Acoustical Ceiling Solutions

USG

How building materials, maintenance procedures and the daily practices of occupants affect health and comfort within a space.

Indoor Environmental Quality

Indoor Environmental Quality (IEQ) refers to all environmental factors that affect the health and wellbeing of building occupants. IEQ includes such factors as indoor air quality (IAQ), comfort, humidity, air exchange, acoustics, and lighting quality.

Design

Healthy Buildings

At their best, buildings provide shelter, adhere to environmentally sound principles, and encourage productivity by creating healthy physical conditions. But without proper design, construction, operation and maintenance, buildings can quickly become a source of distraction, discomfort, and even illness.

What Can Go Wrong

Volatile organic compounds, poor ventilation, high humidity, mold and mildew, distracting noise, odors, poor lighting, glare, combustibility, uneven heat

What Can Cause It

Building materials such as paints, ceiling panels, carpets and vinyl flooring have the potential to add pollutants to the air.

Building equipment such as HVAC systems can cause condensation, uneven heat, and humidity that can act as a factor in increasing the amount of indoor pollution.

People can also add to the mix of pollutants: perfumes, deodorants, personal hygiene, aerosols, cleaning agents, and air fresheners can all cause problems for sensitive individuals.

Control

Volatile Organic Compounds

Volatile Organic Compounds (VOCs) are organic chemicals released as gases from certain solids or liquids. High in pollutants, VOCs include thousands of synthetic and natural chemicals emitted by a wide array of products, building materials, and microorganisms.

What Can Go Wrong

The presence of VOCs can cause numerous health effects in sensitive individuals, including eye, nose and throat irritation, headaches, allergic skin reactions, fatigue, dizziness, loss of coordination, nausea, and damage to the liver, kidneys and central nervous system. The effect depends on many factors, including level of exposure and length of time exposed.

What Can Cause It

VOCs present different issues and challenges during the three main phases of a building's lifecycle:

1 Material manufacture

2 Construction and installation

3 Occupancy

Each one of these stages can introduce risk and health concerns.

VOCS can be emitted in the manufacturing process, although this does not necessarily mean that VOCs continue to be emitted during or after construction. While products may contain VOCs in the manufacturing process, product aging typically reduces the amount of VOC emissions.

During construction and installation, the building structure, envelope and floor system can be major sources of air pollution, although many surfaces will eventually be covered with finish materials. Chemical reactions and emissions from products can occur because of changes in the level of humidity, temperature, and/or exposure to the sun. Deterioration can also result in the release of pollutants.

Occupancy of the building introduces its own issues. It is this phase of the building lifecycle over which building designers and constructors have the least control, because occupants may introduce their own pollutants. Ongoing building maintenance can introduce additional sources of VOCs.

Why You Should Care

The most widely accepted national guideline for environmentally conscious building is the LEED (Leadership in Energy and Environmental Design) Green Building Rating System® developed by the United States Green Building Council. The USGBC is a coalition of leaders from across the building industry, including USG, working to promote buildings that are healthy and environmentally responsible as well as profitable. Selection of building materials with low VOC emissions, combined with proper building maintenance and management, may qualify for LEED points.

Meet and Outperform

Formaldehyde Standards

One of the more commonly occurring VOCs is formaldehyde, a colorless and pungent gas. Formaldehyde is an important industrial chemical used to make other chemicals, building materials, and household products. Formaldehyde may be released into the air, or off-gassed, by some products. Formaldehyde is also a naturally occurring substance.

What Can Go Wrong

Formaldehyde can cause extreme discomfort and adverse reactions—watery eyes, burning sensations in the eyes and throat, nausea, asthma attacks, wheezing, coughing, fatigue, skin rash, and severe allergic reactions.

What Can Cause It

- Cleaning agents
- Paper products
- Foam insulation
- Automobile exhaust
- Cigarettes
- Permanent-press fabrics and draperies
- Glue or adhesive in pressed wood products
- Preservatives in some paints, coating and cosmetics
- Burning wood, kerosene or natural gas
- Vinyls

The U.S. Department of Labor Occupational Safety & Health Administration (OSHA) has defined formaldehyde exposure and content requirements for workers handling materials:

Exposure The OSHA Permissible Exposure Limit (PEL) for formaldehyde is 750 ppb (0.75 ppm) per 8-hour TWA (Time Weighted Average, the average exposure over an 8-hour work period).

Content The presence of formaldehyde must be reported if the concentration of formaldehyde exceeds 0.1 percent of weight. All USG ceilings are well below these levels.

USG's ceiling panels are classified as either low-formaldehyde or formaldehyde-free, based on widely recognized standards of evaluation and testing. The level of formaldehyde in USG's low-formaldehyde ceilings is still far below the level considered an exposure risk.

USG offers the widest selection of standard ceilings that satisfy stringent IEQ requirements and guidelines related to VOC and formaldehyde emissions. Over 20 ceiling families deliver low-formaldehyde or formaldehyde-free performance for the most demanding expectations of owners, specifiers and occupants.

Low-Formaldehyde Performance of USG Ceilings

	Ceiling Formaldehyde Emissions Lower than Concentration Limits			VOC-Free[3]
	CHPS	State of Washington	ANSI/ASHRAE Referenced Guidelines[2]	
Concentration Limits in parts per billion -- ppb	13.5	50	16 to 750	
Low-Formaldehyde Ceiling Options[1]				
Aspen™	•	•	•	
Astro™ *ClimaPlus*™	•	•	•	
Brio™ *ClimaPlus*™	•	•	•	•
Eclipse™ *ClimaPlus*™	•	•	•	
"F" Fissured™	•	•	•	•
Fissured™	•	•	•	
Fresco™ *ClimaPlus*™	•	•	•	•
Frost™	•	•	•	•
Frost™ *ClimaPlus*™	•	•	•	•
Glacier™	•	•	•	•
Mars™ *ClimaPlus*™	•	•	•	
Millennia® *ClimaPlus*™	•	•	•	
Millennia *ClimaPlus* High NRC	•	•	•	
Olympia Micro™ *ClimaPlus*™	•	•	•	
Orion™ 270 *ClimaPlus*™	•	•	•	
Pebbled™ *ClimaPlus*™	•	•	•	
Radar™	•	•	•	
Radar™ Ceramic *ClimaPlus*™	•	•	•	
Radar *ClimaPlus*	•	•	•	
Radar *ClimaPlus* High CAC, High NRC	•	•	•	
Rock Face® *ClimaPlus*™	•	•	•	
Sandrift™ *ClimaPlus*™	•	•	•	•
Sheetrock® Lay-In Ceiling Panels *ClimaPlus*™, Vinyl		•		
Summit™ *ClimaPlus*™	•	•	•	•
Touchstone™ *ClimaPlus*™	•	•	•	

Note
(1) Includes Illusion scored panels, where applicable.
(2) ANSI/ASHRAE Standard 62.1 – 2004 "Ventilation for Acceptable Indoor Air Quality" cites selected air quality guidelines for enforceable and/or regulatory levels or non-enforceable guidelines and reference levels. These guidelines (OSHA, MAK, Canadian, WHO/Europe, NIOSH, and ACGIH) establish workday exposure limits in ppb of 750, 300, 50, 81, 16, and 300, respectively.
(3) Formaldehyde VOC Classification, according to standards established by CHPS, the State of Washington, ANSI, and ASHRAE.

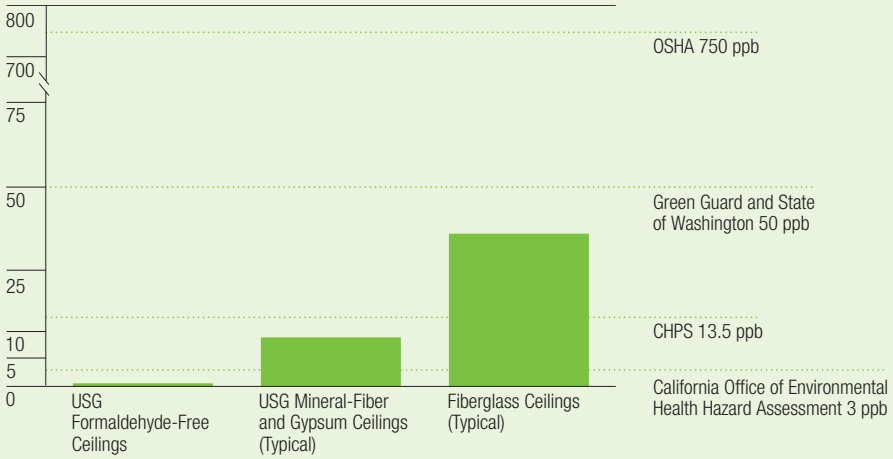
Why You Should Care

California's Office of Environmental Health Hazard Assessment recognizes products with emissions of less than 3 parts per billion (ppb) as "formaldehyde-free," and the Collaborative for High Performance Schools (CHPS) limits formaldehyde concentration in school classrooms to 13.5 parts per billion (ppb).

Washington State requires that each construction product contribute less than 50 ppb to building air. The ANSI/ASHRAE Standard 62.1-2004 on Ventilation for Acceptable Indoor Air Quality cites selected standards that establish workday exposure limits.

Outperforming the Highest Standards

Formaldehyde (ppb)



Inhibit

Mold and Mildew

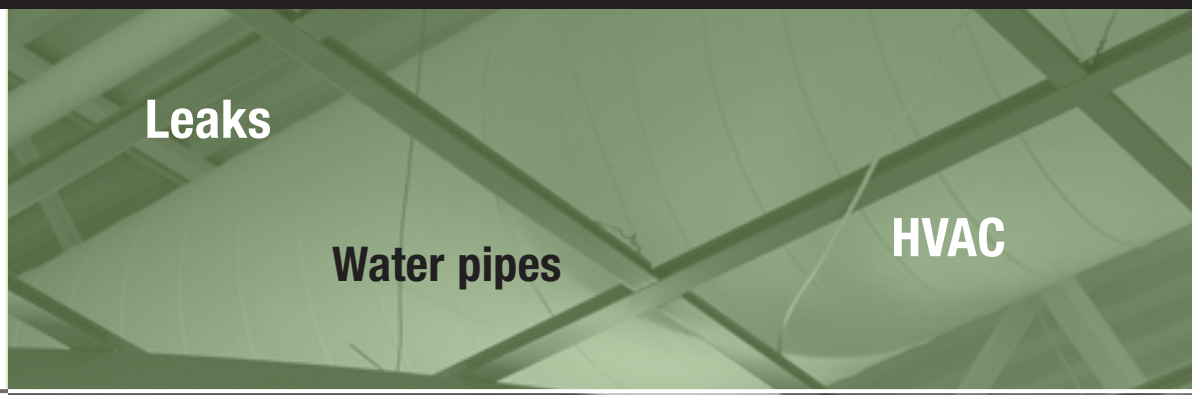
The presence of mold or mildew is a symptom of a larger construction or maintenance problem. While moisture is essential to the growth of mold and mildew, its source is not always easy to track down.

What Can Go Wrong

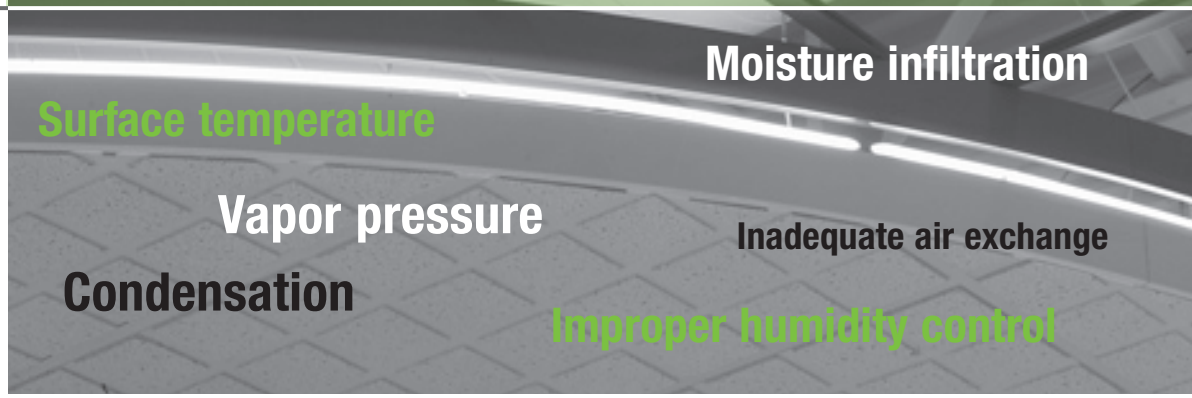
Molds can produce allergens, toxins and irritants, even when dormant, leading to health problems in susceptible people. It is important to recognize how unwanted moisture and conditions in the indoor environment can allow these microbes to infiltrate a structure.

What Can Cause It

In the plenum area above the ceiling
contributing factors include condensation, building leaks, and improperly maintained ductwork or water pipes.



Below the ceiling
many factors can contribute to moisture: poor enclosure or exposure to outdoor elements, leaks from windows, slow air circulation, improper humidity control, low surface temperature, and even some indoor plants.



USG helps owners and specifiers address the issue of mold and mildew growth by providing two levels of antimicrobial protection. For superior protection and warranty coverage against mold and mildew, standard ceilings with *ClimaPlus* Superior Performance feature a patented antimicrobial treatment for broad-spectrum control of fungi, mold, mildew, bacteria, yeast and algae. These ceilings deliver performance scores of '8' to '10' when tested per ASTM D3273. In addition, USG mineral-fiber ceilings with *ClimaPlus* AntiMicrobial Treatment contain face and back coatings and/or formulations that inhibit or retard growth of mold, mildew and odor/stain-causing bacteria on treated surfaces.

USG's Mold and Mildew Solutions

Products	*ClimaPlus* Superior Performance	*ClimaPlus* AntiMicrobial Treatment
Astro *ClimaPlus*	•	
Astro *ClimaPlus* Illusion	•	
Brio *ClimaPlus*	•	
Eclipse *ClimaPlus*	•	•
Eclipse *ClimaPlus* Illusion and Pedestals		•
Fresco *ClimaPlus*	•	
Frost *ClimaPlus*	•	
Mars *ClimaPlus*		•
Millennia *ClimaPlus*		•
Millennia *ClimaPlus* High NRC		•
Millennia *ClimaPlus* Illusion		•
Olympia Micro *ClimaPlus*		•
Olympia Micro *ClimaPlus* Illusion		•
Pebbled *ClimaPlus*		•
Radar *ClimaPlus*		•
Radar *ClimaPlus* High CAC, High NRC		•
Radar *ClimaPlus* Illusion		•
Rock Face *ClimaPlus*		•
Sandrift *ClimaPlus*	•	
Summit *ClimaPlus*	•	
Touchstone *ClimaPlus*		•

Why You Should Care

To inhibit mold growth on ceiling panel surfaces, potential treatment areas include face and back surface coatings, or the formulation of materials used to create the ceiling substrate. While other manufacturers simply apply additives or surface treatments, USG follows a more integrated approach that includes patented formulary science as well as coatings technology.

It is important to understand that no mold inhibitor can prevent the growth of mold if building conditions introduce risk in the form of unwanted moisture or humidity.

Resources

USG Literature

Ceiling Systems (SC2000)

Indoor Environmental Quality Acoustical Ceilings Certification of Performance (SC2451)

Ceiling Systems Warranties and Limitations (SC2102)

Sustainable Design (SA120)

Technical Assistance

800 USG.4YOU

Expert advice for any project-related inquiries.

USG *Gypsum Construction Handbook*

The industry's best resource for good construction practices.

Government Web Sites

California Office of Environmental Health Hazard Assessment/Proposition 65

www.oehha.ca.gov/prop65.html

The Collaborative for High Performance Schools (CHPS)

www.chps.net

National Institute for Occupational Safety and Health (NIOSH)

www.cdc.gov/niosh/topics/indoorenv

U.S. Department of Labor Occupational Safety & Health Administration (OSHA)

www.osha.gov/SLTC/indoorairquality/index.html

www.osha.gov/SLTC/molds/index.html

U.S. Environmental Protection Agency (EPA)

www.epa.gov/iaq

www.epa.gov/mold

Washington State Department of Health Division of Environmental Health

www.doh.wa.gov/ehp/default.htm

Industry Web Sites

American Institute of Architects (AIA)

www.aia.org

American National Standards Institute (ANSI)

www.ansi.org/

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

ashrae.org

American Society of Interior Designers (ASID)

www.asid.org

Greenguard Environmental Institute

www.greenguard.org/

International Interior Design Association (IIDA)

www.iida.org

Leadership in Energy and Environmental Design (LEED)

www.usgbc.org/DisplayPage.aspx?CategoryID=19

Scientific Certification Systems

www.scscertified.com/manufacturing/manufacture_certclients.html

As a manufacturer of building materials for over a century, USG's commitment to the environment has made us a leader in the industry. Our use of natural, recycled and recaptured materials before it became fashionable, our adherence to strict quality standards and our charter membership in the U.S. Green Building Council have established USG firmly at the forefront of the movement to safeguard the environment.

Technical Service
800 USG.4YOU

Web Site
www.usg.com

Samples/Literature
888 874.2450

Samples/Literature E-mail
samplit@usg.com

Samples/Literature/Fax
888 874.2348

Customer Service
800 950.3839

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