





"Our buildings have a profound impact on our health, well-being and productivity".

Accreditations

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WELL Designed Lighting and Controls AIA/CES HSW / SD Program # WL001 (1.0 Learning Units)

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WELL Designed Lighting and Controls GBCI Approved Course Course Approval Number 0920016605 (1.0 Continuing Education Hours) WELL v1

Learning Objectives

- Explain the purpose and structure of the WELL Building Standard vl.
- Cite good, better, and best solutions to meet the requirements of Light Features 54 Circadian Lighting of the WELL Building Standard vl.
- Identify electric and daylight control strategies that meet requirements of Feature
- 56 Solar Glare Control and Feature 60 Automated Shading and Dimming Controls of the WELL Building Standard vi.

- Describe how the ASID Headquarters in Washington DC used a total light management system to achieve Feature 53 Visual Lighting Design and most of the other Light Features in the WELL Building Standard vl.



Who creates the WELL standard?

Green Business Certification.Delos.

Delos Innovate Well

GREEN BUSINESS CERTIFICATION INC.

What is the WELL Building Standard™?

- WELL is an independently verified, performance based system for measuring, certifying and monitoring features of buildings that impact human health and well-being.

- WELL is the first building standard to focus exclusively on human health and wellness. - WELL Certified[™] spaces are designed to improve the nutrition, fitness, mood, sleep patterns, productivity and performance of the people working, living, shopping or playing inside of them. - WELL is composed of over 100 features that can be applied to each building project for a customized approach. - Each WELL feature is designed to address issues that impact health and wellness through design, operations and behavior.

It's the people that matter most

Why

WELL?

- We spend about 90% of our time indoors, and buildings have a profound effect on our well-being.

- Businesses spend roughly \$3/sf on utilities, \$30/sf on rent and \$300/sf on people annually.

- Since people are typically a business's greatest expense, they are the biggest opportunity for savings, too.

 Following the WELL Building Standard™ may add measurable value to employee health, well-being and productivity.

- Effective lighting, daylighting and lighting control benefit both: energy and people costs.

WELL allows people to connect with buildings

WELL

benefits

- Our buildings can shape our habits, help balance our sleep-wake cycle, drive us toward healthy and unhealthy choices, and passively influence our health through the quality of our surroundings.

- WELL provides a framework for project teams to incorporate a variety of strategies to integrate human health and well-being at the heart of building design, construction and operations.

- WELL also allows project teams to innovate and transform the way humans can interact with the buildings and spaces they experience.

Categories



Certification

- WELL Certification is achieved when projects demonstrate all Preconditions.

- Depending on the features you choose to pursue, you can earn certification at one of three levels: Platinum, Gold or Silver. - The mission of the International WELL Building Institute[™] (IWBI) is to improve human health and well-being in buildings and communities everywhere. - Green Business Certification Inc. (GBCI[®]) provides third-party certification for WELL. - Over 100 million square feet registered or WELL Certified. - Pilot programs for multifamily residential, education, retail, restaurant and commercial kitchen.

Project types

- New & existing buildings.
- New & existing interiors.
- Core & shell.

Certification levels



Platinum level certification is achieved by meeting all of the WELL Preconditions, as well as 80 percent or more of the Optimization Features.





Silver level certification is achieved by meeting 100

percent of the WELL Preconditions applicable to the project Type in all Concepts.

- Higher certification levels above Silver can be achieved by pursuing Optimization Features.

- Because health and wellness objectives vary from one building to the next, WELL provides flexibility when selecting Features that best suit the project owner's goals.

Certification process

The WELL certification process involves five steps:

1. Reaistration

WELL Certification begins with registration through WELL Online, an online platform designed to take projects through the WELL Certification process from start to finish.

2. Documentation requirements

Documentation is required prior to final certification review.

3. Performance verification

A series of onsite post-occupancy performance tests known as performance verification occurs.

4. Certification

WELL Certification recognizes that the project has successfully documented compliance with all features and passed performance verification with all required features.

5. Recertification and documentation submission

Recertification, which must be completed after three years, ensures that the project maintains the same high level of design, maintenance and operations over time.

Building costs

- If you consider the life of a building over 30 years, personnel costs significantly outweigh any other building and operational cost.

- By introducing WELL into buildings, we have the potential to reduce personnel costs – health, medical and productivity – in the long run. Long term value can be generated by addressing health in both commercial and residential spaces.

- By placing people at the heart of design, construction, operations and development decisions, WELL can add value to real estate assets, generate savings in personnel costs and enhance human health, well-being and experience.

"WELL combines best practices in design and construction with evidence based health and scientific research".

TO AD PLANTON

Let's focus on the



concept...





Light metrics

- Luminous flux.
- Luminous intensity.
- Illuminance.
- Luminance.
- Color temperature.

Electromagnetic spectrum

- Light is a part of the electromagnetic spectrum.
- The electromagnetic spectrum is the range of all types of electromagnetic radiation.
- Electromagnetic radiation is generally classified by wavelengths, using nanometers (nm).





WAVELENGTH IN NANOMETERS





Our eyes do more than see

Human circadian rhythms

- Light entering the eye is picked up by 3 types of photoreceptive cells at the

- back of the eye:
- 1. Rods
- 2. Cones
- 3. Intrinsically photosensitive retinal ganglion cells.





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Light concept & features

Goals

- Provide illumination guidelines to minimize the disruption to the body's circadian system, enhance productivity and provide appropriate visual acuity.

- Require specialized lighting systems to increase alertness, enhance occupant experience and promote sleep.

Strategies

- Circadian design
- Daylighting
- Glare controls
- Color quality
- Activity-based lighting levels
- Visual acuity

Light features in v1

- 53: Visual lighting design Precondition
- 54: Circadian lighting design Precondition
- 55: Electric light glare control Precondition
- 56: Solar glare control Precondition
- 57: Low-glare workstation design Optimization
- 58: Color quality Optimization
- 59: Surface design Optimization
- 60: Automated shading and dimming controls Optimization
- 61: Right to light Optimization
- 62: Daylight modeling Optimization
- 63: Daylight fenestration Optimization

"Access to daylight & exterior view improves occupant well-being."





Visual lighting design

Feature 53

PART 1: Visual acuity for focus Precondition

INTENT

- To ensure workers have proper light levels.

KEY REQUIREMENTS

- Maintain at least 20 foot candles at workstation height. (for workstations and desks only)
- Control zones no greater than 500 sf or 20% of open area. (whichever is larger)
- If lighting is less than 300 lux (28 fc), provide task lighting if requested.

VERIFICATION

- Letter of assurance from architect.
- Policy document.
- Spot measurement.

Visual lighting design

Feature 53

PART 2: Brightness management strategies Precondition

INTENT

- Maintain a luminance balance to prevent eye strain.

KEY REQUIREMENTS (at least 2 of the following)

- Maintain brightness contrasts between main rooms and ancillary spaces. (10 to 1)
- Maintain brightness contrasts between task surfaces and adjacent surfaces. (3 to 1)
- Maintain brightness contrasts between task surfaces and remote surfaces. (10 to 1)
- Maintain lighting variety while minimizing dark spots and glare. (10 to 1)

VERIFICATION Professional narrative.









Circadian lighting design

Feature 54

PART 1: Melanopic light intensity for work areas Precondition

INTENT

- To support circadian health by setting a minimum threshold for daytime light intensity.

KEY REQUIREMENTS (at least 1 of the following)

- For at least 75% of workstations provide at least 200 EML between 9:00am and noon.

- For all workstations maintain a least 150 EML or use IES RP-1-12 recommendations for each workstation.

VERIFICATION

- Letter of assurance from architect on site spot measurement.

What is equivalent?

Melanopic Lux

(EML)

– Measured Lux (L) Multiplied by the Ratio (R) that signifies how biologically active the light source is.

- Blue light is typically more biologically active.

- EML= L x R

сст (к)	Light Source	Ratio(R
2950	Fluorescent	.43
2700	LED	.45
2800	Incandescent	.54
4000	Fluorescent	.58
4000	LED	.76
6500	Fluorescent	1.02
6500	Daylight	1.1
7500	Fluorescent	1.11





Possible solutions

Feature 54

Good

Use a cool CCT fixture with a higher ratio. Uses less energy. The drawback is that circadian rhythms may be disrupted due to the biologically active light, even with a dimmer.

Better

Use a bright, warm CCT fixture. Even though it has a low ratio, if it is bright enough, it will meet the EML requirements. The drawback is that it uses more energy and may be too bright. So a dimming system is desirable here.

Best

Use tunable white fixtures that automatically adjust CCT and light intensity throughout the day (e.g. cooler light in the morning, transitioning to a warmer and dimmer output in the late afternoon and evening). This would save energy and provide optimal circadian lighting. The drawback is the upfront costs of color tunable fixtures.



ExxonMobil HQ Houston, TX





Electric light glare control

Feature 55

PART 1: Luminaire shielding Precondition

INTENT

- To reduce glare and minimize eyestrain.

KEY REQUIREMENTS Part 1 – Luminaire shielding

- No shielding for less than 20,000 cd/m2
- 15°for 20,000 to 50,000 cd/m2
- 20° for 50,000 to 500,000 cd/m2
- 30°for 500,000 cd/m2 and above

VERIFICATION

- Letter of assurance from architect.

Electric light glare control

Feature 55

PART 2: Glare minimization Precondition

INTENT

- To reduce glare and minimize eyestrain.

KEY REQUIREMENTS Part 2 - Glare minimization

- For seating areas luminaires more than 53° above the center of view (degrees above horizontal) have luminances less than 8,000 cd/m2

VERIFICATION

- Letter of assurance from architect.









Solar glare control

Feature 56

PART 1: View window shading Precondition

INTENT

- To avoid glare from the sun by blocking or reflecting direct sunlight away from occupants.

KEY REQUIREMENTS

- For all "view windows" (glazing less than 7 ft above floor) in regularly

- occupied spaces provide one of these: - Controllable or automatic window shades/blinds.
 - External shading system.
 - Variable opacity glazing. (e.g. electrochromic glass)

VERIFICATION

Letter of assurance from architect; onsite spot check.

Solar glare control

Feature 56

PART 2: Daylight management Precondition

INTENT

- To allow daylight while controlling glare.

KEY REQUIREMENTS

- At least 1 of the following for all "daylight windows" (glazing more than 7 ft above floor) in regularly occupied spaces:

- Interior shading-automatic or manual.
- External shading system.
- Light shelves.
- Micro mirror film.
- Electrochromic glass or equivalent.

VERIFICATION

- Letter of assurance from architect; onsite spot check.







Low glare workstation design

Feature 57

Glare avoidance Optimization

INTENT

- To reduce glare at workstations.

KEY REQUIREMENTS

Screens within 15 feet of a window must be oriented away from window.
 (within a 20° angle perpendicular to the plane of the nearest window)
 Overhead luminaires can not be aimed at computer screens.

VERIFICATION

- Onsite visual inspection.



Feature 58

Color rendering index Optimization

INTENT

- To accurately portray colors and enhance occupant comfort.

KEY REQUIREMENTS

- Color Rendering Index Ra (CRI, average of R1 through R8) of 80 or higher.
- Color Rendering Index R9 of 50 or higher.

VERIFICATION

- Letter of assurance from architect.









Surface design

Feature 59

Working and learning area surface reflectivity Optimization

INTENT

- Ensure that a sufficient amount of light reaches the eye without increasing energy consumption or glare.

KEY REQUIREMENTS (in regularly occupied spaces) - Ceilings have an average LRV of 0.8 or more for at least 80% of surface area.

- Walls have an average LRV of 0.7 (70%) or more for at least 50% of surface area.

- Furniture systems have an average LRV of 0.5 (50%) or more for 50% of surface area.

VERIFICATION

- Letter of assurance from architect.







Automated shading and dimming controls

Feature 60

PART 1: Automated sunlight control Optimization

INTENT

- Implement an automated shading system that controls glare and reduces energy consumption without disrupting occupants.

KEY REQUIREMENTS

- For windows larger than 6 square feet at workstations and other seating areas, shading devices automatically engage to prevent glare.

VERIFICATION

- Letter of assurance from MEP.

Automated shading and dimming controls

Feature 60

PART 2: Responsive light control Optimization

INTENT

- Implement automated controls that reduce output based on occupancy and daylight availability.

KEY REQUIREMENTS (in all major workspace areas)

- All lighting dims or turns off when space is unoccupied.
- All non-decorative lighting dims in the presence of daylight.

VERIFICATION

- Letter of assurance from MEP.







Right to light

Feature 61

PART 1: Lease depth PART 2: Window access

INTENT

- Ensure building occupants are exposed to adequate levels of sunlight.

KEY REQUIREMENTS

- Part 1 – Lease depth: at least 75% of the area of all regularly occupied spaces are within 25 ft. (7.5m) of window.

– Part 2 – Window access: 75% of workstations within 25 ft. and 95% of all workstations are within 41 ft. (12.5m) of an atrium or window with views to the outside.

VERIFICATION

- Architectural drawings: onsite spot check.

Daylight modeling

Feature 62

Healthy sunlight exposure Optimization

INTENT

- To support circadian and psychological health by setting thresholds for indoor sunlight exposure.

KEY REQUIREMENTS

- Spatial daylight autonomy is achieved for at least 55% of regularly occupied space. (sDA 300Lux, 50%)

- Annual sunlight exposure is achieved for no more than 10% of regularly occupied space. (ASE 1000Lux, 250hrs)

VERIFICATION

- Modeling report.



Red area indicates at least 30 foot- candles of useful daylight for more than 50% of the work hours per year.





Daylight fenestration

Feature 63

PART 1: Window sizes for working and learning Optimization

INTENT

- To balance energy performance, thermal comfort and access to quality daylight.

KEY REQUIREMENTS

- Window wall ratio as measured on external elevations is between 20% and 60%.

- Percentages greater than 40% require external shading or adjustable opacity glazing to control unwanted heat gain and glare.
- Between 40% and 60% of window area is at least 7 ft. above the floor.

VERIFICATION

- Architectural drawings; onsite spot check.

Daylight fenestration contrd

Feature 63

Optimization

INTENT

- To balance energy performance, thermal comfort and access to quality daylight.

KEY REQUIREMENTS

- PART 2 - Window transmittance in working & learning areas.

- All glazing located higher than 7 ft. from the floor has VT of 60% or more.
- All glazing located 7 ft. or lower from the floor has VT of 50% or more.
- PART 3 Uniform color transmittance.

- All windows used for daylighting have visible light transmittance of wavelengths between 400 and 650nm does not vary by more than a factor of 2.

VERIFICATION

- Letter of assurance from architect.





Innovation

Features 101 - 105

PART 1: Window sizes for working and learning Optimization

- A project may earn up to 5 innovation features for the following:

- Above and beyond WELL.
- Explanation of the health concern.
- How the strategy impacts health.Scientific, medical, and industry research supporting the strategy.

- Potential innovation features:

- Educational outreach.
- Automatic and dynamic circadian lighting with color tunable lights.
 Better sleep environment with blackout shades combined with side
- channels.



Key changes & features

WELL v2

Key changes in v2 - One unified WELL for all project types. - 10 concepts instead of 7. - Flexible optimizations. - Point-based like LEED.

- Streamlined features and fewer preconditions.

Light features in v2

- ght features in v2
 L01: Light exposure and education Precondition
 L02: Visual lighting design Precondition
 L03: Circadian lighting design Optimization
 L04: Glare control Optimization
 L05: Enhanced daylight access Optimization
 L06: Visual balance Optimization
 L07: Electric light quality Optimization
 L08: Occupant control of lighting environments Optimization

Real World Project

ASID HQ

World's first LEED Platinum and WELL Platinum project

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Real World Project

ASID HQ

World's first LEED Platinum and WELL Platinum project

HISTORY

- Founded in 1975, the American Society of Interior Designers (ASID) is the oldest, largest and only multi-disciplinary professional organization for interior designers, interior design students, and the manufacturers and suppliers who support the profession.

DESCRIPTION

- Corporate office in Washington D.C.
- 8,500 sf.
- Architect: Perkins + Will.
- Lighting design: Benya Burnett VISION.

- "Workplace of the future"—a living laboratory that could prove exactly what is possible in office design with a reasonable budget.

GOAL

- The primary goal was to create a space that supported health, wellness, and the well-being of employees, which would improve the organization's productivity, engagement, and retention.

Real World Project

ASID HQ

World's first LEED Platinum and WELL Platinum project

KEY STRATEGIES

- Visual lighting design.
- Circadian-optimized lighting.
- Automated shading and dimming.
- Daylighting and views.
- Electric light and solar glare control.
- Minimize heat solar heat gain.
- VOC reduction.

KEY SOLUTIONS

- Digitally addressable lighting control system.
- Tunable white lighting fixtures.
- Solar-adaptive automated window shades.
- GREENGUARD Gold window shade fabrics.

RESULTS

- Achieved nearly all the Light features.
- All employees have access to daylight.
- 9% increase in employee collaboration.
- 19% improvement in absenteeism.

- Lighting energy reduction of 78% which equates to \$7,654 savings each year.





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