

APPLYING “WELL BUILDING STANDARDS” IN INTERIOR DESIGN OF ADMINISTRATIVE BUILDINGS

تطبيق "معايير البناء الجيدة" في العمارة الداخلية للمباني الإدارية

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ABSTRACT

Scope – The indoor environment of administrative buildings affects the physical and psychological health of the human being, where he spends more than one third of his day.

Methodology – Reviewing the concepts and principles of "WELL Building Standards" program, also describing and analyzing the seven standards of "WELL Building Standards" program which are: Air, Light, Water, Comfort, Nourishment, Fitness and Mind.

Purpose – Promote well-being and human health in the administrative building by interior designing.

Findings – “WELL Building Standards” program was the first environmental assessment program in the world to focus on well-being and human health within the administrative building by means of interior designing.

Conclusion – Enhancing the physical and psychological health of the human being is done by improving the quality of indoor environment of the building, and it is necessary to resort the “WELL Building Standards” program and using its standards in the interior design.

KEYWORDS

Indoor environment; Administrative Building; WELL Building Standards

المخلص

الحدود - البيئة الداخلية للمباني الإدارية تؤثر على الصحة الجسدية والنفسية للإنسان، حيث يقضي فيها أكثر من ثلث يومه.
المنهجية - استعراض مفاهيم ومبادئ نظام "معايير البناء الجيدة"، ووصف وتحليل المعايير السبعة لبرنامج "معايير البناء الجيدة" وهي: الهواء، الضوء، الماء، الراحة، التغذية، اللياقة البدنية والعقل.

الهدف - تعزيز صحة الإنسان ورفاهيته في المبنى الإداري من خلال تصميم العمارة الداخلية.
النتائج - تمكن نظام "معايير البناء الجيدة" من أن يكون أول نظام تقييم بيئي في العالم يركز حصرياً على صحة الإنسان ورفاهيته داخل المبنى الإداري من خلال تصميم العمارة الداخلية.

الخاتمة - يتم تعزيز الصحة الجسدية والنفسية للإنسان من خلال تحسين جودة البيئة الداخلية للمبنى، ومن الضروري اللجوء إلى نظام "معايير البناء الجيدة" واستخدام معاييرها في تصميم العمارة الداخلية.

الكلمات المفتاحية

البيئة الداخلية؛ المبنى الإداري؛ معايير البناء الجيدة

1. INTRODUCTION

Human health problem is one of the obstacles facing all societies lately, and most of the world's people endure health issues, and after proving that the interior design and the indoor environment of the building are important determinants of health, there are increasing demands from global bodies such as the World Health Organization and the United Nations to stakeholders, national governments, and other actors, to increase coordination between the interior design profession and public health.

Multidisciplinary and comprehensive strategies are important to handle the complicated issues of well-being and human health purposefully, and a low concentration on selected health issues are insufficient for the mission. While numerous physical environmental elements affect massively on daily productivity and health, a body of research has emerged supporting these claims, but not much has been done to switch the research into an application.

Over the past ten years, standard-setting institutions and green building standards have made great steps toward market evolution in the designing field, which has led to the quick spread of green building (environmentally sustainable buildings) and environmentally mindful building applications across the whole world, however, scenarios to improve well-being and human health played a secondary small role in the development of designing standards.

We think it is time to bring comfort and human health to the forward of interior design practices that are not just environmentally better for the earth planet, but also healthier for individuals. That is why the environmental assessment Program “WELL Building Standards®” was released as the first and unique program in the world whose task is to improve well-being and human health through the indoor environment.

2. "WELL BUILDING STANDARDS" PROGRAM

"Well Building Standards®" is an environmental assessment program for measuring, accrediting and controlling the properties of the indoor environment which affect well-being and human health, through seven standards:

- Air standard
- Comfort standard
- Water standard
- Light standard
- Nourishment standard
- Fitness standard
- Mind standard

“WELL Building Standards” program provides perfect solutions in the interior design based on evidence-based medical and scientific research, and its relationship to the indoor environment by putting health and wellness in the heart of Interior design decisions and provides creative solutions for the indoor environment.

"WELL Building Standards" program was released after seven-years research in partnership with architects, scientists, clinicians, and interior designers to produce a series of medical studies



*Figure 1, WELL Building Standards Program logo
(Source: Delos Living LLC, 2014)*



*Figure 2, Delos company logo.
(Source: Delos Living LLC, 2020)*

that explore the relationship between the interior spaces of the building where individuals spend more than 91% of their day and well-being and the health of the building occupants.

"WELL Building Standards" program (Figure 1) was launched by Delos (Figure 2) in October 2014, and it is managed by International WELL Building Institute -a beneficiary organization General and headquartered in Los Angeles - USA, based on the commitment to the "Clinton" global initiative, which includes the participation of "WELL Building Standards" globally and the development of interior spaces that promote quality of life and the health for the occupants of the administrative building, thus improving the way people live.

2.1 WELL BUILDING STANDARDS STRUCTURE

"WELL Building Standards" program takes a comprehensive strategy to enhance human health in the indoor environment based on three main structures:

- Behavior
- Operations
- Design

This study will focus heavily on the basis of "design" which is part of the field of study of interior design.

2.2 WELL BUILDING STANDARDS FEATURES

As we mentioned earlier, the "WELL Building Standards" program is divided into seven standards: air, nourishment, water, light, comfort, fitness and mind. These seven standards consist of 105 features, and each one of these features is designed to address a particular aspect of the health or comfort of the building occupants, and every feature of them is divided into parts (Figure 3), usually defined according to the type of building, meaning that relying on the type of project implemented, only certain parts may be applied of "WELL Building Standards" features in it. "WELL building standards" features are classified into: (preconditions) or (optimizations), and the following is an explanation of what each of them:



Figure 3, Each standard consists of features, and the features contain parts. (Source: the author, 2022)

2.2.1 PRECONDITION

Some of "WELL Building Standards" features are classified as preconditions - required for all certifications' levels of "WELL Building Standards". These features address the heart of "WELL Building Standards" program. The preconditions is considered the foundation of wellness in the administrative building's indoor environment, and it is necessary to note that all preconditions for the accreditation of "WELL Building Standards" certificate must be met.

2.2.2 OPTIMIZATION

Optimizations are not necessary to obtain Silver accreditation but providing an opportunity to obtain Gold or Platinum accreditation. These optimizations incorporate optional strategies, protocols, techniques, and interior designs. International WELL Building Institute recommends that all administrative buildings seek to achieve the largest possible number of optimizations.

2.3 WELL BUILDING STANDARDS CERTIFICATION

"WELL Building Standards" program awards one of three classified levels of certification: Silver, or Gold, or Platinum (Figure 4), and in order to obtain "WELL Building Standards" certification at any level, a project must fulfill all of the preconditions features, and to achieve higher levels of "WELL Building Standards" certification, a project must successfully implement a percentage of optimizations features and all preconditions, and buildings become certified if an adequate number of features are done.



Figure 4, The three levels of accreditation: Silver, Gold, and Platinum. (Source: IWBI pbc,

3. AIR STANDARD

Indoor air quality may be corrupted by outer sources and by outgassing from building materials and inside burning sources, and improper ventilation practices can fail to address these sources, exposing the individuals to volatile organic compounds (VOCs) and microbial microorganisms. Indoor air quality may be decreased through surfaces, where airborne microorganisms can gather, so these contaminations add to a scope of negative health results like asthma, sensitivities, and different impacts of upper respiratory sicknesses, Additionally, air quality issues can diminish work usefulness and lead to sick building syndrome (SBS), in which no illness or cause can be recognized, but extreme health impacts are connected with the time individuals spend in the Administrative Building.

3.1 VOC REDUCTION

Excessive levels of VOCs may cause nose and throat irritation while also being associated with asthma and respiratory health problems, Therefore, "WELL Building Standards" program requires that all interior paints, coatings, interior adhesives, and sealants be zero VOCs or at least 90% Low VOCs and choose among materials that are listed in 3.1.1, 3.1.2, 3.1.3.

3.1.1 FLOORING

It must be ensured that the floors have no or low VOC emissions such as the materials listed in points 3.1.1.1, 3.1.1.2, 3.1.1.3, 3.1.1.4.

3.1.1.1 WOOD

Natural solid hard wood, prefinished hardwood, plywood, vinyl-wood, cork, bamboo flooring, Luxury vinyl plank & HDF flooring (Look for brands with certificates, and the gold level certificate from "GreenGuard" is the best certification for wood; because that is the most stringent level of formaldehyde allowed).

3.1.1.2 TILES

Marble Tiles, terrazzo, quartz, natural stones such as: travertine, limestone and soapstone, glass tiles, magnetic ceramic tiles, ceramic & porcelain tiles (no high percentage of lead in the ceramic/porcelain glazing process), Hydrotect® air cleaning tiles that contain a coating which uses the photocatalytic oxidation process to clean the air (Figure 5), in which a layer of non-toxic titanium dioxide is used in coating the tiles, and this coating reacts with ultraviolet light; to create a reaction that can destroy some molds, bacteria, volatile organic compounds, and viruses.

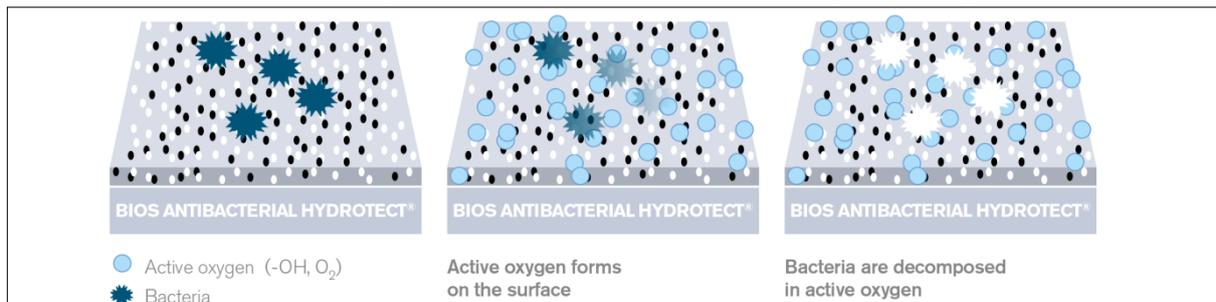


Figure 5, Explains how air cleaning tiles work. (Source: CASALGRANDE PADANA™, 2017)

3.1.1.3 CARPET

Seagrass carpet, wool carpet, polyethylene terephthalate polyester carpet with a felt backing treated with a chemical fluorocarbon which is used in the treatment of upholstery and fabrics, as it adds a layer of defense against water damage, dirt, bacteria, mold, oil, and stains.

3.1.1.4 OTHER

Bio-based polyurethane flooring, Natural linoleum flooring, Polished concrete flooring.

3.1.2 INSULATION

Ensure that the product is free of formaldehyde or less than 3% and does not contain synthetic fibers or chemical binders in the following types of insulation: Mineral wool insulation, Fiberglass insulation, Wool batt insulation, Blown-in wool insulation, Hemp insulation, Cellulose insulation, Magnesium oxide cementitious insulation.

3.1.3 FURNITURE

- Choose natural fabrics such as linen or organic cotton, and avoid industrial materials such as petroleum polyester, and make sure that there are no chemical or formaldehyde treatments on the fabric.
- Leather needs to be checked in terms of dyes and treatments, it is preferable to use vegan and chrome-free leather, environmentally friendly certificates are available for leather.

3.2 MICROBE & MOLD CONTROL

UV lamps are used in cooling coils (figure 6) & sinks, Use on the surfaces a Nano coating, which is anti-mold and the growth of mildew and the sink should be manufactured with the counter as a one unit together from "Corian" material; cause The seams are one of the reasons for collecting mold and Microbe.

3.3 HEALTHY ENTRANCE

Use permanent entrance system comprised of slots, grates or grilles, at minimum the width of the entrance and a length of 3 meters in the primary direction of entry cause they allow easy cleaning under them / or use rollout mats, at least the width of the entrance and Its length is 3 meters in the main direction of entry. For slowing the motion of air from outdoors to indoors at the main entrance of building, install Building's entrance vestibule with two ordinarily shut doorways or set up revolving entrance doors.

3.4 DISPLACEMENT VENTILATION

The under-floor air distribution system (figure 7) is the best in terms to obtain the required temperature. When the air conditioning temperature is set to 18° for example, it will reach the occupants of 18°; Because the source of ventilation is close to the occupants, and it prevents dust from forming in the ceiling, as the air movement resulting from this system breaks the stagnation of the upper air layer at the ceiling and thus prevents dust from forming over time.

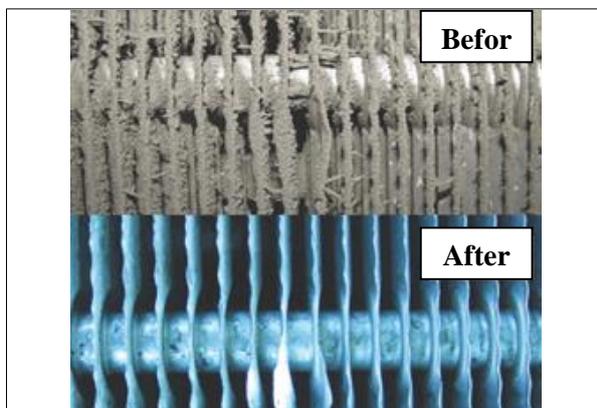


Figure 6, Effect of using UV lamps in cooling coils
(Source: Milomir Gligorijevic, 2020)

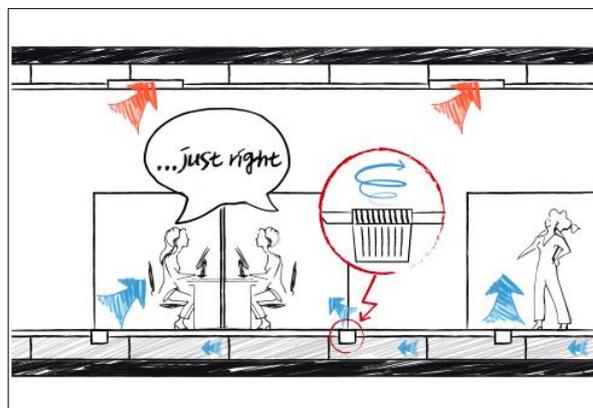


Figure 7, Under floor Air Distribution system
(Source: LG ELECTRONICS, 2018)

4. WATER STANDARD

Potable water contamination is a significant general medical issue, and many individuals get water that has been presented to possibly unsafe degrees of organic, substance and mineral impurities, and the source of water contamination can at times be followed back to industry and related processes, consequently, "WELL Building Standards" program looks to keep up with this asset at the same time while working on its quality for human well-being in the different purposes of water.

4.1 WATER TREATMENT

- Using the activated carbon filter to remove organic chemicals
- The filters are rated to prevent from suspended solids with a pore size of 1.5 μm or less.
- The ultraviolet germicidal irradiation system (UVGI) (Figure 8) is used to remove microbes and sanitize water.

4.2 DRINKING WATER PROMOTION

It is important to drink enough water throughout the workday; To avoid mild dehydration associated with muscle cramps, dry skin and headaches, thus, “WELL building standards” program encourages water consumption by requiring one water dispenser at least to be placed somewhere around 30 meters of the occupied floor space (at least one water dispenser per floor).

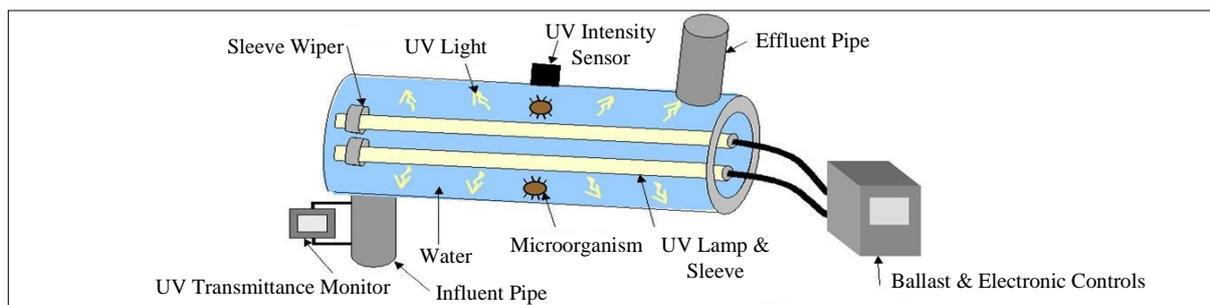


Figure 8, The ultraviolet germicidal irradiation system (Source: Tracey H., Paul S. and Dr. R. B. Robinson. 2002)

5. NOURISHMENT STANDARD

"WELL Building Standards" program tries to carry out interior design techniques and arrangements inside the built environment that increment admittance to quality food decisions, and empower individuals to go with more educated dietary decisions and lead to better well-being and health.

5.1 SAFE FOOD PREPERATION MARERIALS

To keep up with appropriate cleanliness, "WELL Building Standards" Program expresses that cutting sheets ought to be made of pyro ceramic, plastic, glass, marble, or non-laminated wood which is either treated or untreated by linseed oil or food-grade minerals. Cutting boards ought to likewise be replaced if they have experienced deep cuts or worn out. Equipment utilized for food preparation (for example dishware, pots, and pans) excluding cutting boards ought to be made by any of the recorded materials: glass, cast iron, ceramics (non-lead choices), coated aluminum, stainless steel, or non- laminated wood which is either treated or untreated by linseed oil or food-grade minerals.

5.2 FOOD STORAGE

Employees are urged to eat new fresh foods for why sufficient fridges are expected to protect taste and freshness. "WELL Building Standards" program suggests an accessible fridges capacity volume of somewhere around 20 L for each occupant.

5.3 FOOD PRODUCTION

Food production activities and participation in planting might increase the awareness of the nutrient food selection. "WELL Building Standards" suggests that a cultivating area of somewhere around 0.1 m² per occupant is accessible. The cultivating region ought to comprise of greenhouse (Figure 9), a food-bearing plant garden or crop production Infrared booths (Figure 10) or an edible landscaping.



Figure 9, Using the building's roof in gardening or establishing a greenhouse (Source: ArchDaily, 2021)



Figure 10, Crop production Infrared booth (Source: Myrto katsikopoulou, 2021)

6. LIGHT STANDARD

"WELL Building Standards" program gives rules that are intended to limit disturbance to the human body's circadian system, improve efficiency, support great rest quality and give proper visual sharpness where required.

6.1 SOLAR GLARE CONTROL

For windows that are placed at a height of 2.10 meter or less, the presence of controllable interior or exterior shading is required or, as a substitute, glazing with adjustable opacity. One of the following options should be present for windows placed at a height above 2.10 meter:

- Light reflecting shelves (Figure 11).
- Controllable interior or exterior shading.
- Windows with adjustable opacity.
- Micro mirrors (Figure 12).

6.2 LOW-GLARE WORKSTATION DESIGN

PC screens might cause discomfort by reflected glare. "WELL Building Standards" program suggests that upward lights are not orientated directly at screens (Figure 13). PC screens situated on work areas inside 4.5 m of windows ought to moreover have the choice to be arranged opposite to the windows at a point of 20 degrees.



Figure 11, The usage of light-shelf (Source: Latif G., Hüseyin S., Cengiz Y. & Burak G., 2018)

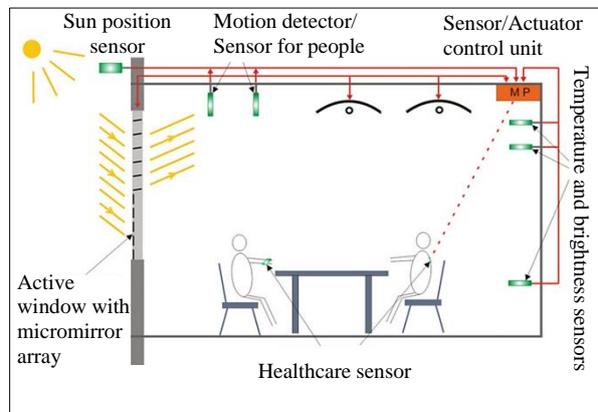


Figure 12, Micro mirrors with brightness sensors (Source: Palmén, Dumitru, Wilhelm & Cyril, 2015)

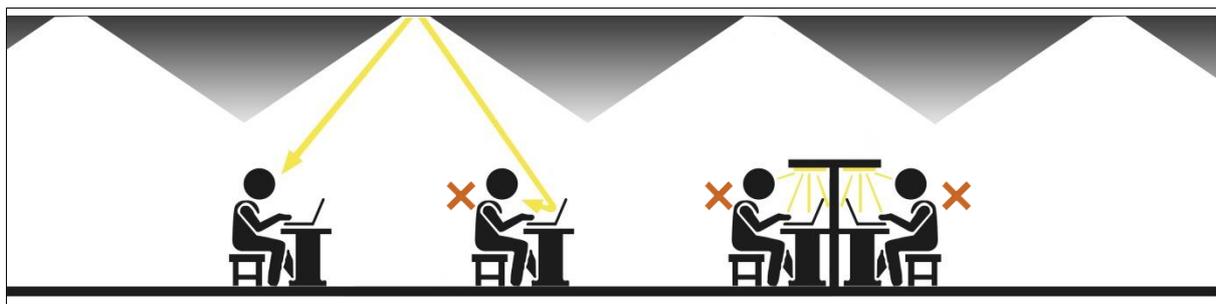


Figure 13, Overhead luminaries are directed wrongly straight at monitors (Source: lunovation, 2019)

7. FITNESS STANDARD

Active furnishings, Stair accessibility in buildings and other numerous factors can influence the active work level of a person. Considering that 91% of our day is spent within the indoor environment, building design strategies that are intentionally expressed either to support more actual work or deter inactivity can establish strong strategies to advance a more dynamic way of life.

7.1 PHYSICAL ACTIVITY SPACES

This feature promotes active daily living through exercise spaces in the administrative building, and offices with accessible activity spaces (Figure 14), so it states that an exercise area covering at least 28.6 m² must be available in the administrative building.

7.2 ACTIVE TRANSPORTATION SUPPORT

This feature enhances cycling by providing facilities that support cycling and providing secure and separate storage for bicycle with 5% of capacity of the occupants of the administrative building at least (Figure 15).

7.3 ACTIVE FURNISHING

By implementing ergonomic and active chairs and workstations, it is possible to reduce the time that employees spend seated. The active furnishings feature requires that treadmill desks, pedal desks (Figure 16), bicycle desks or stepper machines should be available for the occupants.



Figure 14, Examples for activity spaces (Source: INTERIORZINE, 2019)

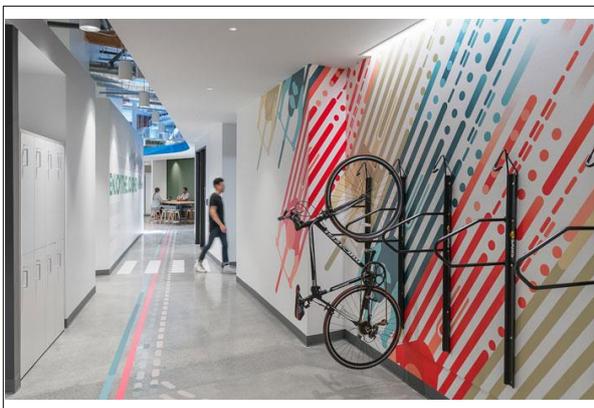


Figure 15, Building's support for bicycle storage and places (Source: INTERIORZINE, 2019)



Figure 16, Treadmill desk and pedal desk (Source: Inmovement®, 2021; Woohyeok C., 2016)

8. COMFORT STANDARD

This standard aides in decreasing the wellsprings of physiological disturbance, interruption and aggravation and on improving ergonomic, acoustic, olfactory and thermal comfort to forestall pressure and work with comfort, usefulness and prosperity.

8.1 ERGONOMICS: VISUAL AND PHYSICAL

Firstly, Computer monitors are adjustable in height and distance dimensions. Secondly, choose office chairs that achieve a wide distribution of pressure on the muscles and bones across the backrest, the greater the retraction, the more weight is transferred to the backrest and that pressure decreases (Figure 17).

8.2 SOUND MASKING

By installing a sound masking system (Figure 18), a speaker system which emits sound in the natural speech frequency, it is possible to prevent excessive migration of conversation sounds.

8.3 SOUND REDUCTION SURFACES

Use Fabric-covered screens in workstation and perforated file boxes as these holes absorb noise and offer privacy (Figure 19).

8.4 INDIVIDUAL THERMAL CONTROL

Use a desk fan, a foot warmer, or a chair with a cooling/heating feature (Figure 20).

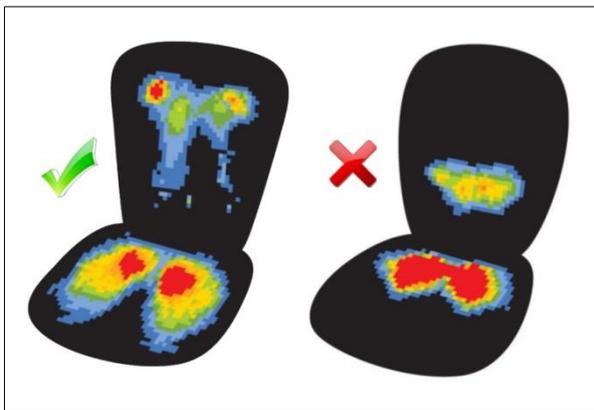


Figure 17, Achieving a wide distribution of pressure while sitting (Source: Herman Miller, 2013)



Figure 18, Sound masking system in the ceiling (Source: Niklas Moeller, 2016)

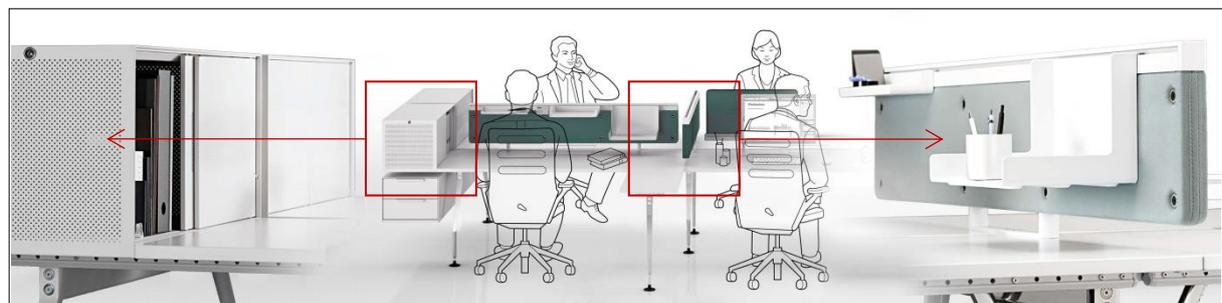


Figure 19, Fabric-covered screens, and perforated file boxes are acoustically effective (Source: Vitra., 2012)



*Figure 20, Personal comfort systems help resolve the unaddressed HVAC systems gaps
 (Source: Ziran Zhang, Wenfang Song, Zihao Chen, Bin Yang & Faming Wang, 2022)*

9. MIND STANDARD

This standard perceives the features of the indoor environment and recognizes working environment arrangements that can be carried out to emphatically affect mind-set, psychosocial status, rest and feelings of anxiety to enhance and improve whole occupant's well-being and health.

9.1 BIOPHILIA 1 – QUALITATIVE

Prior to the urbanization, mankind has lived in close relation to nature which is manifested through a psychological affinity for environmental surroundings and the biophilic design; an idiom used to enhance occupant's bond to the natural environment by using spaces, place conditions direct nature and indirect nature. A work environment which tends to those features has a positive influence on mood and feelings, whereas a sterile and lackluster interior design can have the opposite effect. "WELL building standards" program requires incorporation of environmental elements, lighting, space layout and design patterns in a manner which tends to nature. A "biophilia" plan is improved that contains a characterization of project's way to integrate the patterns of nature through the design and consists of 14 patterns as shown in Table 1.

Table 1, Describes the patterns that make up the biophilic design.

#	Pattern Title	Pattern Application	#	Pattern Title	Pattern Application
1	Eye contact with Nature	Working spaces next to windows that overlook natural elements such as: sky, trees, water and mountains.	2	Non-Rhythmic Sensory Stimuli	Moving facades: facades with Kinetic elements which can be caught sight of eye corner (Figure 22).
		Using green wall, flowers, and Plants in the administrative building.			Viewing interior design art that creates shadows or light patterns (Figure 23).
		Hanging an artwork that shows a landscape (Figure 21).			Interactive design display (Figure 24).

3	Non-Visual Connection with Nature	Play the sound of nature in the background.	4	Biomorphic Forms and Patterns	Leaf patterns in furniture details (Figure 25).
		Natural scents such as aromatic plants.			Use fractals in wallpaper or window details (Figure 26).
		Grainy fabrics.			Organic shapes.
		Wooden panels.			Natural colors.
		Granite table tops.			Spirals & Curves.
5	Thermal Airflow Variability	Sunlight shines through the windows (Figure 27).	6	Complexity and order	Repetitive & symmetrical shapes.
		Outdoor balconies with workspace.			Merging classic or ancient Egyptian art.
		Window heat treatment.			Pattern order.
7	Dynamic Diffused Light	Daylight from multiple angles such as ceilings (Figure 28).	8	Risk/Peril	Passing under, over or through water.
		Ambient diffuse lighting on walls and ceilings.			An art display that defies gravity.
		Firelight.			Transparent floor pane.
9	Presence of Water	Paintings of Ocean life.	10	Material Connection to Nature	Paints inspired by nature.
		Water walls.			Materials that represent the native nature, such as: specific types of stones, wood, clay, wool, leather, and other fabrics.
		Fountains.			
		Aquarium.			
11	Connection to Natural Systems	Native plantings in the buildings (Figure 29).	12	Prospect	Display a piece of art at the end of a long corridor.
		Offices with patios.			Transparent materials.
		Roof top gardens.			Divide large rooms with functional partitions.
13	Refuge	Incorporating high back chairs.	14	Mystery	Creating Winding paths.
		Reading corner (Figure 30).			Partially cover windows.
		Hammock.			Labyrinths



Figure 21, Hanging an artwork that shows a landscape (Source: IWBI™, 2017)



Figure 22, Moving facades which can be caught sight of eye corner (Source: Interface®, 2016)



Figure 23, Viewing interior design art that creates shadows & light patterns (Source: Oliver H., Victoria J. & Eden G., 2018)



Figure 24, Interactive design display such as interactive LED tiles (Source: Dina Soliman Baghdady, 2013)



Figure 25, Leaf patterns in furniture details (Source: Oliver H., Victoria J. & Eden G., 2018)

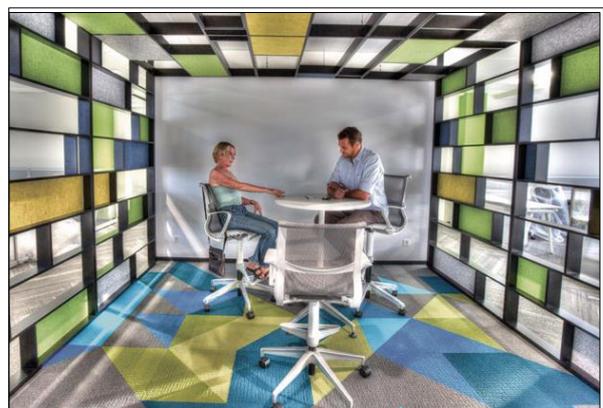


Figure 26, An example of using fractals in the details of windows (Source: Interface®, 2016)



*Figure 27, Sunlight shines through the windows
(Source: Stephen R. Kellert, 2018)*



*Figure 28, Daylight from multiple angles such as ceilings
(Source: Homa Jabbarioun Moghaddami, 2019)*



*Figure 29, Native plantings in the building
(Source: Viktoria Ernstsson, 2015)*



*Figure 30, Creating reading corner
(Source: Biofilico, 2019)*

10. RESULTS

- The change in the way of design thinking and directing it towards enhancing human physical and psychological health contributes to the quality of the indoor built environment of the administrative building.
- The “WELL Building Standards” program was able to be the first building standard in the world focusing on human wellness and health achieving best practices in interior design by placing wellness and health at the heart of interior design decisions and providing innovative solutions for the indoor built environment.
- Successful interior design for administrative buildings depends on studying the seven standards of the "WELL Building Standards" program that must be observed: air, nourishment, water, light, comfort, fitness, and mind.
- The ability to control the indoor built environment of the building is a key element in the success of designing the quality of the indoor built environment, and the right of the occupant to have a comfortable workplace in which he receives more attention.

11. RECOMMENDATIONS

- Paying attention to the health aspect as a pivotal concept in the interior designs of administrative buildings, which in turn supports the economy of society.
- Resorting to the "WELL building standards" program and looking at its standards in the interior design as part of a large system that represents the web of life that unites nature and human health together.
- Taking the nature as a source of learning and benefiting from its unique ecosystems and applying them in the interior designs of administrative buildings to enhance human health within the administrative building.
- Minimizing the harmful effects of administrative buildings on human health by using the philosophy and the methods of design treatments according to the "WELL building standards" Program.
- We recommend interior designers to expand the use of environmentally friendly materials that are recyclable and reusable, and that do not harm the environment or human health.

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