503) will be featured. This toilet is engineered to provide an extraordinary combination of water conservation and flushing performance. The flapperless tower design provides reliable performance with no tank run-ons and an industry-leading 3-1/4-inch flush valve and efficient, direct-fed jet maximizes water flow for extraordinary bulk flushing performance. The 1.28-gallon flush setting saves 2,000 to 3,200 gallons of water per year. A Toilet Seat with bidet functionality

Sterling®/Kohler® OC-S-63 Series Roll-In Shower Module



- Made from solid Vikrell material for strength, durability, and lasting beauty, the Sterling® module is designed with a low-profile threshold for easy wheelchair access. The ADA-compliant roll-in shower meets the home's universal design and adaptability design requirements.



Kohler® Fairfax® Essentials Performance Showering Package

- The guest vanity shower assembly will be the Kohler® Fairfax® Essentials Performance Showering Package (K-10826-4).



Kohler® Wellworth® Pressure Lite & C3™-100 Bidet Toilet Seat

- The toilet fixtures in the guest vanity bathroom will be a Kohler Wellworth® Pressure Lite™ Comfort Height™ elongated 1.1 gpf toilet (K-35310) with elongated toilet seat with bidet functionality and tank heater in white (K-4711 C3-100).

Kohler® Wellworth® Pedestal Lavatory & Fairfax® Faucet



- A coordinated white Kohler® Wellworth® Pedestal Lavatory (K-2293) and Fairfax® single-control lavatory faucet (K-12183-CP) will complement the Wellworth toilet.

and tank heater with side-arm user-friendly function controls (C3-100 K-4711-0) is specified.

A 24-inch Devonshire pedestal (K-2288) and 27-inch pedestal lavatory in white Vitreous china (K-2294-4) also will be featured. The lavatory will be fitted with a Devonshire ADA-compliant widespread lavatory faucet with lever handles and pop-up drain in polished chrome (K-394-4).

Accessories in the Devonshire style will include the 30-inch towel rack (K-10552-CP), K-10553-CP 26-inch double towel bar (K-10553-CP), towel ring (K-10557-CP), K-10563-CP glass shelf (K-10563-CP), toilet tissue holder (K-10554-CW), soap dish (K-10560-CP), tumbler and holder (K-10561-CP), robe hook (K-10555-CP), double light sconce (K-10571-CP)—all in polished chrome, and a Devonshire mirrored cabinet (CLW2030DAW).

Fireplaces

RSF Wood-Burning Fireplace

The wood firebox featured in the all-slate designed fireplace located in the living room of the Optimum Performance Home is the Delta

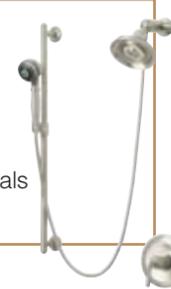
Sterling® Accord™ Barrier-Free Bathing Module



- A universal design Sterling® Accord™ barrier-free whirlpool and bath module in white with integral Kohler showerhead (76141110-LH) and diverter bath spout (K-389-CP) will be featured in the guest bathroom.

Kohler® Devonshire® Essentials Performance Showering Package

- The guest bathroom bath assembly will include a Kohler® Devonshire® Rite-Temp® pressure-balancing valve trim with lever handle and a shower assembly (K-T8228-4) consisting of the Kohler Devonshire Essentials Performance Showering Package (K-10825-4).



Kohler® Devonshire® Class Five™ EcoSmart™ Toilet

- A Devonshire® Comfort Height™ white elongated 1.28 gpf toilet with Class Five™ EcoSmart™ flushing technology (K-3503) will be featured in the guest bedroom bathroom.



Kohler® Devonshire® Pedestal & Centerset Faucet

- A Devonshire® pedestal (K-2288) and 27-inch pedestal lavatory in white (K-2294-4) also will be featured. The lavatory will be fitted with a Devonshire wide spread lavatory faucet with lever handles (K-393-4).



fireplace by RSF Wood-Burning Fireplaces. The Delta has a huge firebox, gently curving panoramic glass doors, and beautifully sculpted firebricks. It utilizes RSF's patented and exceptionally clean burn technology. Not only is it efficient but it is also capable of heating large areas, as is the case with the open-plan design of the home's main residence. The Delta's huge bay window will offer an unequalled view of a fire from three directions—the living room/kitchen, window seats, and dining room.

Dimplex® Electric Fireplaces

Dimplex® electric fireplaces will be featured in the master bedroom suite, the guest bedrooms, library/home theatre/surround music room, and the home office. These patented electric fireplaces feature the ultra-realistic OptiFlame® effect. The hand-finished log set and detailed ember bed contribute to the realistic appearance. The OptiFlame fireplaces are energy-efficient and operate for pennies per hour. Unlike some fireplaces, they need no standing pilot and contribute no particulates or emissions, such as carbon monoxide, to inside or outside air. They reduce environmental impact by consuming no wood or fossil fuels and provide thermal comfort through efficient zone heating.

The Dimplex built-in firebox featuring the Purifire™ Air Treatment System (BF33DXP) will be used throughout. Purifire is a breakthrough air treatment system that purifies indoor air 24/7. This is the world's first integral air filtering electric fireplace. The high-efficiency washable allergen reduction filter operates with the heater or may be run with the air-circulating fan only to provide continuous, quiet cleaning. Based on a 12- x 14-foot room, the BF33 will circulate and clean the air four times per hour.

Courtyard Fireplace

A Firebird outdoor barbecue grill and fireplace, created by award-winning Danish architectural designer Bent Falk, will be featured in the courtyard. The Firebird by Rais & Wittus is made of durable Cor-Ten steel, which permanently oxidizes to form a rich reddish brown coating. Built to be maintenance-free and to last a lifetime, the Firebird will be used as an outdoor fireplace and barbecue grill, and enjoyed as outdoor sculpture. The grill has adjustable grill racks that are made of heavy, solid stainless steel 5mm rods. The innovative design features stay-cool handles, a built-in warming and frying surface in back where one can simmer sauces or sauté vegetables, and a neat way to store the grill rack when not in use. The chimney creates a strong draft for faster-built fires and then "funnels" the smoke up and away from the chef—and nearby guests.

Master Bedroom Suite Bath Fireplace

On the wall facing the Kohler BubbleMassage bath will be a built-in Lopi black 21 DV Wilmington direct vent propane fireplace. This black, painted, coated, propane portrait-style fireplace by Travis Industries House of Fire is only 12 inches deep. It features a built-in convection fan, 82 percent overall efficiency, and 650-square-foot heating capacity. The soothing Aromatherapy option is specified.

Bedroom Closets And Pantry

The closets in the Optimum Performance Home will feature fine, handcrafted ventilated hardwood shelving and cabinetry by Cope Closet Concepts. The company crafts closet systems that have the warm richness and luxurious grain of 100 percent hardwood shelving, while providing efficient space organization. The tower units feature adjustable open storage and flexible storage options.

The Cope Closet Concepts ventilated shelving system will also be featured in the kitchen pantry.

Reversica Concealment Fixtures

Reversica concealment fixtures will be installed in the home office, wine cellar, and master bedroom suite. Reversica hardware combined with a flat panel video display cabinet and bed frame design doubles the function of a bookshelf or bookcase. In addition, it can actually double the function of an entire room. Reversica provides plans to build integrated bookshelves with a flat panel widescreen display and bookcases with a wall bed. The entire assembly's motion is as easy as opening a door.

The Reversica Gyre™ 6300 hardware is designed for bookshelf/video display wall units and can hold up to 375 pounds. The bookcase swings forward and around, twisting 180 degrees in a slim 18-inch depth and back to its original resting place—only reversed. The 50-inch video display screen replaces the bookshelf with 12 linear feet of shelf space.

The Gyre Hyde & Sleep™ is designed for bookcase/wall bed installations and can hold up to 1,000 pounds, requiring a minimum wall depth of 22 inches with 30 inches optimum. In the case of the bookcase/wall bed, the queen wall bed replaces the 87-inch high bookcase.

The Gyre 6300 will be integrated into a custom cabinet and installed on the wall of the wine cellar and master bedroom suite. The Gyre Hyde & Sleep will be installed in the wall next to the home office nook, and provide bookcase space and a wall bed for the occasional need. No other solution provides such flexibility to use space better.

Clarus Crystal Architectural Address Marker

At the vestibule entrance to the Optimum Performance Home, there will be a lighted crystal address marker handmade by highly skilled artisans at Clarus Crystal. This elegant address sign is made from the finest materials, such as optic crystal, mahogany, and advanced lighting products. This unique etched crystal sign is Edge Lit with 12-Volt DC LEDs (Light Emitting Diodes) and enclosed in mahogany brackets. These crystal address signs are surprisingly durable and all-lighting circuitry is completely weatherproof.



RSF Wood-Burning Fireplaces' Delta

- The Delta fireplace by RSF Wood-Burning Fireplaces is featured in the living room. The Delta has a huge firebox, gently curving panoramic glass doors, and beautifully sculpted firebricks.



Dimplex® Electric Fireplaces

- Dimplex® electric fireplaces will be featured in the master bedroom suite, the guest bedrooms, and the home office. These extraordinary electric fireplaces feature the revolutionary and patented OptiFlame® image. The Dimplex built-in Purifire™ Firebox BF39 will

be used throughout. Purifire is an air treatment system that purifies indoor air 24/7.



Rais & Wittus Firebird Outdoor Fireplace/Grille

- The Firebird by Rais & Wittus is made of durable Cor-Ten steel, which permanently oxidizes to form a rich reddish brown coating. Built to be maintenance-free and to last a lifetime, the Firebird will be used as an outdoor fireplace, and barbecue grill, and enjoyed as outdoor sculpture.



Lopi® Wilmington Fireplace

- A Travis Industries' built-in Lopi black 21 DV Wilmington direct vent propane fireplace will be featured in the master bedroom suite bath.



Cope Closet Concepts

- Closets will feature fine, hand-crafted ventilated hardwood shelving and cabinetry by Cope Closet Concepts. The company crafts closet systems that have the warm richness and luxurious grain of 100 percent hardwood shelving, while providing efficient space organization.

NuTone Video Door Answering System

A NuTone video door-answering system will be installed in the Optimum Performance Home. The system will make it possible to see and communicate with visitors before anyone in the household opens the door. The VSM4RK/VSM4SK built-in monitor station will be located in the main residence kitchen. This compact station features a four-inch color LCD monitor, hands-free door communications, and a three-note door chime. The VSC4R recess-mount camera features a sleek design in a rich brushed metal finish. Additionally, a VSA4S wall-mount handset will be located in the home office and allow communication between the monitor station, handset, and one door camera.

Reversica Concealment Fixtures

- Reversica concealment fixtures will be installed in the home office, wine cellar, and master bedroom suite. Reversica hardware combined with a flat panel video display cabinet and bed frame design doubles the function of a bookshelf or bookcase.



Clarus Crystal Architectural Address Marker

- A Clarus Crystal architectural address marker will be in position at the home's entry. The Mahogany bracket will be stained to match the home exterior siding stain. The address marker will feature Starfire Crystal and LED backlighting.



NuTone® Video Door Answering System

- A NuTone video door answering system will be installed in the Optimum Performance Home. The system will make it possible to see and communicate with visitors before anyone in the household opens the door.



Liberty Safe Personal Vault

- Liberty Safes provide outstanding fire and bank-like security protection for valuables and are built to be concealed and to store personal treasures and financial valuables.



Liberty Safes

Liberty Safes provide outstanding fire and bank-like protection for valuables and are built to be concealed and to store personal treasures and financial valuables. With a beautiful look and feel, they will complement the Optimum Performance Home décor. A Personal Vault Fire & Security safe is specified.

Liberty Safes offer warm contemporary colors, soft textures, and brass or brushed-chrome accents, and feature access through a UL Listed Type 1 electronic touch-pad lock. Liberty Safes have earned the Omega™ Point Laboratories fire-resistance Listing and are rated at 1,200 degrees Fahrenheit for 60 minutes. They also have earned the trusted Underwriter Laboratories Listing for Residential Security with a 12-gauge-thick carbon steel body, 3/16-inch-thick plate steel door, one-inch-diameter active-locking bolts on the door front, clutch-drive mechanism, and Fail-Safe™ rocker, protecting against torch, drill, and punch attacks.

Holzcraft® Custom Wood Doors

Holzcraft® custom stain-grade wood doors will be used throughout the Optimum Performance Home. Generations of ingenuity and superb wood crafting of the finest materials attribute to the unparalleled quality and performance found in every Holzcraft custom door and component. Meticulously handcrafted, their doors are created with select, premium grade hardwoods of rich, naturally maturing beauty and life-long durability.

Dowel-jointed stiles and rails feature beautiful think sawn lumber faces and solid wood edges, and are constructed with warp-resistant kiln-dried lumber cores to provide years of reliable function. Grain-matched center panels utilize a "floating" assembly to compensate for natural wood expansion and contraction due to atmospheric conditions.

The interior standard and sliding panel doors will be an arts and crafts style 2011-P in stained clear oak. These exquisite wood doors feature a square-stick sticking and flat panel profile of the prairie, craftsman, and bungalow schools.

The wood entry door to the main entrance to the residence off the vestibule, the home office, the entrance to the garage/laundry area, and the upstairs guest quarters will be an arts and crafts Style 2011-P wood door with clear glass insert. A 2011-P wood door is specified for the entrance to the guest vanity bathroom. The interior face of this door will be mirrored. A 2011-P without mirror also is specified as the door to the residential elevator off the glass-enclosed walkway and upstairs guest quarters.

Custom Holzcraft square-top two-sided mirror wood doors will be used for the closets in the master bedroom suite (four-leaf bifold) and guest bedrooms (two-leaf bifold), as well as the guest bathroom door.

The wine cellar exterior entry door will be Style 9200-P. This is a two-panel, flat-arch, flat-herringbone plank panel door with radius top and an integrated "speak easy" latch opening.

TruStile® Fire Rated Wood Doors

TruStile® stain-grade fire-rated wood doors will be used in three locations in the Optimum Performance Home. TruStile is a leading manufacturer of quality architectural doors in both medium-density fiberboard (MDF) and stain-grade wood.

Holzcraft® Custom Wood Doors

- Holzcraft® custom stain-grade wood doors will be used throughout the interior of the Optimum Performance Home and as the entry door to the wine cellar. Stile and rail construction methods produce crisp, clean lines that are architecturally correct.



Rocky Mountain Hardware

- Rocky Mountain Hardware is specified for all of the exterior Pella® Designer Series® doors, and specified for all interior Holzcraft® wood doors and the wine cellar door. Handcrafted for exceptional beauty and durability, each Rocky Mountain piece is cast in solid bronze and is available in a diverse palette of rich patina finishes.



Sentinel Security Cabinets

- A couple of in-wall Sentinel Security Cabinets by Tiffin Metal Products will be installed in the Optimum Performance Home Theatre rear-projection room to store computer discs.



StiraMatic Folding Stairs

- Custom-built 36-inch-wide interior frame StiraMatic wooden folding stairs will be fitted to the home office ceiling to provide access to the equipment and storage loft space.



Pearl® Protected Permanent Escape & Rescue Ladder

- A Pearl® Protected Permanent Escape And Rescue Ladder will be installed in each second-story guest bedroom and the library/home theatre/surround music room. Pearl provides the ultimate escape solution in the event of a fire or other home emergency.



Stile-and-rail construction methods produce crisp, clean lines that are architecturally correct. TruStile achieves perfectly square, 90-degree corners, and precision-engineered profiles.

TruStile wood doors are precision engineered and carefully sculpted from the highest furniture-grade, hand-selected wood. The TruStile warranty is lifetime. And the selected TruStile doors are fire-rated up to 90 minutes.

TruStile builds all of their wood doors with engineered stiles and rails that feature TruSpec™ from Huber Engineered Woods and extra-thick premium veneers and premium wood preservatives to ensure a quality finish. This exterior-grade material provides superior strength and dimensional stability, guaranteeing that it won't warp or twist. TruSpec is also environmentally friendly. It is made from fast-growing renewable woods that come from self-regenerating forests and plantation-grown trees.

The entrance door to the garage/laundry area will be a 90-minute fire-rated PL2030. The same PL2030 is specified as the door to the residential elevator off the glass-enclosed walkway and upstairs guest quarters. TruStile's positive pressure doors are manufactured with patented FireWedge®, an intrumescent strip which expands and provides a smoke seal when heated.

Rocky Mountain Hardware

As noted in Issue 08, March/April 2007, Rocky Mountain Hardware is specified for all of the exterior Pella® Designer Series® doors, and for all interior TruStile wood doors and wine cellar door. Handcrafted for exceptional beauty and durability, each Rocky Mountain piece is cast in solid bronze and is available in a diverse palette of rich patina finishes applied by hand—without using powder coatings, paints, or lacquers. The finish will be silicon bronze medium patina.

The selection of hardware supports the universal design standards for the home.

Interior pocket doors will be fitted with the 10-inch "D" grip handle (G619) and Edge Pull (EP100). Interior doors will be fitted with Stepped Escutcheon passage function (E308) with Rock Creek lever (L121). The pantry and closet doors will be fitted with the Rectangular Escutcheon passage function (E414) and Mushroom Knob (K201). Door hinges will be in the Butt Hinge style (HNG4).

The Pella entry doors will be equipped with a Rocky Mountain 30-inch CB Cane Bolt. A Door Knocker (DK7) will be fitted to the TruStile Tuscan wine cellar entry door to complement the Curved Thumb Latch Keyed Escutcheon Set (G501/G502).

The interior Carriage House Door custom sliding barn doors will be fitted with Rocky Mountain "D" grip handles (G617). The exterior barn door will be fitted with an Rectangular Entry Escutcheon Set (E423) with the Rock Creek Lever (L121).

All hardware finishes will be in silicon bronze medium patina.

Sentinel Security Cabinets

A couple of in-wall Sentinel Security Cabinets (501W-C19244) by Tiffin Metal Products will be installed in the Optimum Performance Home Theatre rear-projection room to store computer discs. These heavy-duty 16-gauge steel cabinets feature pick-resistant cylinder-keyed lock and proprietary keys.

Alaco Rolling Ladder

- The library will feature an Alaco Rolling Ladder to access the taller shelves of the built-in natural wood bookcases. Alaco natural wood Rolling Ladders are custom made to enhance the aesthetics of any room.



WeatherTRAK® Smart Irrigation Management System

- A HydroPoint WeatherTRAK® ETplus™ Smart Irrigation weather-based management system will be installed to deliver sustained savings and optimal plant health by eliminating over-watering and reducing runoff.



NuTone® Central Vacuum System

- A NuTone® central vacuum system will be featured in the home to help maintain healthy interior air quality. NuTone's central vacuum power units feature a space-saving sleek oval shape design, internal sound suppression system, and a status light on the hose handle and power unit, which indicates when the VX™ unit's bag or canister is full and needs emptying.



Stira Loft Ladder

Access will be provided from the home office to the equipment and storage loft located above the rear-projection room in the Optimum Performance Home. Custom-built extra 36-inch-wide interior frame StiraMatic wooden folding stairs will be fitted to the home office ceiling to provide access to the loft space. The self-contained heavy-duty StiraMatic is the strongest folding stairs available. It features a unique patented innerframe and patented wraparound hinge for unparalleled strength, and is spring-loaded so there are no locks or latches. The stairs are designed with deep steps and handrails. The StiraMatic features electronic remote control (or manual) up and down operation.

PEARL® Protected® Permanent Emergency Escape Ladder

A PEARL®—Permanent Escape And Rescue Ladder—will be installed in all second-story guest bedrooms and in the library/home theatre/surround music room. The PEARL ladder provides the ultimate escape solution in the event of a fire or other home emergency. The ladders will be installed in the interior wall space beneath upper-story windows. The design of the product features a paint-grade cabinet door that can be painted or wallpapered to blend seamlessly with each room's décor. PEARL ladders are lightweight and simple enough for a child to use. The ladders are ruggedly built using high-tech engineering and durable materials, including anti-slip rungs and standoffs, which can support up to 1,500 pounds. This ensures that the ladder is

strong enough to support multiple people descending the ladder and stable enough for children to use. In addition, PEARL can easily support a firefighter in full gear performing rescue operations. The PEARL ladder is unaffected by outdoor temperatures and can be deployed over multilevel rooflines.

Alaco Rolling Ladder

The library will feature an Alaco Rolling Ladder to access the taller shelves of the built-in natural wood book cases. Alaco Rolling Ladders are custom made to enhance the aesthetics of any room and are available in a wide variety of natural woods. To stow and provide a clean path when not in use, the ladder pivots up against the bookcase. These are the sturdiest, most stunning rolling ladders made.

WeatherTRAK® Smart Irrigation

A HydroPoint WeatherTRAK® ETplus™ Smart Irrigation weather-based management system will be installed to deliver sustained savings and optimal plant health by eliminating over-watering and reducing runoff. The WeatherTRAK Scheduling Engine™ automates accurate scientifically-based irrigation schedules according to landscape-specific parameters. The ET Everywhere™ service delivers local weather-based ET updates via a wireless communication network every day, automatically adjusting irrigation in accordance with changing weather. Data is collected from 14,000-plus weather stations across the U.S., including the National Oceanic and Atmospheric Administration (NOAA) network, state and county networks, and private weather stations. Proven scientific modeling techniques validate local weather down to one square kilometer before ET updates are transmitted to ET plus controllers. The end result is a system that enhances the environmental health of the landscape with managed conservation in mind.

NuTone® Central Vacuum System

According to the EPA, 50 percent of all illnesses are caused by or aggravated by unhealthy indoor air. The Optimum Performance Home will feature a NuTone® central vacuum system to help maintain

G Squared Art Ceiling Fan

• A G Squared Art San Francisco brushed steel and chrome architectural ceiling fan with bird's-eye maple blades and integral halogen light (F529-BS/CH) will be suspended from the center of the VELUX pyramid skylight in the library/home theatre/surround music room.



Leviton® Vizia-RF & Acenti™ Home Control System

• Leviton designs their products to be universal-design friendly and to make a home safer, more accessible, and more enjoyable for all users. Among the architectural grade products are scene-capable switches, dimmers, plug-in serial and appliance interface modules, scene-capable plug-in lamp dimming modules, four-scene controllers, four-zone controllers, IR and RF handheld remote controllers, and plug-in RS-232 interface modules for use with automation systems, and instant on motion activated light control modules.



Monster® IlluminEssence™ Lighting System Products

• Also featured is Monster's IlluminEssence™ Lighting System Products. The partnership between Leviton and Monster ensures the ultimate reliability in whole-home lighting systems, and makes it possible to intricately control lighting throughout the entire home.



Leviton® Structured Media™ Center

• A Leviton Structured Media™ Center also has been specified to serve as the home's command central for home media convergence. The center will bring every conceivable technology distribution point together in one place—home networking, fax, Internet (including high-speed services such as DSL, cable, and satellite modems and ISDN), multi-line telephones, security cameras, coaxial cable, and satellite video distribution.



healthy interior air quality. A central vacuum system has up to five times the power of uprights and the ability to remove 100 percent of contacted dirt and dust from the home. The system is also capable of removing dust mites, pollen, animal dander, and other allergens from the home, including protection against the formation and growth of mold, creating a healthier indoor environment.

NuTone's central vacuum power units feature a space-saving sleek oval design, internal sound suppression system for quiet operation, and a status light on the hose handle and power unit, which indicates when the VX™ unit's bag or canister is full and needs emptying.

The VX550C power unit was selected for its bagless cyclonic air filtration with HEPA® filter and Teflon® anti-stick technology. The dirt and dust are picked up by its powerful suction and completely removed

from the living space and vented to the outside. The central vacuum tank will be located in the garage, an unoccupied region of the home.

Two deluxe electric kit attachments (VXCK355) feature the convenience of maximum power without the need for an electrical plug. The electrified direct connect crushproof hose has selections for carpeting, hard floors, draperies, and furniture. The hose connects to the ElectraValve® electrified direct-connect inlets, which eliminates the need for the extension of electrical cords from the inlet to an electrical outlet. Other attachments include a hard surface floor tool and extra-wide hard surface tool, as well as several automatic VacPan™ dustpans in rooms and areas with hard surface floors.

An Ultra Deluxe Garage and Car Care Kit also is specified as part of the central vacuum system for the garage and workshop.

Noteworthy is that the NuTone Central Vacuum Power Units and Power Nozzles are Green Label approved by the Carpet and Rug Institute for superior soil removal, filtration, efficiency, and carpet wear.

G Squared Art Architectural Ceiling Fan

A G Squared Art San Francisco brushed steel and chrome architectural ceiling fan with bird's-eye maple blades and integral halogen light (F529-BS/CH) will be suspended from the center of the VELUX pyramid skylight. The San Francisco model features 56-inch diameter fan blades and wall-mount three-speed reversible plus infinite light dimmer touch-control operation. An RC210 remote control provides added control convenience. The San Francisco is a Good Design Award winner at the Chicago Athenaeum Museum of Architecture and Design and is featured in its permanent collection.

Leviton® Advanced Lighting Control And Structured Wiring Systems

Leviton® is a 100-year-old manufacturing company that has a reputation for dependability and innovation. Energy efficiency, California's title 24 compliancy, and user experience are all factors that go into many of the products they are incorporating in the Optimum Performance Home project. Leviton is the top brand in Structured Wiring System solutions and will provide a comprehensive infrastructure to manage the telephone, video, and networking solutions.

Leviton designs their products to be universal design friendly and to make a home safer, more accessible, and more enjoyable for all users.

The Vizia™ Collection

The Vizia™ collection is Leviton's most advanced statement in residential lighting and home control technology. This line of standard and wireless control products is designed to accommodate every type of lighting within the Optimum Performance Home. This collection of products will cover controls from a basic dimmer to operate a single lamp to creating an entire wireless home control system incorporating scenes, zones, and other advanced features.

Vizia

Vizia's striking good looks speak to the advanced technologies underneath the surface. An all-digital design, coupled with an elegantly simple user interface, results in an exceptionally intuitive, easy-to-operate control. Uncluttered and streamlined, Vizia complements a wide range of decorating styles, and delivers a performance and aesthetic return for a relatively small investment. Best of all, it is completely compatible with Decora® screwless and standard wall plates, as well as Leviton's line of Decora® wiring devices. The end result: a family of lighting controls that provides a touch of class as well as significant energy savings.

This exciting new family of lighting control products includes a complete selection of dimmers, matching and coordinating remotes, switches, and a fan speed control.

Vizia RF™

Vizia RF™ represents a major innovation lighting design, function, and energy savings. In addition to incorporating all the features of the standard Vizia line, Vizia RF goes beyond by introducing easy, wireless remote control of lighting, household appliances and electronics. Vizia RF will control individual zones and scenes of light within the home, delivering a powerful user experience by managing the lighting needs to support various tasks and complement changing moods-on-demand or on a schedule. Combining multiple areas of lighting into a single button will allow for quick and efficient energy control throughout the entire Optimum Performance Home and property.

Acenti

Beautifully integrating style and substance, the Acenti Collection has won prestigious design awards, including a 2005 Silver Level Industrial Design Excellence Award (IDEA) and a 2005 Good Design™ award. The luxurious feel and highly detailed sophistication of its design accentuates any decor.

Acenti's return-to-neutral device design provides the ultimate in visual and tactile appeal. Switches and lighting controls respond alike; their push pads remain permanently graded with no line breaks or irregular shadow patterns to ever detract from their pleasing, symmetrical appearance. Acenti's gentle glow of its soothing blue locator light helps guide residents to the dimmer or switch in the dark of night.

Acenti's exclusive and innovative Triplex Receptacle accommodates three NEMA grounding plugs and fits into a standard size wallbox, and the industry-leading Acenti Surge Protective Sixplex Receptacle provides surge protection for up to six NEMA grounding plugs and fits into a standard two-gang wallbox. This helps eliminate the need for power strips or adapters.

The Acenti Collection presents a notable complement of engineering-grade polymer screwless wall plates that put the finishing touch on every Acenti installation, as well as the industry's first completely screwless wall plates in brushed stainless steel, polished chrome, and 24k gold finishes.

The Decora® IPP15 Manual-ON Occupancy Sensor

The Decora® IPP15 Manual-ON Occupancy Sensor was developed to comply with California Title 24 Residential Lighting Specifications. The IPP15 has the added benefit that if you forget to turn the lights OFF, they will turn OFF automatically if motion is not detected within the coverage area (900 square feet) and within the set time-out limit. The IPP15 uses PIR or passive infrared technology to sense motion. This technology senses the difference between the body heat of someone in the controlled space and the background temperature levels. It monitors the controlled space through a segmented Fresnel lens, which helps achieve wide coverage. PIR type sensors are considered ideal for residential use.

The IPP15 is ideal for single-pole applications for controlling the light from one location, such as a laundry room. It also has true three-way and multi-location control capabilities, which are ideal for controlling lighting with two or more entrances, such as a Jack and Jill bathroom. It has a 15 Amp rating, screw terminals for fast, easy installation, an LED locator to make it easy to find in the dark, and four selectable time-out options: 30 seconds, 5, 15, or 30 minutes.

California Title 24

California Title 24 requires that new homes built beginning October 1, 2005, must be wired with high-efficacy lighting (fluorescent and compact fluorescent or high-intensity (HID) lamps). If no high-efficacy lighting has been installed, a Manual-ON/Automatic OFF occupancy sensor switch, or a dimmer switch must be installed to comply with the standard.

Total Protection Systems SPDs

- The Optimum Performance Home will incorporate at each electrical panel an electrical panel-mount surge protection device (SPD) rated for 100,000 amps of surge current. Each electrical panel-mount SDP will protect all modes: line to line; line to ground; line to neutral; neutral to ground.



Structured Wiring

Leviton brings the innovation and robust designs of their voice and data enterprise products into the home with their Leviton Structured Media™ system. This system provides the main infrastructure for telephone, data networking, CATV, and video distribution, and includes a video-monitoring system and an easy-to-use Intercom System, both of which provide an added degree of safety to the home.

There will be two 42-inch Structured Media Centers (SMCs) located in the Optimum Performance Home Theatre's rear-projection room, one for the coax cable needed for CATV and/or satellite TV distribution, and the other for the UTP Category 5e and Category 6 cabling for telephone, data networking, cameras, and Intercom connections. The lockable tinted acrylic doors will be finished in black. The second SMC will also include a Leviton Gigabit Gateway/Router and 10/100/1000 Ethernet switch to meet the high-speed demand of intra-home multi-player gaming. At the other end of most of these cable runs are Leviton wall plates with snap-in Cat 6 jacks for data as well as snap-in F-connectors, video RCA jacks, and telephone jacks.

The Leviton Indoor and Outdoor analog color cameras come assembled with integral balun, power regulation, and an IDC punch-down connection for terminating on a single Cat 5e cable. This cable provides both power to the camera and video signal to the SMC. One Outdoor will be located at the front entrance and one in the courtyard. An Indoor camera will be installed in the home office. A Camera Hub in the SMCs distributes the power and connects video to the IP/Quad module, which in turn offers quad camera views on either in-home TV

monitors or away from home via the Internet using a PC browser.

The Intercom System outdoor stations have a stylish brushed stainless look and also use one Cat 5e for connection to the SMC control module. When a visitor at the door pushes the station button, the control module rings all telephones with a distinctive ring. If the telephone is in use, the residents can put their party on hold while they talk with the person at the door.

Monster® IlluminEssence™ "One-Touch" Lighting System Products

To complement the Leviton lighting controls in the Optimum Performance Home selected Monster® IlluminEssence™ Lighting System Products will be employed. The partnership between Leviton and Monster ensures the ultimate reliability in whole-home lighting systems, and makes it possible to intricately control lighting throughout the entire home. The IlluminEssence and Viza RF lighting system is an RF Mesh Network, requiring no new wires, control boxes, RF repeaters, or computers to maintain, thereby eliminating any long-term maintenance requirements. Also featured will be Monster's dedicated table top lighting controller with an astronomical clock function, automated wireless timed lighting controller, and a keyless entry and lighting controller that bridges the garage door opener with the IlluminEssence Lighting System. A key fob pocket controller will add more convenience by placing control of lighting within arms reach at all times.

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Z-Wave® Technology

Both Leviton's Vizia-RF and Monster's IlluminEssence family of products incorporate Z-Wave® wireless RF-based home-control technology. This highly versatile and dependable technology is capable of controlling hundreds of devices while consuming very little power. Developed by Zensys™ and engineered to fit on a single advanced microchip, this technology effectively transforms any component—switches, lighting controls, thermostats, appliance and lamp modules, garage openers, and more—into an intelligent networked device that can be wirelessly controlled and monitored. The Z-Wave common protocol assures compatibility of Vizia-RF and IlluminEssence devices with all other Z-Wave-enabled home-automation products manufactured by over 100 leading companies.

Total Protection Solutions

Total Protection Solutions, LLC principals are the leading developers of surge-protection and power-filtering for aerospace, medical, and high-tech industrial applications. Recently, the company developed a residential program to fit the need of today's electronic home environment. These products incorporate the same power-conditioning and filtering technology used in their commercial and industrial products.

The Optimum Performance Home will incorporate a power-conditioning surge-protection device (SPD) rated for 100,000 amps of surge current at each electrical panel. This provides double the strength of most competitors' residential units. The TPS products carry an unlimited lifetime free replacement warranty, including destruction by lightning or any other voltage anomaly. Each electrical panel-mount SDP will protect all modes: line to line; line to ground; line to neutral; neutral to ground. Each SPD panel device has an enhanced

transient filter (ETF) that addresses dirty power bidirectionally by tracking the sine wave and diverting this energy to ground before it passes through to equipment fed from the breaker panels. This means it dramatically improves the electrical and electronic equipment's performance by cleaning the power from the utility company as well as filtering any switching transients caused by loads inside the home. The company's filtering system technology has proven to double the life of electronic equipment. A basic surge suppressor without this filtering can only address high-amplitude surges, such as lightning, that may never occur. Utility grid switching happens frequently and causes damaging transients. Internally generated transients and noise caused by equipment operating in the home happens thousands of times every day.

The other three components of the company's protection system include a four-line phone suppressor, a cable suppressor, and a satellite suppressor that will be mounted in the Leviton structured wiring cabinet. The four-line phone suppressor will protect phone systems, computer modems, security systems' dialers, and automation systems, and pass both analogue and digital signals up to T1/E1 speeds of 16 megabits per second (mb/sec). The cable device will protect from surge current energy up to 20,000 amps and passes signals bidirectionally. This means it will allow the pay-per-view signal generated inside the home to pass as well as the signal generated by the cable company. It will also handle cable high-definition and Internet signals without impeding or distorting the signal. The satellite cable suppressor is designed specifically for dish signal distribution. Both the telephone and cable/satellite devices are lifetime warranted for unlimited free replacement.

Next

The next series of articles will con-

tinue to focus on particular design elements and on each stage of construction, the design approach taken, and the technologies and building systems and materials used to create the first Optimum Performance Home. **UHD**

The Author

Gary Reber is the President of Ultimate Home Design, Inc. and the founding Editor-In-Chief and Publisher of *Ultimate Home Design*®, The Optimum Performance Design & Build Resource For Environmentally Enhanced Lifestyle Living™. He is also President of WSR Publishing, Inc., which publishes *Widescreen Review*®, The Essential Home Theatre Resource™. His diverse background in several fields includes an undergraduate, graduate, and postgraduate university education in architecture, community planning, and economic development planning. For years he was a consultant on community and economic development planning. For the past 15 years he has been an editor and publisher of magazines in the consumer electronics field. Gary can be reached at 951 676 4914 or gary@ultimatehomedesign.com.

Product Information

- ABBAKA, 1500 Burke Avenue, San Francisco, California 94124, 800 548 3932, www.abbaka.com
- ALACO Ladder Company, 5167 "G" Street, Chino, California 91710, 888 310 7040, www.alacoladder.com
- Alpha-Core, Inc., 915 Pembroke Street, Bridgeport, Connecticut 06608, 203 335 6805, www.alphacore.com
- Broan-NuTone, 926 West State Street, Hartford, Wisconsin 53027, 800 548 0790, www.nutone.com
- Carriage House Door, 1421 Richards Boulevard, Sacramento, California 95814, 916 375 0575, www.carriagedoor.com
- Clarus Crystal Architectural Embellishments, 13 Taft Court, Novato, California, 877 898 7676, www.claruscrytal.com
- Cope Closet Concepts, 1117 South Big A Road, Toccoa, Georgia 30577, 800 809 2423, www.copeclosetconcepts.com
- Cosentino North America/Silestone, 13124 Trinity Drive, Stafford, Texas 77477, 281 494 7277, www.cosentinousa.com
- Dimension One Spas, 2611 Business Park Drive, Vista, California 92081, 800 345 7727, www.d1spas.com
- Dimplex North America Ltd., 1367 Industrial Road, Cambridge, Ontario N1R 7GB Canada, 519 650 3630, www1.dimplex.com
- Eldorado Stone, 1370 Grand Avenue, B, San Marcos, California 92078, 800 925 1491, www.eldoradostone.com
- Evergreen Slate Company, Inc., 68 East Potter Avenue, Granville, New York 12832, 518 642 2530, www.evergreenslate.com
- Finnleo Sauna & Steam, 575 East Cokato Street, Cokato, Minnesota 55321, 800 346 6536, www.finnleo.com
- Franke Consumer Products, 3050 Campus Drive, Suite 500, Hatfield, Pennsylvania 19440, 800 626 5771, www.frankeconsumerproducts.com
- Gladiator Garage Works, 2000 M-63 North MD 3201, Benton Harbor, Michigan 49022, 866 342 4089, www.gladiatorgw.com
- Glass Block Products, Inc./WECK, 1357 South Lewis Road, Anaheim, California 92805, 800 930 8113, www.glassblockproducts.com

- G Squared Art, P.O. Box 2480, Avila Beach, California 93424, 877 858 5333, www.g2art.com
- Holzkraft Industries, LLC, 28206 Commercial Avenue, Barinton, Illinois 60010, 847 381 7670, www.holzkraft.com
- HydroPoint/WeatherTRAK, 1726 Corporate Circle, Petaluma, California 94954, 800 362 8774, www.hydropoint.com
- In-O-Vate Technologies, Inc./The DryerBox, 810 Saturn Street, Unit 21, Jupiter, Florida 33477, 561 743 8696, www.dryerbox.com
- Iron-A-Way, 220 West Jackson, Morton, Illinois 61550-1588, 309 266 7232, www.iron-away.com
- John Boos & Company, 315 South First Street, Effingham, Illinois 62401, 217 347 7701, www.johnboos.com
- Kähns, 940 Centre Circle, Suite 1000, Altamonte Springs, Florida 32714, 407 260 9910, www.kahrs.com
- Kohler Company, 444 Highland Drive, Kohler, Wisconsin 53044, 920 457 4441, www.kohler.com
- Lance Larkin Brew Express, 2700 NW Front Avenue, Portland, Oregon 97210 360 425 0336, www.lancelarkin.com
- Leviton, 2222-222nd Street SE, Bothell, Washington 98021, 800 877 0190, www.leviton.com
- Liberty Safe And Security Products, Inc., 1199 West Utah Avenue, Payson, Utah 84651, 800 247 5625, www.libertysafecom.com
- Lindal SunRooms/Cedar Homes, P.O. Box 24426, Seattle, Washington 98124, 206 725 0900, www.lindal.com
- Monster Cable, 455 Valley Drive, Brisbane, California 94005, 415 840 2000, www.monstercable.com
- Moving Color, 2351 Sunset Boulevard, Suite 170-425, Rocklin, California 95765, 916 337 6296, www.movingcolor.net
- Natural Cork, 150 Connector 3, Dalton, Georgia 30720, 800 250 6690, www.natural-cork.com
- Pella Corporation, 102 Main Street, Pella, Iowa 50219, 641 621 1000, www.pella.com
- Rais & Wittus, Inc./Fire By Design, 40 Westchester Avenue, P.O. Box 120, Pound Ridge, New York 10576, 914 764 5679, www.raiswittus.com
- Pearl Protected, 730 Peachtree Street, NE Suite 850, Atlanta, Georgia 30308, 800 374 5737, www.pearlprotected.com
- Reversica Design & Manufacturing, 207-B McPherson Street, Santa Cruz, California 95060, 888 887 6887, www.reversica.com
- Rocky Mountain Hardware, 1030 Airport Way, P.O. Box 4108, Hailey, Idaho 83333,

- 888 788 2013, www.rockymountainhardware.com
- RSF Fireplaces/Industrial Chimney Company, 400 J-F Kennedy, St. Jerome, Quebec J7Y 4B7 Canada, 450 565 6336, www.icc-rsf.com
- Runtal North America, Inc., 187 Neck Road, P.O. BOX 8278, Ward Hill, Massachusetts 01835, 800 526 2621, www.runtal-northamerica.com
- Stira Folding Attic Stairs Ltd., Baunogues, Dunmore, Galway, Ireland, 011 1850 639 639, www.stira.ie
- SunBriteTV/MPO, 5069 Maureen Lane, Moorpark, California 93021, 866 357 8688, www.sunbritev.com
- ThermaSOL, 2255 Union Place, Simi Valley, California 93065, 800 776 0711, www.thermasol.com
- Tiffin Metal Products/Sentinel Security Cabinets, 450 Wall Street, Tiffin, Ohio 44883, 800 537 0983, www.tiffinmetal.com
- Total Protection Solutions, 4366 LB McLeod Road, Orlando, Florida 32811-5619, 407 841 4405, www.surgepack.com
- Travis Industries House Of Fire, 4800 Harbour Pointe Boulevard, SW, Mukilteo, Washington 98275, 800 654 1177, www.travisproducts.com
- TruStile Doors LLC, 1780 East 66th Avenue, Denver, Colorado 80229, 888 286 3931, www.trustile.com
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Home Safe Home

May Is Electrical Safety Month: Make Sure Your Home Is Safe From Electrical Hazards

Pamela Winikoff

(Figure 1, center) 49563-FAN: A nightlight provides a reassuring beacon of light in dark areas of your home for just pennies a day.

When you stop to consider how safe you are in your home, certain things come to mind: your neighborhood, the chain link fence surrounding your property, your security system, and your home insurance policy. While all that might feel reassuring, invisible hazards may be hidden behind your walls and in the everyday appliances you use in your home that may threaten your safety and that of your loved ones.

According to the U.S. Consumer Product Safety Commission (CPSC), over 400 people are electrocuted in the United States every year. An additional 500 lives are claimed by electrically related fires, which also cause nearly 1.6 billion dollars in property damage. To keep yourself and your family safe from the potential dangers of electricity, you should conduct a professional electrical safety inspection of your home and its grounds every ten years. You should also perform an annual electrical safety inspection using a checklist of your home's key electrical components. With May as National Electrical Safety Month, now is as good a time as any to make sure your home is free from electrical hazards.

What You Don't Know About Electricity Can Shock You

Most of us assume that the circuit breakers in our home provide an electrical safety net, but this is not altogether true. In instances of a severe short circuit, the circuit breaker will trip to prevent dangerously high levels of electrical current in your home's wiring. Unfortunately, the current level needed to trip a breaker is much higher than the amount needed to deliver a powerful and possibly lethal electrical shock.

In the case of a ground fault condition, for example, you or a member of your family can be at risk from serious electrical shock, but the circuit breaker may not detect a high enough current level to cause it to trip. Fortunately, GFCIs are designed to offer specialized protection from the hazards of ground fault shock.

What's A Ground Fault?

A tool or appliance can become damaged through normal use in a way that allows electricity to "leak" out of it. Electricity will always take the lowest path of resistance to travel to ground.

Now considering that water is an excellent electrical conductor, should you touch this damaged device in any area where it's wet or damp, you can become the path through which electricity travels to ground. Ground faults can be lethal.

To protect your family, you should install GFCIs (ground fault circuit interrupters) in your kitchen, bathroom, garage, laundry room, workshop and outdoor areas such as a pool or hot tub. These inexpensive devices are designed to replace ordinary receptacles and must be installed in accordance with local codes and manufacturer's instructions.

What Does A GFCI Do?

When an appliance is plugged into a GFCI receptacle, the GFCI monitors current flowing through it. If everything is working



well, the amount of current flowing out through the hot conductor should equal the amount flowing back through the neutral conductor. If there is an imbalance, current leaking out of the appliance may cause a potentially hazardous ground fault condition. The GFCI will detect a relatively small level of leakage current and trip within a fraction of a second to shut off power at the receptacle. This significantly reduces the risk of electrical shock due to a ground fault.

Don't Take Your GFCIs Performance For Granted

GFCIs have had a significant impact on consumer safety since their introduction over 30 years ago. If they are damaged, however, they will no longer offer protections from ground faults. Voltage surges from lightning and other sources can damage GFCIs just as they would any other electronic device. That's why it's crucial to test GFCIs monthly to make sure they're working properly.

If you find that a GFCI has tripped off, perform a quick investigation. First, unplug any appliance because a ground fault in it may have caused the GFCI to trip. Next, engage the RESET button on the GFCI. If you cannot engage the RESET button or if the GFCI trips immediately after you reset, there is an electrical problem and you should consult a qualified electrical contractor. If the GFCI can be reset, do not assume that all is well. A standard GFCI will continue to deliver power even after ground fault protection has been lost. You may assume you're protected when you may not be. That's why you should always test a GFCI after it has tripped.

Newest Requirements Made GFCIs Even Safer

To make GFCIs less susceptible to damage, Underwriters Laboratories Inc. (UL) issued new requirements last year that manufacturers must meet in order to maintain their product's UL listing. To make sure you have the safest possible GFCIs installed in your home, consider having your electrician install these newer models with lockout features and an internal diagnostic that signals that the device no longer works as intended.

With a lockout feature you will not be able to engage the RESET button if the device becomes damaged and cannot respond to a ground fault. The new required built-in diagnostic features will also prevent your installer from miswiring the device during installation by alerting him to a line/load reversal. In older models, this type of miswiring condition would enable the device to carry electricity but not provide protection. In addition, these newest devices provide an end-of-life feature that prevents users from resetting the device when it

fails to pass its internal test function. These added safety features will give you the highest level of GFCI protection available.

Other Sources Of Potential Electrical Hazard In Your Home

Other areas of your home's electrical infrastructure that you may be taking for granted should be inspected regularly. These range from the adequacy of your home's electrical service, to the use of extension cords, and the proper rating of light bulbs.

Service Capacity

Electrical systems can become overloaded. As you continue to upgrade your home with more lighting, appliances and electronics, your home's electrical service capacity may become overburdened. If fuses blow or circuit breakers trip frequently, you may need to increase your home's electrical service and add new branch circuits. A qualified, licensed electrician can determine the appropriate service requirements for your home and provide you with an estimate to upgrade your home's service.

Electrical Outlets

Check all your home's outlets to determine that they grip plugs tightly. Loose fitting plugs can cause a shock or fire hazard. It's important that you replace all outlets that don't grip plugs tightly and securely. You should also replace

How To Test A GFCI

Testing is a simple process that takes less than a minute. Plug a nightlight, lamp or radio that you know is in working condition into the GFCI outlet. Turn on the lamp or radio. Push the TEST button on the GFCI. If the GFCI is working properly, it will trip and power to the nightlight, lamp or radio will be cut off. If power did not go off when you pushed the TEST button, there is a problem with the GFCI and protection is compromised. At this point, you should consult a licensed electrical contractor.

If the TEST button successfully trips the GFCI, now engage the RESET button. If the RESET is successful, your GFCI is in proper working condition. If the RESET is unsuccessful, there is a problem and you should consult a licensed electrical contractor.



(left) 89000: This spring-loaded wallplate, easy for adults to open but not so easy for kids, prevents curious fingers from coming in contact with electricity. (center) Acenti® Sixplex: This innovative receptacle from Leviton, ideal for kitchens and home offices, provides surge protection for up to six connected appliances. (right) SmartLockPro: GFCIs provide protection against ground fault shock hazard.

missing or broken wallplates on switches and outlets so wiring and electrical components are not exposed.

Appliance Plugs

When using a vacuum cleaner, coffee maker, rug shampooer or other home appliance, never force the plug on the appliance into an outlet or alter the plug in any way to make it fit into an outlet. Do not remove the ground pin (third prong) to make a three-prong plug fit a two-conductor outlet. It's especially important to avoid overloading your outlets with adapters and too many appliance plugs.

Striking A Harmonious Chord

Make sure your home is free from damaged, frayed or cracked appliance cords. Extension cords are designed for temporary use only and should never be nailed or stapled to walls, floors or other objects. Never run extension cords under rugs or furniture. They should always have safety closures to protect young children from shock hazards and mouth-burn injuries.

Light Bulbs

Check light bulbs in lamps and overhead fixtures to ensure that their wattage matches the lamp or fixture's requirements. Replace bulbs that have higher wattage ratings than recommended. Make sure they are screwed in securely so they don't overheat.

Circuit Breakers/Fuses

Fuses should be properly rated for the circuit they are protecting. If you don't know the correct rating, have an electrician identify and label the correct size to be used. Always replace a fuse with the same size you are removing. Check that circuit breakers are working properly.

Home Appliances And Electronics

If an appliance repeatedly blows a fuse, trips a circuit breaker or has given you an electrical shock, immediately unplug it and have it repaired or replaced. Look for cracks or damage in wiring, plugs and connectors.

Protecting Your Children

Bringing a baby home from the hospital is the perfect time to think about childproofing your house. Don't wait: before you know it, your child will be crawling around, exploring your home and investigating everything with insatiable curiosity.

To ensure your children are safe in your home, install tamper-proof outlets throughout your home. These devices feature an internal barrier that only allows insertion of a properly-rated plug, while keeping out small fingers and foreign objects. You can also add child-resistant wallplates. These fit over standard receptacles, and protect unused outlets with a spring-loaded wallplate that is easy for adults to open, but difficult for children to access. Plastic outlet caps are yet a third good option. Insert these into empty receptacles. They snap into each outlet to block toddlers' fingers from coming in contact with unused outlets.

Install switch locks that fit over most standard wall switches. They feature handy locking snaps to prevent children from turning lights or appliances on or off. Finally, nightlights provide a reassuring beacon of light in dark areas of your home. Perfect for the nursery, bathrooms, and bedrooms, they come in a wide variety of kid-friendly styles. Some models offer a convenient automatic On/Off feature that turns on at dusk, off at dawn. Another practical design fits over both outlets of a standard duplex receptacle, blocking the unused outlet from prying fingers while casting a warm glow at night. Night-lights are economical, costing just pennies a day to operate.

Protecting Your Furry Friends

While thinking of ways to make your home safer, don't forget about those other family members who bring us so much joy: the four-legged ones. Be sure to route electric cords away from where your pets can reach them. Puppies and kittens love to chew on things, including wires. They can easily

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gnaw through insulation and receive a painful shock or be electrocuted. Also, don't burn candles where you cat or dog can knock them over.



Make sure your pets are safe from dangerous electrical hazards both inside and outside your home.

Protecting Your Home's Expensive Electronics

Computers aren't the only expensive equipment in your home that can be damaged by voltage surges: Audio/video components, your new high-definition TV and many other electronic devices are also susceptible. Fortunately, a wide selection of surge protective plug-in devices and wired-in receptacles are available that help protect your valuable equipment from damage due to voltage surges on the power line.

Outdoor Electrical Safety

When you're outdoors, water and electricity can easily mix. The risk of electrical shock from frayed power cords or damaged equipment is much greater on wet or damp ground. Have GFCIs installed in place of outdoor receptacles. Swimming pool lighting and hot tubs should also have GFCI protected circuits. If you already have outdoor GFCIs installed, test them monthly as you do with your indoor GFCIs to ensure they're providing protection. The National Electrical Code requires "while-in-use" weatherproof receptacle covers where outdoor equipment is used. These covers completely enclose receptacles while plugs are inserted, keeping out rain and moisture. Both GFCIs and "while-in-use" weatherproof covers are available at hardware stores, home centers and a variety of retail outlets.

Edgers, mowers and weed trimmers feature heavily insulated cords with sturdy molded-on plugs, but indoor electrical devices (stereos, table lamps, kitchen appliances) do not. Moisture or a sudden summer shower can easily damage electrical devices not designed for outdoor use, turning them

Are Electrical Hazards Cooking In Your Kitchen?

Today's modern kitchen sports more electrical appliances than ever before. These appliances, like any other electrical devices in your home, need to be operated safely and conscientiously in accordance with manufacturers' guidelines. Never use a fork, knife or other metal object to clean debris from "live" kitchen appliances such as toasters and toaster ovens. Make sure appliances are disconnected before you clean their internal parts. Never submerge an appliance, its electrical cord or plug in water or any other liquid. Check your appliances for damaged cords or plugs before you use them. Never let power cords or plugs dangle over the edge of counters or come in contact with hot surfaces.

In recent years, microwaves have become one of the most popular kitchen appliances. Be wary of the dangers associated with improperly using them. Use only containers and tableware stamped "microwave safe." Cooking trays made of metal or aluminum should never be used to heat food. Never put aluminum foil in a microwave since it can ignite.

12777: Outlet caps snap into the top and bottom opening of an outlet to block toddlers' fingers from coming in contact with live electrical components.



into serious shock hazards. Always inspect appliances for frayed cords, broken plugs or cracked housings and don't use the equipment until you repair or replace it. Be careful not to overload your outdoor receptacles as this can cause overheating and fire. Never use electrical devices in the rain, on wet surfaces or while you're standing in water.

Turn off outdoor electrical devices when you're through using them and unplug them at the receptacle. Never leave a "live" device unattended, even if you're only going in the house for a minute.

By taking steps to protect your home and family from the dangers of electricity, your home will be a "safe house" both during May and the other eleven months of the year. **UHD**

The Author

Pamela Winikoff is Manager of Corporate Public Relations for Leviton Manufacturing Company, North America's leading manufacturer of electrical and electronic wiring devices and Managing Editor of *Helpful Hints On Home Electricity*.

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A Healthy Home

Grant Olewiler



Building a healthy home can clearly make an impact on the quality of life of those who live there. A forward-thinking builder also plans for maintenance of the occupants' lifestyles long after they move in. A key element in maintaining this home would be the methodology employed in keeping it clean. Marketing jargon bombards us daily surrounding HEPA filtration and vacuums that are "hypo-allergenic," but what truly is the healthiest alternative for cleaning the home?

Grant Olewiler, General Manager of MD Manufacturing in Bakersfield, California, will unequivocally suggest a central vacuum system. "It's gotten to the point that allergists will even write prescriptions for central vacuums," say Olewiler. "When you consider the physics of a central vacuum, it's the only logical choice." Because the tank is located in a remote, unoccupied region of the home, every germ picked up by its powerful suction is removed from the living space, never to be breathed again.

According to the Environmental Protection Agency (EPA), 50 percent of all illnesses are caused by, or aggravated by, unhealthy indoor air. A recent University of California Davis School of Medicine study delineated household dust as one of the most common culprits in allergy ailments. Their study documented 25 allergy-suffering households who used both quality portable vacuums and central vacuums on a controlled basis. Their conclusive results identified the central vacuum as producing major improvements in eye symptoms, nasal symptoms, non-nasal symptoms, and even emotional and sleep abilities.¹ A simple particle counter will clearly show a major difference in a room vacuumed with a portable vacuum versus a central vacuum. "No matter how extensive the filtering system, air still leaks back into the room with a portable vacuum," states Olewiler.

But clean air is not the only reason for a central vacuum. Recent studies indicate that the main reason a central vacuum was purchased was for the convenience and ease of use. MD Manufacturing surveyed thousands of their clients and found that 78 percent were looking for and found an easier way to vacuum. If the hose and attachments are easier to use, the vacuum will be used more often, the home will stay cleaner, and the client will have less body stress and more

time. Apparently the concept must be catching on, as more central vacuums are being sold globally than ever before. "This really helps to maintain the 'ultimate home,'" stated Olewiler to the *Ultimate Home Design* staff.

Think of the advantages of simply inserting a lightweight hose into a strategically located suction outlet. With the flick of a finger, two-to-three times the suction power of any portable vacuum is silently and effortlessly at your command. Staircases, cobwebs, spills, and messes are easily cleaned. In fact, special attachments are now designed for hardwood floors, tiles, dogs, and furniture. The new CentraMop simultaneously vacuums and damp mops your floors. "This is no longer your mother's old central vacuum," continues Olewiler. "There are hose socks to protect baseboards, VacPans to remove debris from the kitchen floors, and even a VacnSeal™ attachment to vacuum-seal your foods in Ziploc® bags with the central vacuum."

The cost of the central vacuum can easily be included in the mortgage and is just slightly higher than a top-of-the-line portable, but the time and effort saved is invaluable. The serendipity is that the value is returned when, and if, the home is ever sold.

When shopping for a central vacuum look for good filtration; lots of power; quality attachments, including an electric beater brush; and a professional installer. A great research resource is www.builtinvacuum.com.

The future of central vacuums creates an even more exciting ultimate home. MD Manufacturing recently announced a central vacuum that e-mails you when the bag is full or when any other service is required. It even shuts off automatically when the doorbell or telephone rings, and all of its diagnostics can be programmed to pop up on the home's automation panel. Now if we can just get it to do the cleaning for us, we will have the Ultimate Vacuum! **UHD**

¹J Invest Clin Immunol 2001; 11(4): 290-294

The Author

Grant Olewiler launched the first central vacuum industry website (centralvacuum.com) in 1996 which, at over 5000-plus pages, is still acclaimed by the industry as the most comprehensive vacuum site on the net.



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