STANDARDS

INTRO TO WELL BUILDING STANDARD

Introduction to the WELL Building Standard and its impact on three architectural product categories

By: Wanda Lau

Sponsored by: Excel Dryer

COURSE DESCRIPTION

This article will review the influence of the WELL Building Standard on the design and specification of commercial interior spaces.

1.25 AIA LU/HSW CREDITS



LEARNING OBJECTIVES

After reading this article, you should be able to:

1 Describe how the WELL Building Standard has helped designers and owners understand how interior environments can support the health and well-being of occupants.

2 Discuss the founding principles, framework, concepts, and award system of the WELL Building Standard version 2.

3 Explain how the hand dryer product category can help a project earn WELL certification.

4 Compare the purpose of circadian lighting with that of tunable lighting.

5 Discuss ways in which furniture can promote human health and activity in the workplace.

6 Understand the interdisciplinary relationship between standards and product manufacturers or suppliers to achieve healthier spaces.

ince the turn of this century, the architecture, engineering, construction, and owner/operations (AECO) sector has paid increasingly more attention to its tremendous impact on the natural environment and on the people who inhabit the spaces it creates. Previously, a few forerunners, many spurred by the Energy Crisis of the 1970s, were sounding the alarm. Though the industry-wide shift to evidence- and science-backed strategies for architectural design and products-which includes buildings as a whole as well as everything that goes inside and outside them-started slowly, the pace has picked up due to greater awareness of climate change and, more recently, the COVID-19 pandemic.

Today, humans spend approximately 90% of their lives indoors . Several green building standards, such as the U.S. Green Building Council's (USGBC)



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Leadership in Energy and Environmental Design (LEED) rating system and the International Living Future Institute's (ILFI's) Living Building Challenge, provide guidance on sustainable building design, construction, and performance. That is important, says William Gagnon, executive vice president and chief operating officer of Excel Dryer, headquartered in East Longmeadow, Massachusetts. But the profession also needs "to focus inside the buildings to make sure their environment is healthy and sustainable," he continues. "It's really about living in the building and who's going to be in it."

Enter the WELL Building Standard, launched in 2014 by the International WELL Building Institute (IWBI), a public benefit corporation based in New York. The performance-based certification program is third-party certified by the Green Building Certification Inc., which also certifies the LEED program. The WELL Building Standard does have some overlap with LEED and other

certification programs, but its objective is distinct. "Fundamentally, WELL is about improving human health and well-being in a holistic and multifaceted way," says IWBI chief product officer Jessica Cooper. "We look at physical, mental, and social well-being. The idea is that we're setting up places, spaces, and organizational practices that enable people to be their best selves, do their best work. and thrive."

This article will review the influence of the WELL Building Standard on the design and specification of commercial interior spaces with a closer look at its impact on three product categories: hand dryers, lighting, and furniture.

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WELL BUILDING STANDARD

Version 2 of the WELL Building Standard (WELL v2), piloted in 2018 and launched in 2020, "is a vehicle for buildings and organizations to deliver more thoughtful and intentional spaces that enhance human health and well-being," according to the introduction of the guide[2], which is available online and for free. And the general public is overwhelmingly interested in having a healthy work environment. According to IWBI's 2023 State of Workforce Well-Being Poll^[3], a survey conducted by the Harris Poll of more than 1,000 full-time employees in the U.S., 96% of respondents believe "a healthy work environment is necessary for employee productivity." Furthermore, 87% of respondents believe that "employers should be 'ethically obligated' to create a work environment that enhances the health, safety, and well-being of their employees"; 84% of respondents believe that "supporting the health of employees is a 'must-have' for companies"; and 81% believe that "their company's physical work environment has a major impact on their health and well-being."

In the wake of recent shifts in the commercial real estate market due to the lasting trend of hybrid work policies, an opportunity has emerged for organizations, says Rebecca Horton, senior insights strategist at MillerKnoll, a collective of global design brands. "Because of the legacy of the pandemic, we see a movement toward the Class A real estate market," she explains. Businesses that are consolidating and reducing their real estate assets are "making their spaces as hospitable and welcoming as possible."

Class A buildings tend to be more recently constructed or renovated, centrally located in an active business district, in close proximity to public transit, and exemplars of high design and construction quality. Their building systems, namely MEP and HVAC infrastructure, are also newer or recently updated. As such, these projects are primed for WELL certification. "We always encourage folks that are moving into a new space and starting their interior from scratch to consider going the WELL path because you're [likely] half of the way there," Horton says.

WELL V2 FOUNDATION

Though WELL is a relatively new building standard, it already has been deployed in nearly 140 countries worldwide and engaged in some manner by one-third of Fortune 500 companies, Cooper says. The standard comprises design and product-focused strategies, building operations requirements, work policies and protocols that support people and community building, and performance-based outcomes, Cooper says. "We have found that it's very scalable" for organizations hoping to certify multiple locations in their real estate portfolio.

As stated in the WELL v2 introduction^[4], the standard is founded on six principles:

• **Equitable:** Aims to benefit a variety of people, including and especially disadvantaged or vulnerable populations.

• **Global:** Proposes interventions that are feasible, achievable, and relevant across many applications throughout the world.

• **Evidence-based:** Draws upon a diverse and rigorous body of research across varying disciplines,

validated by a collaborative body of experts, including IWBI advisors.

• **Technically robust:** Defines industry best practice and validates strategies through performance verification and a rigorous third-party verification process.

•**Customer-focused:** Sponsors the success of WELL users through dedicated coaching services, dynamic resources, and an intuitive platform for navigating the journey.

• **Resilient:** Keeps pace with advances in research, science, technology, and society, continuously improving by integrating new findings.

WELL RUBRIC

The WELL v2 scorecard is divided into 10 concepts, each divided into multiple features that are considered as either preconditions or optimizations. Projects must satisfy all preconditions across the 10 concepts to be considered for certification. The optimizations offer different pathways for a project to earn points toward certification. "Projects may earn no more than 12 points per concept and no more than 100 points total across the 10 concepts," according to the WELL v2 guide. However, projects can earn an additional 10 points in an auxiliary concept, Innovation.

The 10 main concepts, their shorthand abbreviation, and a description of their intent, as summarized from WELL v2, are as follows:

1. Air (A): Achieve high levels of indoor air quality across a building's lifetime.

2. Water (W): Manage the quality, distribution, and control of liquid water in a building.

3. Nourishment (N): Make available fruits, vegetables, and nutritional transparency to create healthy food environments.

4. Light (L): Promote exposure to light and create lighting environments that promote visual, mental, and biological health.

5. Movement (V): Promote physical activity in everyday life through environmental design, policies, and programs.

6. Thermal comfort (T): Promote human productivity and provide a maximum level of thermal comfort among all building users.

7. Sound (S): Bolster occupant health and well-being through the identification and mitigation of acoustical comfort parameters that shape occupant experiences in the built environment.

8. Materials (X): Reduce human exposure to chemicals that may impact health during the construction, remodeling, furnishing, and operation of buildings.

9. Mind (M): Promotes mental health through policy, program, and design strategies that seek to address the diverse factors that influence cognitive and emotional well-being.

10. Community (C): Support access to essential healthcare, build a culture of health that accommodates diverse population needs, and establish an inclusive, engaged occupant community.

The Innovation concept provides a way for projects "to develop unique strategies for creating healthier environments" that are not already described in the WELL features^[5].

These 10 concepts reflect a "holistic approach to

addressing occupant health and well-being through buildings and organizational policies from [a project's] onset," Cooper says. Each concept is overseen by a member of IWBI's standard development team who is also a subject matter expert. They are each informed by an advisory of external experts^[6].

In 2020, IWBI formed a governance council that "rectifies and ensures the integrity of the standard development process," Cooper says. The council reviews proposed changes to the WELL standard, including the graduation of beta features and strategies that IWBI pilots with the industry into the standard. IWBI publishes updates and minor changes to the standard in quarterly addenda. "We try to balance how much change is too much change," Cooper says. "We don't want to be disruptive when we make changes. We want it to be additive and helpful to the community."

Projects can be recognized at the bronze, silver, gold, or platinum level. To achieve WELL certification, projects must pass on-site assessments conducted by an authorized WELL Performance Testing Agent^[7], who can spend one to three days on-site verifying a project's performance.

Out of 100 possible points available through the WELL v2 optimizations and 10 additional points attainable through the Innovation concept, projects must earn 40 points to attain WELL Bronze certification; 50 points for Silver; 60 points for Gold; and 80 points for Platinum. Points must be achieved in every concept for WELL Silver, Gold, and Platinum certification.

BENEFITS OF BECOMING WELL

Numerous studies have been conducted by both IWBI and independent researchers on the impact of WELL-rated environments and interiors. A 2022 peer-reviewed study published in *Building and Environment*[8]found that occupants in WELL-certified spaces reported a 28% increase in satisfaction between pre- and post-occupancy studies, a 26% increase in perceived well-being, a 10% increase in reported mental health scores, a 2% increase in physical health scores, and a 10-point increase in median productivity score, as measured by the World Health Organization (WHO) Health and Work Performance Questionnaire.

"[T]he study showed that with WELL Certification occupants felt more energized, more motivated to work, more confident that the workplace is conducive to health and well-being and increased pride in being part of the organization," according to IWBI's research spotlight "The WELL Factor: Understanding the Impact of WELL Certification"^[9].

Excel Dryer's Gagnon can attest to these benefits firsthand. His company recently completed a 5,000-square-foot renovation and 5,000-square-foot expansion of its headquarters office space, which is pursuing WELL certification. "As the owner and the client in this scenario, we feel [the investment and upgrades to meet the standard were] worth it a hundredfold by the reactions we get when people see the space and because of our employee interviews where they're saying, 'Tm proud to work here,'' he says.

An IWBI review of nearly 60 independent studies also found that investing in healthy building environments and solutions has a positive impact on business performance and financial returns. A 2000 study[10] by Lawrence Berkeley National Laboratory found the potential for \$20 billion to \$200 billion gains in worker performance benefiting from better indoor environments (equivalent to \$40 billion to \$400 billion in 2024 dollars). A 2015 study^[11] led by researchers at the Harvard T.H. Chan School of Public Health found that higher ventilation rates can improve the worker performance by 8% per year.

Not only do organizations find their workforce to be healthier, happier, and more productive, Cooper says, but healthy work environments are also good business for the real estate sector. A 2021 study⁽¹²⁾ by researchers at MIT Real Estate Innovation Lab found that buildings pursuing a healthy building standard have effective rents that are 4.4% to 7.7% higher per square foot, and average lease terms lasting more than a year longer, from 75.3 months to 88.3 months.

The pandemic's reset of on-site work policies has also given the AECO community an opportunity to understand that design can affect people in different ways. Horton says the detrimental effects of loneliness and isolation, made even more clear during the pandemic, have underscored the role of buildings to "reinforce strong ties and strengthen weak ties," concepts that are crucial to professional and personal networking that were first described by sociology professor Mark Granovetter, currently at Stanford University, and expanded upon by subsequent scholars^[13].

Greater recognition and awareness of neurodivergence by corporations and the general public have also increased since pre-pandemic times, Horton believes. Between 15% and 20% of the population is neurodivergent, which includes people with dyslexia, autism, and ADHD[14]. Design must be "considerate and inclusive of those individuals when we are planning," she says. Design choices and specifications that relate to color, texture, lighting, and even the olfactory senses can have a significant effect on people.

STANDARDIZATION OF VHEALTHY PRODUCT STANDARDS

With the growing prioritization of worker health and well-being, many organizations might be pursuing certification by multiple standards or mandated to use products approved by standards organizations. In 2023, IWBI, USGBC, the American Institute of Architects (AIA), and ILFI–which also oversees the Living Product Challenge, and Declare–teamed with mindful MATERIALS, a 501(c)(3) organization, to align on the Common Materials Framework (CMF) to help the architecture, design, and specification communities wade through the particular requirements across multiple standards.

The framework "acts as a 'Rosetta Stone' for product sustainability, translating diverse product standards and disparate data points into consistent categories of impact: Human Health, Climate Health, Ecosystem Health, Social Health + Equity, and Circularity," according to a joint press release^{115]}. These five "impact pillars" were first articulated by the AIA Materials Pledge^[16].

As part of its collaborative effort, IWBI will be mapping the existing Materials features in WELL to the CMF and conducting a gap analysis to inform potential CMF-aligned WELL beta features, according to the same press release. Cooper sees the CMF as another avenue for sustainable and healthy building standards to help advance the materials industry. "Healthy and environmentally safe materials are a really complex topic that requires an understanding of chemical compounds, the supply chain, and a whole host of various aspects in the manufacturing process," she says. "Having a common materials framework to point to makes it easier for us to all be speaking the same language and asking for the same [requirements], which ideally ... enable us to make more progress faster."



Common area, Excel Dryer headquarters

William Horne courtesy of Excel Dryer

WELL'S PRODUCTIVE IMPACT ON PRODUCTS

A combination of research, events, and advancements in technology has led to the AECO industry's increased interest and investment in building systems and products that are free of toxic chemicals, have minimal or no known deleterious effects on human and environmental health, and offer transparency toward their sourcing, manufacture, and transport.

The movement, which entered the mainstream slowly with LEED in the early 2000s as the industry's skepticism turned to adoption, notably surged with the COVID-19 pandemic. "We have been building awareness over the years with WELL as its adoption has increased," Cooper says, "but some of the emergency events that we have experienced with COVID has also heightened awareness. [During these times,] the industry tends to turn toward us to say, 'What should I do? What are the evidence-based solutions that I can be pointing to or that I should be investing in?"

This section will look at three product categories and how industry and manufacturing advancements have influenced and informed the WELL Building Standard—and vice versa.

HAND DRYERS

The COVID-19 pandemic compelled the general population to become more acutely attuned to the methods by which viruses, bacteria, and, more generally speaking, germs can be transmitted. Limiting the spread of germs via circulated air, water, and direct contact is covered in several WELL concepts. Surfacing and finish materials and the use of handsfree, contactless fixtures and devices can help reduce the spread of germs and make work environments healthier and safer places, Cooper says.

As more workers return to their office or worksite, hand hygiene has remained top of mind, says Excel Dryer's Gagnon: "What were the three things that everyone did globally during the pandemic? Wear a mask, social distance, and wash your hands." With face masks and social distancing now up to individual discretion, the remaining universal hygiene support measure is washing hands. Scrubbing hands with soap for at least 20 seconds, rinsing them under clean, running water, and drying them completely is the best practice, according to the Centers for Disease Control and Prevention^[17].

Though people are taught how to wash their hands, Gagnon says, few are shown how to dry their hands thoroughly, "which is just as important as washing them in the hand washing and hand hygiene process." Wet or damp skin is more susceptible to receiving or transmitting germs than dry skin, according to the *WHO Guidelines on Hand Hygiene in Health Care*^[18]. WELL v2 calls for the provision of contactless means for occupants to dry their hands completely in restrooms as an optimization in feature WO8 Hygiene Support, Part 2: Ensure Bathroom Accommodations: "All bathrooms meet the following requirements: Contactless soap dispensers and hand-drying accommodations are provided."

A clean towel and air hand dryer are both "effective ways to dry your hands," according to the CDC^[19]. A 2020 scoping review^[20] by the University of Arizona of 23 studies comparing the benefits of using hand dryers versus paper towels concluded "there is no empirical data to support one hand drying method over another from a health and safety perspective."

A renewed interest in indoor air quality (IAQ) arose during the COVID-19 pandemic. Modern scientific research about IAQ began in the 1970s with the Energy Crisis and increasing concern about ambient air pollution and exposure to diseases, according to the Handbook of Indoor Air Quality^[21]. In the 1980s, a WHO committee report suggested that up to 30% of new and remodeled buildings could subject occupants to ill health effects, according to the U.S. Environmental Protection Agency (EPA)^[22]. At the time, causes of "sick building syndrome" included inadequate ventilation air "to dilute and remove body odors" and "maintain the health and comfort of building occupants"; chemical contaminants from indoor and outdoor sources, such as volatile organic compounds and formaldehyde; and biological contaminants, including "bacteria, molds, pollen, and viruses."

More recently, inadequate ventilation and fresh air exchange concerns surged with the SARS CoV-2 virus, which spreads via airborne particles and droplets from people infected with COVID^[23]. IWBI's Cooper says, "There's more attention being placed on filtration right now, especially point-of-use and retrofittable filtration that doesn't require certain level of mechanical design." Hand dryers that are equipped with a high efficiency particulate air (HEPA) filter in non-healthcare projects can help meet the WELL v2 optimization in feature WO8 Hygiene Support, Part 4: Provide Handwashing Supplies and Signage, which requires suitable hand drying methods for "all sinks where handwashing is expected (e.g., bathrooms, break rooms, food prep and wellness rooms)."

Hand dryers equipped with a HEPA filter provide an additional means of reducing the spread of germs. A HEPA filter is capable of removing a minimum 99.97% of "dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns" according to the



EPA^[24] "The more often HEPA-filtered hand dryers are used, the more they can help filter the air," Gagnon says. "What COVID has taught us is that moving air is important." Recent efforts to enhance filtration led to new electrostatic HEPA (eHEPA) filtration. The electrically charged polypropylene microfiber media attracts particles enhancing the filtration process; moving away from the traditional use of fiberglass means enhanced durability.

WELL v2 encourages manufacturers to disclosure product ingredients and their impact on human health and well-being through feature X07 Materials Transparency^[25]. The standard accepts several verification systems by which manufacturers can disclose their product's impact on human health, including Health Product Declarations (HPDs). The HPD Open Standard, overseen by the Health Product Declaration Collaborative (HPDC), provides a consistent standard for disclosing product ingredients and their impact and potential hazards on human health^[26]. WELL v2 requires HPDs to be published in the HPD Public Repository, which is maintained by HPDC.

Excel Dryer currently has independently verified HPDs published on the database for four products. These products are also listed on the Works with WELL Directory, a vetted product licensing program to which manufacturers can submit their products for inclusion to IWBI. To earn the mark, products must undergo a third-party document review that validates their alignment and contribution to WELL strategies^[27].

Publishing an HPD or an environmental product declaration (EPD), which discloses the environmental impacts of a product, is an indication that a manufacturer was willing to invest the resources and time to evaluate its product's impact throughout its life cycle, supporting the AECO industry's growing call for greater material transparency. Specifying a product with an EPD can help earn points toward LEED certification, among other green project rating programs.

An EPD is a third-party verified report that consists of two key documents: a product's life cycle assessment (LCA) report, which is not public facing; and a document summarizing the LCA results and other EPD content, which is public facing. An LCA is an evaluation of a product's environmental impact and performance Integrated sink systems combine a soap dispenser, faucet, and hand dryer on the sink deck.

over its entire life cycle, from material extraction to its manufacture and usage and to its end of life, according to EPD International, the program operator and administrator of the International EPD System^[28].

In order to have an EPD, a product must first have official Product Category Rules (PCRs), which detail standard testing guidelines and reporting methods for assessing the functionality and performance of products of the same category through industry consensus. As a result, specifiers and buyers can compare products across manufacturers on an equivalent basis. Furthermore, a PCR provides the "rules, requirements, and guidelines" for conducting an LCA, according to EPD International^[29]. In 2016, UL Environments, a business division of Underwriters Laboratory, published the first PCR for hand dryers^[30]; the hand dryer PCR committee was chaired by Gagnon^[31].

An Excel Dryer hand dryer LCA, for example, would disclose its domestic manufacture, which lessens the carbon emissions and energy expended in the transport of raw materials. "We're always looking for ways to improve our sourcing of materials and to make sure we're sourcing as close to where we manufacture as possible," Gagnon says.

Importantly, a product with a published EPD is not necessarily environmentally superior to its peer. Additional research and study are required. For example, an LCA comparison^[32] of four hand dryer products against a paper towel baseline, conducted by third-party assessor True North Collective and commissioned by Excel Dryer, did find that particular models of the company's hand dryers had a cradleto-grave global warming impact that is up to 83% less than that of a baseline paper towel with 0% recycled content and 81% less than that of a baseline paper towel with 100% recycled content. The allocation of recycled content within a paper towel does not significantly affect its impact because much of the environmental burden comes from the manufacturing process of paper towels, according to the LCA report^[33].

Hand dryers can also offer financial and operational

savings to owners and tenants by reducing the amount of labor and maintenance required in spaces with handwashing accommodations. Not only can they lessen or eliminate a literal paper trail left by occupants, but they can also reduce the amount of water dripped onto floors; integrated sink systems that combine HEPA-filtered hand dryers on the sink deck alongside the faucet and soap dispenser allow users to achieve contactless hand hygiene in one place.

LIGHTING

Lighting researchers and designers have long known the benefits of natural daylight and quality electric light in the built environment. Today, more architects and owners are aware of the impact of light on human health and productivity due in part to its emphasis in building performance and certification programs.

The result is that more owners are interested in supporting productivity and mental health in their buildings, says David LaVigna, vice president of product innovation and marketing at Nova Flex LED, a lighting solutions manufacturing and design company based in St. Cloud, Minnesota: "The WELL standard is a nod to the type of compassion and empathy that we're starting to see more and more from a corporate culture standpoint."

The Light concept in WELL v2 "promotes exposure to light and aims to create lighting environments that promote visual, mental, and biological health."^[34] The benefits of adequate light exposure, according to the standard, include improvements to mood and reducing depression in individuals; health, recovery, and healing; and higher worker performance in office environments.

LaVigna, who has more than three decades of experience in both lighting design and lighting manufacturing, has noticed a recent shift in lighting designs and products for commercial spaces. "Lighting design has always been a mix of creativity and technology," he says. While many lighting designers were highly creative, their ability to leverage technology was not as strong. "Now you look at the landscape of the design and specification community, and you'll see a shift," he says. "We're seeing more technology- and science-based experiences and designs with a creative overlay, instead of creative designs with a technical overlay."

Recent technological advancements combined with research in lighting and circadian rhythm have led to a surge in interest in circadian lighting products. "When I first started with WELL, what was on the market in terms of product was very limited," IWBI's Cooper says. "Today, it's almost best practice to design for those circadian lighting outcomes."

Humans and most organisms have an internal biological clock that regulates their physiological and behavioral functions, such as sleepiness and wakefulness, on an approximately 24-hour cycle, in conjunction with the Earth's rotation around its axis. "The circadian rhythm is synchronized with the natural day-night cycle through different environmental cues, the main cue being light," states the WELL v2 Light concept overview^[35].

Because humans are spending most of their lives indoors, "exposure to adequate levels of light have been compromised as typical indoor electric light levels often do not equate to the amount of light the human body traditionally receives outdoors," states the WELL v2 feature LO3 Circadian Lighting Design. This lack of stimulus has resulted in disruption to human circadian rhythm and increased risk for obesity, diabetes, depression, and metabolic disorders^[36].

The LO3 optimization requires projects to meet the natural lighting needs of "day-active people" through electric lighting at workstations. Projects must provide at least four hours of at least 150 equivalent melanopic lux (EML) or 136 melanopic equivalent daylight illuminance (m-EDI) at 18 inches above the work plane for 1 WELL point, or at least 275 EML or 250 m-EDI for 3 WELL points, in regularly occupied spaces. In very simplified terms, EML and m-EDI are two metrics that "account for a wide range of physiological effects of light," according to Robert Soler, vice president of research at BIOS (Biological Lighting Institute) in his blog post "Melanopic Equivalent Daylight Illuminance."^[137]

The rapid ascendancy of LEDs in the lighting market can be attributed to improvements to their output quality combined with their longer operating life and more efficient conversion of electrical energy to light energy than conventional sources, such as incandescent and halogen. LED technology continues to advance for many applications, including the exploration of how the spectral quality of light affects humans.

Daylight is high in the blue spectrum of visible light and very bright, writes Hoare Lea director Jonathan Rush in his 2021 blog post "m-EDI: A revolution in our understanding of light and health"^[38]; but "[a] s the sun sets, the blue spectrum falls, and the light becomes warmer and less bright." Lighting researchers have found that LEDs with cool or warm correlated color temperatures (CCT), such as 6500K or 2000K, respectively, are not enough to trigger the full benefits of sunlight to humans, Rush continues. As a result, lighting manufacturers are moving toward offering full-spectrum LED products, which can theoretically mimic more closely the broad spectrum of sunlight, which encompasses the visible light spectrum, as well as parts of ultraviolet and infrared light spectra[39].

Researchers are seeing that these full-spectrum LEDs can influence human's physiological needs without visibly changing a light source's CCT, "which may not provide a comfortable interior environment," Rush writes. That is, a workplace does not have to visibly glow blue to simulate daylight conditions or visibly glow orange to mimic sunset. In addition to CCT, lighting designers can research a light source's spectral power distribution (SPD) curve, which charts energy or output against each wavelength band to see how closely a source's output aligns to that of the sun during a particular time of day. "[W]e can have circadian supportive lighting systems which no longer need to simply dim between warm and cool light but can move through the spectrum to create human centric and biologically responsive spaces," Rush writes.

With the advent of full-spectrum LED products entering the commercial market, LaVigna urges designers to distinguish between circadian lighting products and color-tunable or white-tunable lighting products. Tunable products can be adjusted in the field via manual or digital controls to change their color output, or CCT, to create a specific mood or response to an environment's reflectance values or interior aesthetics, LaVigna says. He sees tunable lighting as useful for "set it and forget it" scenarios.

Meanwhile, circadian lighting solutions are sensing and responding to dynamic changes in the environment to trigger a circadian response in humans, LaVigna says. These changes may occur in the SPD curves of the LEDs and not be visibly detectable by humans.

LaVigna is pleased by WELL v2's recognition of the effects of light on humans. "Light does have positive impacts on your life, well-being, and mental health," he says. "I don't think people realize how bad lighting is in their home or their office until they experience quality lighting. [It's similar to how] you never know how unhealthy you are until you get healthy."



For its headquarters renovation, Excel Dryer worked with lighting distributor Illuminate to design a controls system with WELL and LEED standards in mind. Its workplace uses tunable white LED luminaires that emulate natural daylight patterns through changes in color and intensity to help support circadian rhythms. This system works with a shade and light shelving system that gives employees views to the outdoors while diffusing glare and distributing daylight through the workspace.

FURNITURE

With more office workers returning to site, MillerKnoll's Horton says the creation of interior environments that are healing, soothing, and connected to nature has been given more attention. "A lot of people suffered loss during the past four years, and a lot of folks have had a lot of grief," she says. WELL v2 underscores the importance of furniture in supporting healthy environments and work habitats in at least three concepts: Movement, Mind, and Materials.

Over millions of years, the human body has evolved to move, but the Industrial Revolution followed by the advent of technology has led people in developed countries to sit an average of three to eight hours a day, according to Herman Miller's 2013 whitepaper "Sit. Stand. Move. Repeat."⁽⁴⁰⁾ (In 2021, Herman Miller acquired Knoll⁽⁴¹⁾ and created MillerKnoll.) Prolonged sitting can lead to drowsiness, fatigue, and health issues related to a sedentary lifestyle.

As a WELL v2 precondition, the Movement feature VO2 Ergonomic Workstation Design requires projects to provide customizable furnishings to accommodate all users^[42]. This includes heightadjustable workstations, adjustable chairs, support for regularly standing workers, and training on adjusting workstations. "Deploying ergonomic solutions lead to fewer medical claims, employee sick days, and paid costs per claim," according to IWBI's report *Investing in Health Pays Back*^[43].

In conceptualizing its new office space, Excel Dryer followed these WELL guidelines and furnished its open floor areas with ergonomically sound, adjustable workstations made from responsibly sourced, pre- and post-consumer recycled materials.

Specifically, WELL requires 25% of all workstations to be adjustable for both seated and standing work. Alternating between sitting and standing at work has been linked to numerous health benefits, such as increased HDL (good cholesterol) and reduced lower back discomfort, according to the Herman Miller whitepaper. Offering choices for people to sit, stand, and move during their workday is part of the solution, as is "helping people understand the benefits of moving and changing their postures, as well as the basics of adjusting their furniture," it continues. A 2014 study^[44] by researchers at the University of Sydney found that workers with sit-stand workstations reduced their sitting time per work day by 73 minutes and increased their standing time at work by 65 minutes per work day.

In the past, Cooper says, ergonomic furniture would be associated with adjustable workstations and chairs. More recently, manufacturers have offered active workstation options that integrate a treadmill, stationary bike, or step machine component. "This type of product is becoming more commonplace," she



Varying furniture heights and arrangements offer employees an array of working options at the Excel Dryer headquarters.

says, which WELL v2 recognizes in feature V07 Active Furnishings $^{\!\rm [45]}\!.$

Cooper also sees an uptick in furniture manufacturers and designers seeking to remove harmful chemicals from their products and disclosing their product ingredients. As referenced earlier, WELL v2 rewards projects that specify products transparent about their manufacture and ingredients in feature X07 Materials Transparency. With the increasing focus on the built environment's impact on human health, Cooper says, "the progress has felt more urgent and there's more of a call to action around unified messaging as it relates to healthy materials."

MillerKnoll is one of more than 1,500 building product manufacturers, architecture and design firms, and AEC firms to share sustainability data on its product catalog via the online platform Ecomedes^[46], which allows specifiers to browse products that meet specific rating system criteria, certifications, or research data as it relates to human health, performance, and environmental impact.

Horton also celebrates WELL v2's promotion of restorative environments that provide relief from mental fatigue and stress in its Mind feature M07 Restorative Spaces^[47]. Whereas owners or workers may not have understood the reason behind well-being rooms in the past, she says, more organizations are seeing "the necessity to accommodate everyone in the workplace." This includes people who might need time away due to overstimulation from noise, activity, or other reasons, but prefer not to self-disclose that they need an accommodation. "Everyone loves choice," Horton says, "and if you give folks enough variety, they will find a space that fits them for that moment in time." And going to such a space will seem less out of the ordinary if the workplace also promotes movement throughout the day.

But, Horton emphasizes, the layout of furniture

and spaces must be thoughtfully integrated into an environment to support human health, well-being, and on-site work policies. "No single product is going to solve the workplace attraction challenge," she says. She compares holistic design to a Rubik's cube in which multiple aspects, from movement to sound, materials, lighting, and thermal comfort, must come together. "When you get all those sides the right color, you know you have gotten that match," she says. A typical user doesn't know that a litany of regulations and research are involved in interior architecture and design, she adds. "They just know that it feels right when they walk in."

A MUTUAL BENEFIT FOR DESIGN OUTCOMES

"This movement to create healthier places for people globally is interdisciplinary," Cooper says. "The WELL Building Standard helps to provide the ambition and common framework to what we are all marching towards." And though the standard helps organizations and owners learn the value proposition of holistic design and earn recognition for delivering supportive environments, she says, "if there's not a product, design solution, or service provider that can support a client's ability to implement that strategy, we've only gotten us halfway there."

In other words, Cooper continues, WELL wouldn't "exist if manufacturers and product suppliers aren't [bringing] these best practice solutions to market." Oftentimes, she adds, manufacturers are the ones leading the charge and developing innovations that support human health, well-being, and interior environments. In these cases, IWBI can then author and pilot a strategy for these manufacturer-driven initiatives into its WELL standard. "It's a great symbiotic relationship," Cooper concludes.

TO RECEIVE AIA CREDIT:

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End notes

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