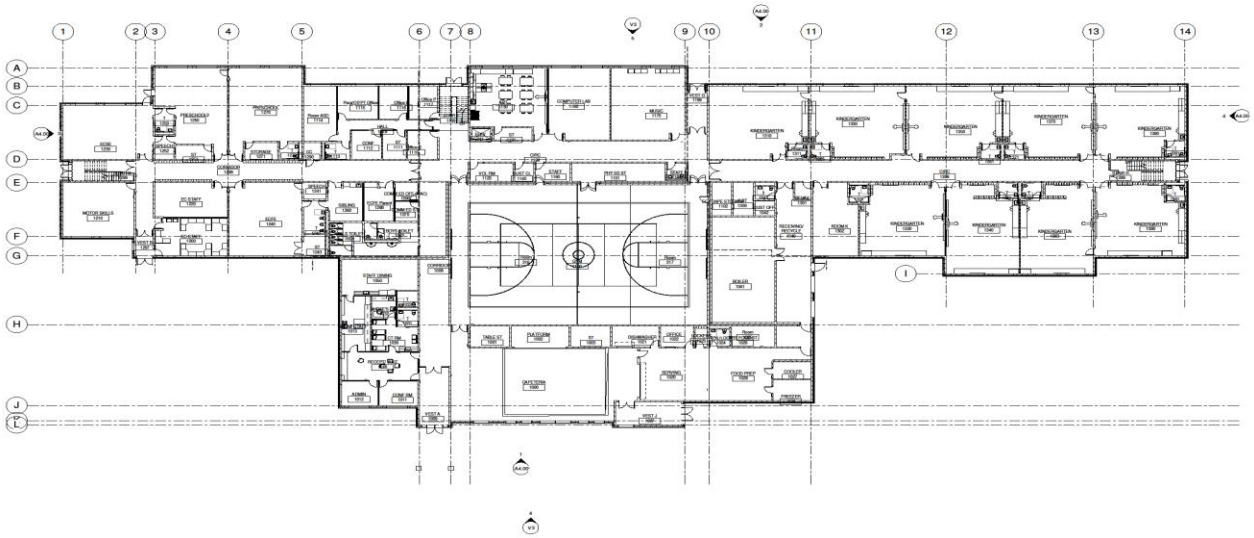


KRAUS-ANDERSON® CONSTRUCTION COMPANY

PROVIDING OUR CLIENTS WITH
INNOVATIVE CONSTRUCTION SOLUTIONS

Indoor Environmental Quality



What is Indoor environmental Quality

- **IEQ – refers to quality of the air and inside environment.**
- **Based on:**
  - **Pollutant concentrations**
  - **Conditions that affect health**
  - **Comfort**
  - **And performance of occupants**

The variable that affect environment include:

- **Temperature**
- **Humidity**
- **Lighting**
- **Acoustics**
- **Air Quality**
- **Control Systems**

IEQ problems can lead to

- Liability Issues
- Poor occupant health
- Missed work
- Expensive repairs

Employee Costs:

- Employees are a companies most expensive asset:
  - Average cost for an employee is $318/sf
  - Mortgage of lease is $20/sf
  - Energy Costs is $2.25/sf

Other Reason Why IEQ is Good:

- Tenant and occupant satisfaction
- Increase marketability of property
- Reduce employee turnover
- Reduce complaints
- People spend an average 90% of time indoors.
- Sick Building Syndrome (SBS) happens with buildings are unhealthy and effects are linked to the time spent in a building
- Building Related Illness (BRI) is used when symptoms of diagnosable illness are identified and can be attributed to airborne contaminates

Air Contaminants May Include – and What to do:

- Dust and contaminants from the building process – keep a clean site and proper ventilation and dust control. Check air quality by testing a and flushing out the system
- Second hand smoke – Comply with Environmental Tobacco Smoke (ETS) is a LEED prerequisite
- CO2 – Monitor levels
- Material off-gassing – Check for products that off gas dangerous levels of pollutants
- Radon – Cancer causing radioactive gas. Seal all openings and cracks
- Chemicals – Be aware of all cleaning products
- Particulates – Control with good ventilation and filtering

Most Products that are acceptable to LEED need to be 3rd party Standards Such as:

- South Cost Air Quality Management District (SCAQMD) – this deals with adhesives, sealants, primers, wood finishes, floor coatings
- Green Seal – approval or aerosol adhesives, architectural paints and coatings, interior anti corrosive paint
- Green label Plus – is Carpets
- Green label – Carpet Cushions
- Floor Score – Vinyl, linoleum, laminate, wood, ceramics, rubber flooring
- GREEN QUARD – Furniture and seating

Green Cleaning:

- Each year approx. 3,700,000 buildings use 8 billion cleaning chemicals, 4.5 billion janitorial paper products, 1 billion pounds of janitorial equipment
- Strategic moves in cleaning are: Where do we store chemicals, quantities of chemicals, Green Seal Certified products, training, indoor pest control and equipment use

Ventilation:

- Increasing the quantity of fresh air, properly filtered, improves air quality. Purpose is to dilute pollutants in the air
- Minimum Air Quality ASHRAAE 62.1-2007 are standards to follow

Increase Occupant Comfort with:

- Natural lighting
- Exterior views
- Individual controls of heat and lighing
- Good acoustics

Benefits of Day lighting

- Can reduce energy use
- Reduce cooling capacity (less energy load)
- Day lighting controls
- Sky lights
- Light shelves reduce energy by bringing day light deeper into the building interior

Occupant Controls:

- This improves occupant comfort
- Temp Control (ASHRAE 55 -2004)
  - Temperature, humidity, air speed, outdoor temperature design and humidity design, clothing, expected activity
  - Lighting control can improve occupant discomfort
  - Can also improve energy if everyone use a task light instead of dozens or hundreds of overhead fluorescents

Acoustics:

- Is important to building types and performance
  - Sound absorption
  - Using white noise to mask sound
  - Improve air flow in proper ducts
  - Build in private areas for employee use

Prerequisite - Minimum Indoor Air Quality Performance:

- Is to meet ASHRAE Standards 62.1 for ventilation
- 2nd – ETS
  - No smoking! And minimum of 25 feet from all entrances
  - A smoke room can be designated with proper venation and back-up showing this…

Credit 1 – Outdoor Air Delivery Monitoring – 1 Point:

- **Monitoring CO2. for loads of 25 people or more per 1000 square feet of space. (3 – 6 feet off floor)**
- **Follow ASHRAE 62.1.**

Credit 2 – Increased Ventilation – 1 Point:

- **Increase outdoor air rate to by 30%**
- **Improve or determine naturally vented areas per CIBSE Application Manual 10:2005, Natural Ventilation in Non-domestic buildings**
- **Create multi-zone or analytical model that predicts room by room airflows for at least 90% of the occupants (ASHRAIE 62.1)**

Credit 3.1 – Construction Indoor Air Quality Management Plan During Construction – 1 Point:

- **Reduce IAQ problems resulting from construction**
- **Meet or exceed SMACNA IAQ guidelines**
- **Protect stored onsite material**
- **If permanent handlers are being used make sure the minimum efficiency reporting valve of 8 is met (MERV)**
- **Need to have an IAQ Management Plan recognizing all materials, chemicals and pollutants being used in construction**

Credit 3.2 – Construction Indoor Air Quality Management Plan Before Occupancy – 1 point:

- **Making sure the building is finished per designed and cleaned after construction**
- **Flush out system – by supplying air volume of 14,000 cubic feet of outdoor air per SF while maintaining an internal temp of 60 degrees and relative humidity no higher that 60%**
- **If occupancy happens before completion – a minimum of 3500 CF of outdoor air and must be ventilated at a min. rate of .302 cubic feet per minute**
- **Must complete air testing and demonstrate contaminates maximums consternations are below proper levels for (formaldehydes, particulates, volatile organic compounds, 4-PCH, Carbon Monoxide (CO)**

Credit 4.1 – Low Emitting Material – Adhesives and Sealants – 1 point:

- **All adhesives and sealant must comply with SCAQMD Rule #1168 and VOC limits**
- **Aerosol adhesives must comply with Green Seal Standards**

Credit 4.2 – Low Emitting Material – Paint and Coatings – 1 point:

- **All architectural paints must adhere to VOC content limits established by Green Seal Standards**
- **Anti-corrosive or rust paints must on exceed VOC levels of 250 g/L established in Green Seal Standard**
- **Clear Wood finishes and other stain coatings must adhere to SCAQMD Standards**

Credit 4.3 – Low Emitting Material – Flooring System – 1 point:

- **Green Label Plus – program is for all carpet installed must meet testing and product requirements**
- **Green Label program is for carpet cushions**
- **All other flooring adhesives or finishes must adhere to SCAQMD in terms of VOC levels**
  - **Carpet VOC limit is 50g/L (per IEQ credit 4.1)**

Credit 4.4 – Low Emitting Material – Composite Wood & Agrifiber Products – 1 point:

- **To reduce indoor air contaminants that are odorous, irritating or harmful. This includes particle board, medium density fiver board, plywood, wheatboard, panel substrates and door cores.**
- **This does not included FF&E**
- **Architect should specify products what contain no added Urea-formaldehyde resins.**
- **MSD sheets should be reviewed and signed off on**

Credit 5 – Indoor Chemical and Pollutant Source Control– 1 point:

- **To minimize occupant exposure to hazardous particulates and chemical pollutants**
- **Construct entryways with proper grates or grills. 10 feet long entry ways to help reduce pollutants from entering the building**
- **Proper ventilation or exhaust of at least .50 CFM**
- **Proper filters with at least a MERV (minimum efficiency reporting valve) of 13.**
- **Maintain proper pressure in building to avoid sucking in contaminants**

Credit 6 – Controllability of Systems – Lighting – 1 point:

- **Minimum of 90% of building to have lighting control for each occupant**
- **Provide shared lighting for multi-occupant spaces**
- **Encourage task lighting for workers. And reduce the use of many overhead lights**

Credit 7 – Controllability of Systems – Thermal Comfort – 1 point:

- **Provide comfort controls for min. of 50% of building occupants to meet needs**
- **Operable windows may be use for individuals within 20 feet inside or 10 feet either side of the operable window. This system must meet ASHRAE Standard 62.1 ventilation.**
- **Thermal comfort, AHSRAE 55, must be designed to meet individual control needs.**
- **Engineers need to carefully work between ASHRAE 55 and 62.1 to ensure each need is met with out compromising one or the other**

Credit 7.1 – Thermal Comfort Design – 1 point:

- **To be able to adhere to AHSHRAE Standard design should take into account the entire building envelope and systems with the capability to meet comfort criteria. Evaluate all criteria including:**
  - **Air temp**
  - **Radiant temp**
  - **Air speed**
  - **Relative humidity**
  - **Integrated fashion**
  - **IEQ prerequisites, outdoor air delivery and ventilation requirements**

Credit 7.2 – Thermal Comfort Verification– 1 point:

- **Provide permanent monitoring system**
- **Min of 6 to 18 months after completion**
- **If 20% of occupants not satisfied have a plan of action to remedy**
- **ASHRAE 55 provides guidance for establishing these guidelines**

Credit 8.1 – Daylight and View – Day Light– 1 point:

- **Computer simulate that spaces to achieve illuminations level of min of 25 foot-candles**
- **Use side lighting or top lighting to achieve total day lighting that is at least 75% of the space**
  - **Windows must be at least 30” above the floor**
  - **Avoid areas of glare by redirecting sunlight or building positioning**
  - **Ceiling must not compromise the light path. The light, from a window, must enter the rooms twice as far as the height of the window**
  - **See pages 78 and 79 for lighting options and measurements**

Credit 8.2 – Daylight and View – Views – 1 point:

- **Give building occupants a connection to the outdoors**
- **For 90% of occupants give views or windows min. of 30” off the floor and 90” high**
- **Need to prove sight lines**

- “This workforce solution was funded by a grant awarded by the US Department of Labor's Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the US Department of Labor. The Department of Labor makes no guarantees, warrantees, or assurances of any kind, express or implied, with respect to such information on linked sites and including but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use by an organization and/or personal use by an individual for non-commercial purposes are permissible. All other uses require the prior authorization of the owner.”