

Green Building Guidelines LEED The Way

- Savings result where LEED has been applied to improve IAQ!

LEED Best Practices Save \$\$\$

- A growing body of green building case studies document the benefits of healthy IAQ in the workplace

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What is LEED?

The U.S. Green Building Council (USGBC) has defined standards for health and sustainability in commercial buildings through its LEED® (Leadership in Energy and Environmental Design) rating and certification system. Businesses or building owners can register their building projects with USGBC and earn points toward LEED certification.

LEED certification has become a sought-after form of recognition in the business world, because green buildings generate operating cost savings, productivity increases and prestige. But it's important to note that the ultimate rewards of building green aren't about good P.R. or earning a plaque! They are the benefits provided by creating healthy, sustainable working environments.

To earn LEED's green building certification, standards addressing these five categories

of building design, construction and maintenance must be achieved:

1. Building site selection and site development
2. Water conservation
3. Energy efficiency and renewable energy use
4. Selection and handling of building materials
5. Safeguarding indoor environmental quality, including IAQ

As of 2007, LEED certification can be obtained for renovation and operation of existing commercial buildings and for new commercial construction projects. LEED certification is also being formulated to address sustainable development for entire neighborhoods, for individual homes and for commercial real estate developments intended to be leased or sold.

What are LEED's environmental quality strategies?

LEED defines a number of action-oriented strategies to improve indoor environmental quality. Any building project must incorporate several of these strategies in order to earn points sufficient for an award of LEED certification. LEED's IAQ strategies were developed to help building designers, owners and managers actively maintain healthy IAQ.

GOALS

- Reduce/eliminate pollutants at the source
- Manage pollutants to minimally impact building occupants
- Provide temperature, ventilation and humidity controls to individual work areas
- Provide daylight and views to workers

STRATEGIES

- Control tobacco smoke
- Use building and decorating materials that emit little or no air pollution
- Require use of Green Cleaning materials and practices
- Place air intakes away from pollution sources
- Monitor indoor air quality
- When possible, design building systems to allow for individual climate controls
- Whenever possible, configure working spaces to maximize use of natural light and window access

What does LEED insist on for environmental quality?

LEED green building certification can be based on many combinations of design, construction and ongoing operational strategies, but some factors are non-negotiable prerequisites.

These strategies are required to earn LEED certification. Ideally, they should be followed in every workplace, because they are such crucial safeguards of IAQ.

Minimum IAQ performance

Outdoor air – thoroughly circulated and appropriately mixed with conditioned indoor air – is essential to good IAQ. LEED requires that outdoor air ventilation distribution systems be designed, modified and maintained to supply minimum ventilation rates defined by ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers). These systems must be maintained according to U.S. EPA or SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) guidelines. Finally, all building exhaust systems - including bathroom, shower, kitchen, and parking areas - must be tested and maintained according to adequate building operation protocols.

Environmental tobacco smoke (ETS) control

Negative health effects of inhaling direct and second-hand smoke are widely recognized. Smoking is increasingly banned in many public places. However, smoking is still permitted in defined areas, indoors or outdoors, in many private workplaces.

LEED mandates elimination or strict mechanical control of workplace smoking areas. LEED offers two options:

1. Prohibit smoking in the building, including locating any exterior smoking areas at least 25 feet from entries, outdoor air intakes and operable windows.
2. Prohibit smoking indoors except in smoking area(s) designed to contain, capture and remove ETS from the building. Design measures can include construction and maintenance of a completely sealed, specially pressurized facility with air directly exhausted outdoors so ETS-contaminated air cannot be re-circulated indoors.

Asbestos removal or encapsulation and PCB removal

Asbestos was formerly widely used to insulate pipes and ductwork, in ceiling tile, and fire-proofing strategies. Asbestos often remains in older buildings. Polychlorinated Biphenyls (PCBs) are typically present in motor oils, fossil fuels, and vehicle or manufacturing exhaust. Asbestos particles pose an extreme respiratory hazard when they become airborne, and PCBs add to building hazards in the event of fire.

To reduce occupant exposure to these very toxic substances and prevent harmful effects, LEED mandates that a program must be in place to manage indoor asbestos and PCBs according to regulatory requirements, including maintaining an up-to-date survey of all asbestos and PCB locations.



**Let LEED
Work In
Your Office**

**In these
LEED Certified
buildings:**

- **Absenteeism has been reduced by 50% at Alberici Corporation in St. Louis, Missouri**
- **Day cleaning has cut energy bills by 8% and reduced janitorial related complaints by 70% at California EPA Headquarters, resulting in annual savings of over \$210,000**

LEED points add up to healthy workplace IAQ.

The current (2007) LEED rating systems for commercial buildings consist of multiple criteria, called "points," that define many ways to enhance the well-being of everyone who works in such spaces.

Even for businesses not seeking LEED certification, it can be profitable to understand and apply the methods LEED sets forth to safeguard healthy IAQ.

The LEED IAQ points include:

Monitoring outdoor air delivery

To sustain occupant comfort and health, a permanent carbon dioxide (CO₂) monitoring system should be installed and used by building managers to monitor levels of space ventilation and filtration.

Increasing ventilation

This action will provide high-level outdoor air ventilation necessary for occupant comfort, health and productivity. Functions will satisfy requirements set by ASHRAE for mechanically ventilated spaces or by CIBSE (Chartered Institution of Building Service Engineers) for naturally ventilated spaces. To earn this LEED point, 90% of occupied spaces must be ventilated by outdoor air.

Documenting productivity impacts

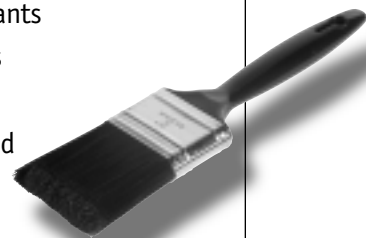
USGBC will award up to two LEED points to projects that document a history of factors such as absenteeism and health care claim costs, while also tracking changes over time in these and other productivity factors. The idea is to show how green buildings positively impact the health of people who work in them. Collecting and sharing such data helps make an economic case for investing in the green building practices defined by LEED.

Using building and decorating materials that emit little or no air pollution

Several LEED points may be earned by choosing building and furnishing materials that minimize air pollutants which are odorous, potentially irritating or otherwise harmful to occupant health.

Such materials include:

- Adhesives and sealants
- Paints and coatings
- Carpet systems
- Composite wood and laminate adhesives
- Office furnishings

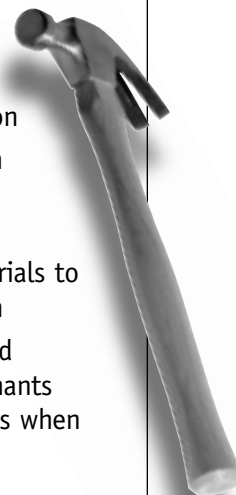


Rigorous criteria are detailed by LEED, and independent laboratories conduct tests and award green certifications for each of these types of materials, ensuring that product characteristics have been proven to safeguard IAQ.

Following an IAQ construction management plan

An IAQ construction management plan will help manage air quality factors during construction or renovation to prevent later development of IAQ problems. In order to earn this point, a plan must include:

- Attention to SMACNA guidelines for sheet metal and air conditioning design
- Use of high-performance air filters during construction
- Replacement of all filtration media immediately prior to building occupancy
- Protection of building materials to prevent moisture absorption
- Adherence to strictly defined options to remove contaminants from affected interior spaces when construction is complete



Controlling indoor chemical and pollutant sources

LEED points may be earned by reducing hazardous particle contaminants in the work environment through use and maintenance of high-performance filters on all outside air intakes and returns for re-circulation of inside air, and through strict isolation and exhausting of pollutants commonly generated by high-volume printing and copying areas.

Use and maintain entrance area doormats. Up to 80% of particulate contaminants are carried indoors on peoples' feet!

Green Means A Healthy Workplace

In any workplace, LEED IAQ guidelines can be good tools:

- To safeguard employee health
- To improve productivity
- To boost profitability
- To enhance employee satisfaction

Green Cleaning

The requirements for these LEED points are the most extensive of all the IAQ safeguards defined by LEED.

Why is cleaning so heavily emphasized in LEED strategies to maintain IAQ? It's because choice and use of cleaning practices, cleaning products and janitorial equipment - key to maintaining the physical space - are also crucial to good maintenance of everyone's health at work!

For example, have you ever used more of a cleaning product than the label recommends because you think more will work better? Think about the amount of dirt (and more serious pollutants) that can be kept out of your workplace in the first place, when good quality entry mats are used. Healthier pest-control options, called Integrated Pest Management (IPM), have been defined by U.S. EPA and other agencies. IPM protocols deal with insects and similar infestations without the use of toxic chemicals.

Multiple LEED Green Cleaning points are intended to maintain a clean environment while protecting both custodial and office workers. Green Cleaning reduces exposure to the hazardous chemical, biological and particle contaminants generated by cleaning products and practices.



LEED's Best Practices safeguard the health of cleaning personnel as well as office workers.

The LEED Green Cleaning criteria include:

- Use of materials and other cleaning strategies for entryways and exterior walkways that prevent dust, dirt, pollen and other particles from getting in at building entry points
- Isolation and proper setup of all areas where cleaning chemical concentrates are mixed and where janitorial equipment is stored
- Implementation of a low environmental impact cleaning policy, including:
 - Use of sustainable cleaning products and systems, such as those tested and certified by the Green Seal laboratories (see page 21 and [Resources](#), page 41)
 - Use of chemical concentrates in appropriate dilutions
 - Proper training of cleaning personnel in hazards, use, maintenance and disposal of cleaning chemicals, dispensing equipment and packaging
 - Use of hand soaps without microbial agents, except as required by local health codes
- Development and maintenance of a low environmental impact pest control policy, such as use of an Integrated Pest Management system

Green Cleaning

- **Minimizes indoor air pollutants through use of non-toxic or less toxic cleaning products**
- **Reduces health risks for janitorial workers**

- Development and implementation of a low environmental impact cleaning equipment policy, including:
 - Use of equipment that maximizes reduction of contaminants with minimal environmental impacts
 - Use of vacuum cleaners that meet standards set by the Carpet & Rug Institute's Green Label Program, which capture 96% of particulates 0.3 microns in size
 - Use of carpet extraction equipment that removes moisture, enabling carpets to dry completely in 24 hours or less, preferably incorporating dry foam extraction to reduce chemical usage as well as drying time
 - Use of powered equipment designed to capture fine particulates and operate with a sound level less than 70 decibels
 - Use of low-emission, high-efficiency engines in all propane-powered equipment, including automated scrubbing machines equipped with

- variable speed feed pumps to maximize use of cleaning fluids
- Use of environmentally preferable gel batteries in all battery powered equipment
- Use of active micro-fiber technology products to reduce cleaning chemical consumption and prolong the life of disposable cleaning pads
- Use of ergonomically designed cleaning equipment to minimize vibration, noise and user fatigue
- Use of rubber bumpers on cleaning equipment to minimize damage to building surfaces
- Maintenance of cleaning logs for powered housekeeping equipment and chemical use

Following an ongoing IAQ management program

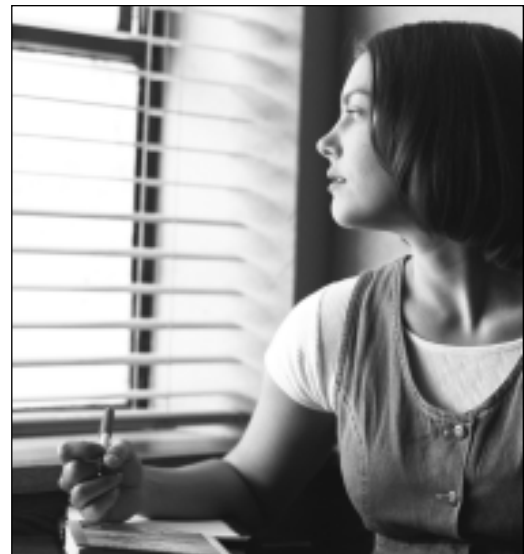
Comprehensive guidelines for maintaining healthy IAQ are provided by U.S. EPA's excellent free publication *Building Air Quality: A Guide For Building Owners And Facility Managers* (see [Resources](#), page 41).

Beyond IAQ: how does LEED enhance workplaces?

Addressing related environmental quality factors

In addition to LEED points that specifically address IAQ factors, three additional factors have been proven to significantly improve occupant health, productivity and well-being at work.

- **Systems controllability**
LEED points may be earned for design and operation of systems that provide individuals or groups sharing multi-occupant spaces with control of airflow, temperature and lighting conditions.
- **Thermal comfort**
LEED points may be earned for building systems that comply with specific ASHRAE standards for control of humidity, including permanent systems to monitor specified comfort criteria.
- **Daylight and views**
Studies demonstrate positive relationships between the health and



productivity of building occupants and the amounts of daylight in a working space, as well as whether occupants have direct visual access to the out-of-doors. LEED points may be earned by providing high levels of access to daylight and views, by reducing glare through window design and by maintaining daylight and views during renovations.