
Architectural Lighting
in Green Buildings
MGBS
MYANMAR
GREEN BUILDING
SOCIETY

CONTENTS

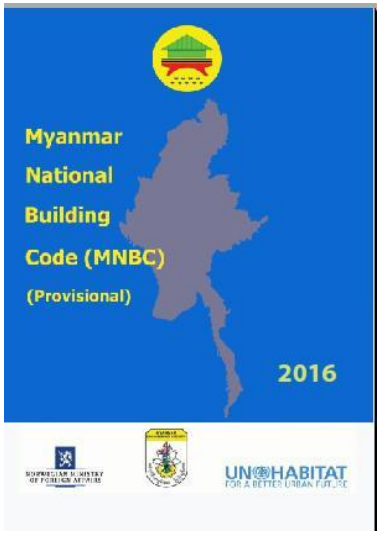
1.MNBC 2025 & JADE

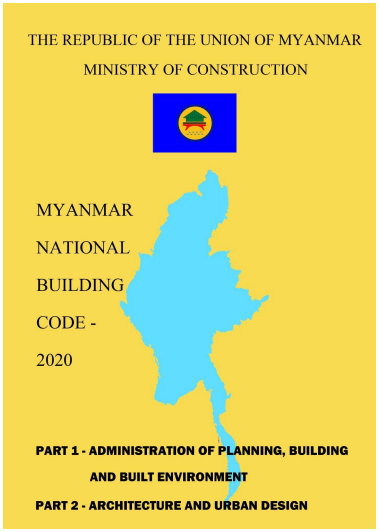
Myanmar National Building Code

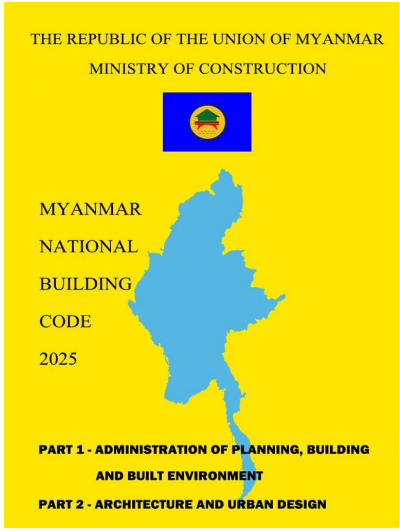
Started in 2012

Energy Efficiency Chapter in Myanmar National Building Code 2016

Green Building Chapter in Myanmar National Building Code 2020







Lighting in MNBC 2025

2.5.4 Lighting

2.5.4.1 General

Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings or artificial light. All residential buildings, other than detached houses built by owners for their own use, shall be provided with natural lighting as per 2.5.4.2.

Exception: does not apply to the following rooms or spaces

(a) any store room of area not exceeding 6.0 m^2; and

(b) any private lift lobby of area not exceeding 6.0 m^2.

2.5.4.2 Natural light

Natural lighting shall be provided by means of one or more windows or other openings with an aggregate light transmitting area of not less than 10% of the floor area of the room or space required to be lighted.

In lieu of natural lighting, artificial lighting may be provided

to the following rooms or spaces within residential units –

(a) bathroom, toilet or lavatory;

(b) store room; or

(c) basement;

2.5.4.2.1 Exterior openings

Exterior openings required for natural light shall open directly onto a public way, or courtyard. Exceptions:

a) Required exterior openings are permitted to open into a roofed porch where the porch:

1) Has a ceiling height of not less than 7 feet (2134 mm).

2.5.4.3 Artificial light

The artificial light shall be illuminated in accordance with Part 5 Building Services (Lighting).

MYANMAR

NATIONAL

BUILDING

CODE

2025

PART 5A
BUILDING SERVICES
(LIGHTING)

JADE in Myanmar National Building Code

2.12 GREEN BUILDING

2.12.1 Introduction

Green building and sustainable building both refer to the design and construction of buildings that have minimal impact on the environment. The purpose of Chapter 12 is to provide minimum design requirements that will promote all phases of design, materials selection, and construction, efficient utilization of energy and water resources in buildings. The requirements are directed toward the design of building envelopes with adequate thermal resistance and low air leakage, and toward the design and selection of mechanical, water heating, electrical and illumination systems that promote effective use of finite energy resources. A green building is designed and constructed to reduce the overall impact of the built environment on human health and the natural environment for the following criteria.

2.12.2 Criteria for Green Buildings in Myanmar

As an art of creating and shaping living environment for the community in general and each person in particular, architecture is currently largely influenced by urbanization, industrialization and also global climate change.

In order to design a sustainable built environment for the people, this chapter would like to highlight the community and especially the architects and engineers to strive for the future development of green buildings and as a tool for the implementation process, this chapter would like to promulgate its own Criteria for Green Buildings in Myanmar.

2.12.2.1 Aims

2.12.2.1.2 Criteria for Green Buildings in Myanmar specify the contents and requirements for architecture and planning in order to shape and promote sustainable built environment and landscape, to ensure living quality for indoor environment, to use energy and natural resources towards efficiency and to develop social sustainability towards communities and modern architecture based on identity with a futuristic vision.

2.12.2.1.3 The criteria to be established aim to:

- conduct research and development/design activities in principles of green building;
- offer training courses on green building for architects, engineers and the community;
- promote and introduce green building;
- offer consultancy and social critiques in principles of green building;
- evaluate green building designs and honour architects, engineers and developers who design and develop green building respectively.

2.12.4 Green Building Grading System

For new constructions or major retrofitted buildings, green building grading system shall be practiced by Myanmar Green Building Society: **JADE – Myanmar**.

JADE is a set of Green Building to develop by the Myanmar Green Building Society (MGBS) specifically for the Myanmar built environment. JADE rating tools are based on various international green building rating systems (LEED, Green Star, BREEAM, GBI, Green Mark, and have the following goals:

- To establish standards and bench marks specific to Myanmar
- To guide the local construction industry towards efficient use of natural resources
- To introduce and promote environmentally friendly practices JADE rating tools have been developed to long term research, with the expert advices of specialist giving particular consideration to Myanmar's cultural and natural characteristics and to existing Myanmar standards and policy. MGBS has developed three grades; Grade A, B and C.
- To award Green Building certificate for Non-Residential and Residential buildings in operation.

2.12.5 Method of Evaluation

2.12.5.1. One building to be recognized "green building" must be evaluated on the basis of all five criteria of green building categorized by Myanmar Green Building Society (MGBS)

2.12.5.1.1. The satisfaction of criteria is categorized in different grades:
• Grade A (Excellent): The performance of a building is well above the criteria of green building.
• Grade B (Good): The performance of a building meets the criteria of green building.
• Grade C (Satisfactory)

2.12.5.1.2. Scoring percentage

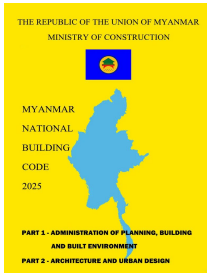
- A building will be recognized as Green Building JADE – Myanmar - Grade A, if it scores above 80%.
- A building will be recognized as Green Building JADE – Myanmar - Grade B, if it scores between 60% - 80%.

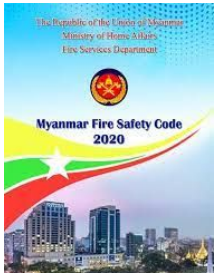
Key Differences

Building Codes

- Minimum Safety, health & Structural Integrity

- Mandatory, IBC, MNBC, MFSD

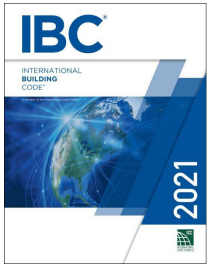


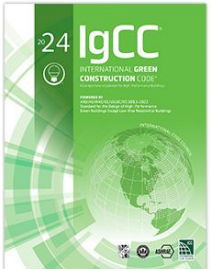


Green Building Codes

- Sustainable Design & Energy Efficiency

- Mandatory,IGCC





Rating Systems

- Voluntary excellence in sustainability and performance

- Voluntary,Market Demand, LEED, BREEAM

- **Often go beyond code**

breeam

2.GREEN BUILDING RATING SYSTEMS & CRITERIA

စိမ်းလန်းမှုဆိုင်ရာအဆောက်အအုံ (Green Building)

စိမ်းလန်းမှုဆိုင်ရာ အဆောက်အအုံ(**Green Buildings**)ဆိုသည်မှာ

ပုံစံထုတ်ခြင်း(**Design**)၊ဆောက်လုပ်ခြင်း(**Construction**)၊အသုံးပြုခြင်း(**Operation**) များတွင်

ရာသီဥတုနှင့် သဘာဝပတ်ဝန်းကျင်(**Climate and Natural Environment**) အပေါ်

ဆိုးကျိုးသက်ရောက်မှုများ **(Negative Impacts)** ကို လျော့ကျစေပြီး

ကောင်းကျိုးသက်ရောက်မှုများ **(Positive Impacts)** ဖြစ်စေသော အဆောက်အအုံဖြစ်ပါသည်။

Credit : World Green Building Council

MGBS
MYANMAR
GREEN BUILDING
SOCIETY

breeam ZOOM

BCA GREEN MARK

CASBEE

greenbuildingindex

iiSBE

DGNB
Deutsche Gesellschaft für Nachhaltiges Bauen e.V.
German Sustainable Building Council

U.S. GREEN BUILDING COUNCIL
LEED
USGBC

MILJÖ
BYGGNAD
CERTIFIERAD | SVERIGE

GREEN
GLOBES

GSAS
المنظومة العالمية لتقييم الاستدامة
Global Sustainability Assessment System

TGBI
THAI'S RATING OF ENERGY AND
ENVIROMENTAL SUSTAINABILITY

ARZ
BUILDING RATING SYSTEM

استدامة
estidama

IGBC

greenstar

G-SEED
GREEN STANDARD FOR ENERGY AND ENVIRONMENTAL DESIGN

HKGBC
BEAM Plus
綠建環評

Excellence In Design
For Greater Efficiencies
Edge

CRITERIA

1. Integrative Process
2. Land and Transport
3. Sustainable Sites
4. Water Efficiency
5. Energy and Atmosphere
6. Materials and Resources
7. Indoor Environmental Quality
8. Innovation
9. Regional Priority

1.Integrative Process

To support **high-performance**, **cost-effective**, **equitable** project outcomes through an early analysis of the interrelationships among systems.

2. Location and Transportation

Neighborhood Development Location

Sensitive Land Protection

High Priority Site and Equitable Development

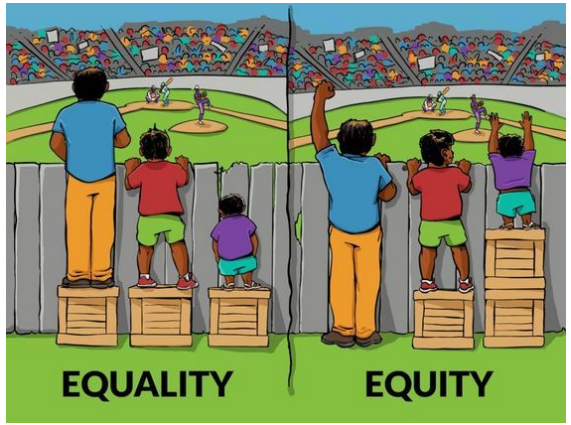
Surrounding Density and Diverse Uses

Access to Quality Transit

Bicycle Facilities

Reduced Parking Footprint

Electric Vehicles



3. Sustainable Sites

Construction Activity Pollution Prevention

Site Assessment

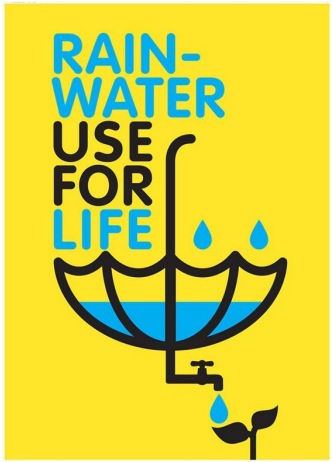
Protect or Restore Habitat

Open Space

Rainwater Management

Heat Island Reduction

Light Pollution Reduction



4. Water Efficiency

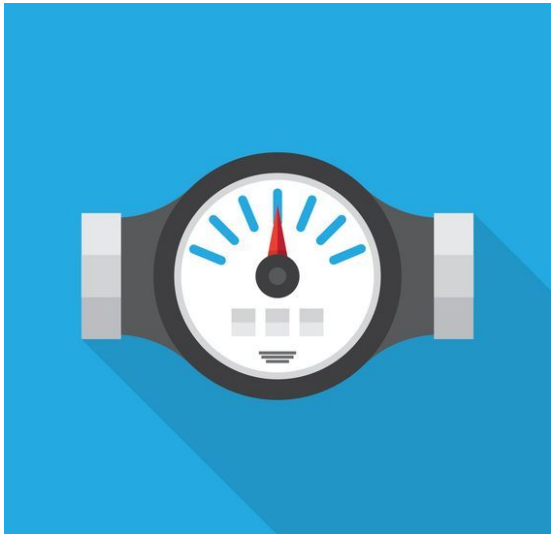
Outdoor Water Use Reduction

Indoor Water Use Reduction

Building-Level Water Metering

Optimize Process Water Use

Water Metering



5. Energy and Atmosphere

Fundamental & Enhanced Commissioning and Verification

Minimum Energy Performance

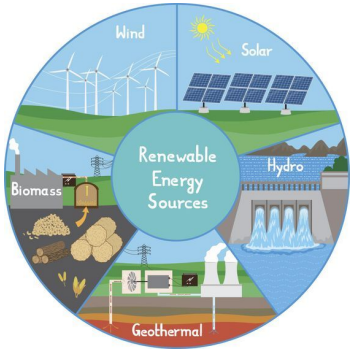
Building-Level & System-Level Energy Metering

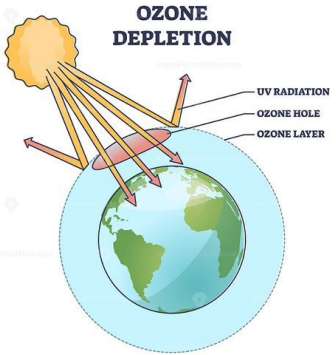
Fundamental & Enhanced Refrigerant Management

Optimize Energy Performance

Renewable Energy

Grid Harmonization





6. Materials and Resources

Storage and Collection of Recyclables

Building Life-Cycle Impact Reduction

Environmental Product Declarations

Sourcing of Raw Materials

Material Ingredients

Construction and Demolition Waste Management

7. Indoor Environmental Quality

Environmental Tobacco Smoke Control
Enhanced Indoor Air Quality Strategies
Construction Indoor Air Quality Management Plan
Indoor Air Quality Assessment
Thermal Comfort
Interior Lighting
Daylight
Quality Views
Acoustic Performance
Minimum Indoor Air Quality Performance

8. Innovation

Innovation

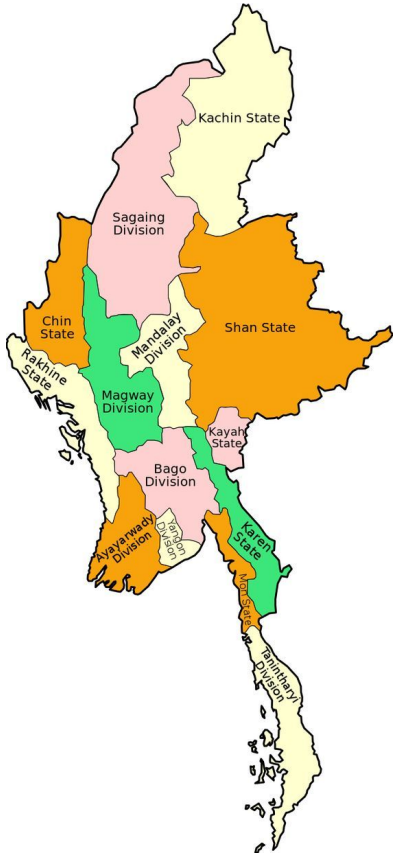
To encourage projects to achieve exceptional or innovative performance to benefit human and environmental health and equity.

Accredited Professional

To encourage the team integration required by a project and to streamline the application and certification process .

9. Regional Priority

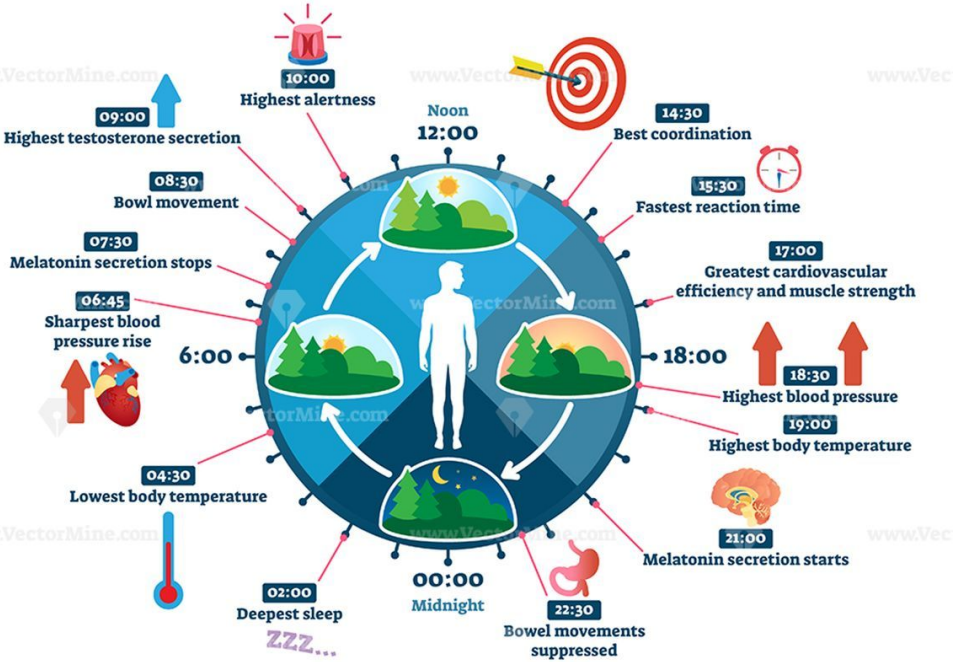
To provide an incentive for the achievement of credits that address geographically specific environmental, social equity, and public health priorities.



3.INDOOR LIGHTING QUALITY

Circadian Rhythm

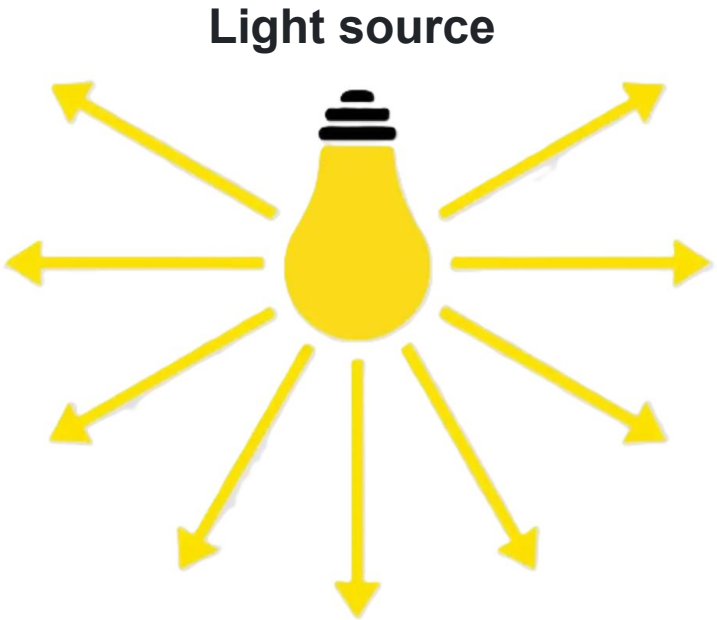
24-hour cycles in physiology and behavior driven by an internal clock



Luminous Flux (Lumens)

Total amount of visible light emitted by a source

Overall brightness of a lamp



Illuminance (Lux or footcandles)

Amount of light falling on a surface

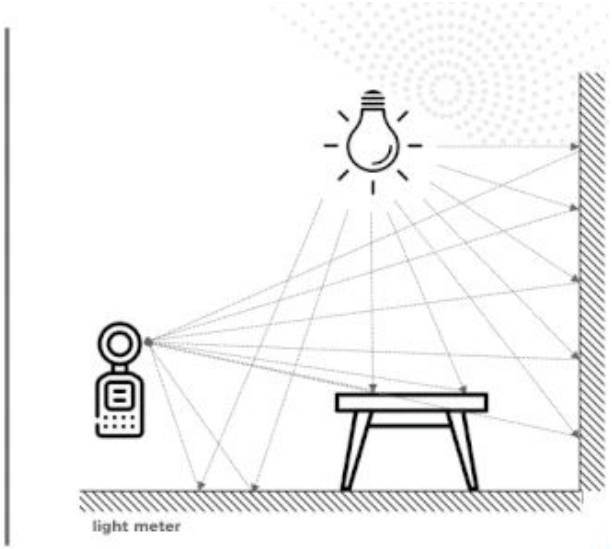
Lighting levels for tasks

Measured on the workplane,

typically 0.76 m above floor

Horizontal illuminance

& Vertical illuminance

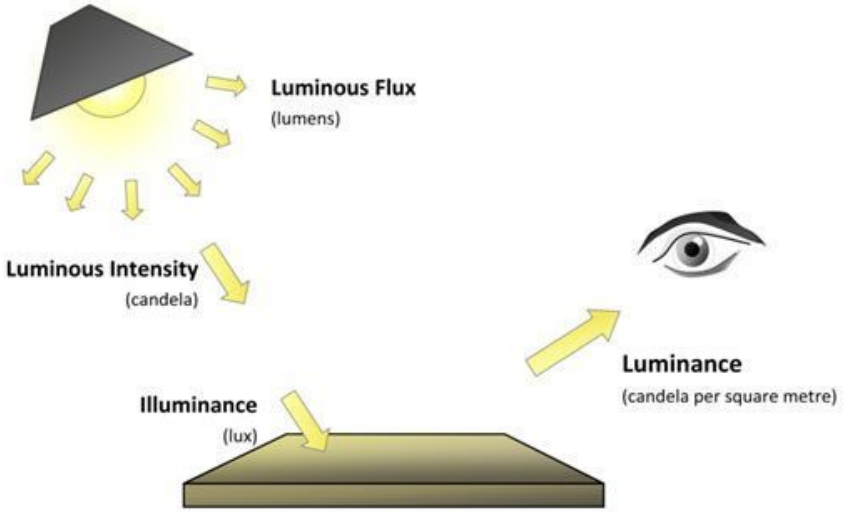


Luminance (Candela per square meter)

Brightness perceived from a surface in a specific direction

Critical for visual comfort, contrast, and glare control

Glossy surface may have high luminance and cause glare

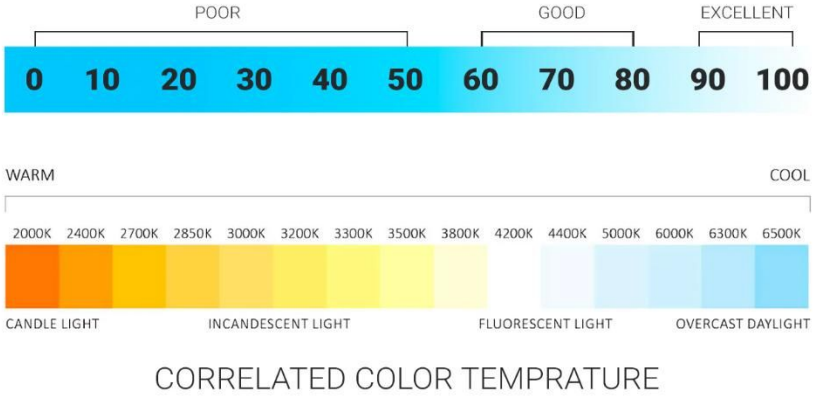


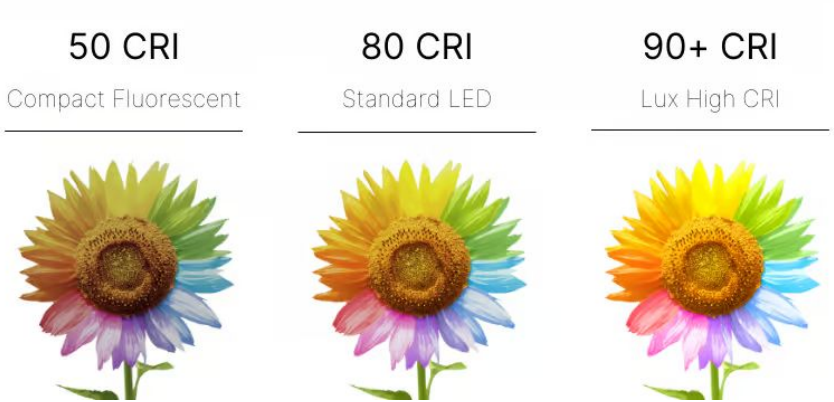
Color Rendering Index & TM-30

how accurately a light source reveals the **true colors of objects**

TM-30 by IES in 2015, Rf- Color fidelity Index, Rg - Color Gamut Index

More reliable for LED lighting,
Rf = 100 means perfect color match.
Rg > 100: more saturated,Rg < 100: **less saturated**.





Correlated Color Temperature

Expressed in Kelvin (K), warm (yellow/red) or cool (blue/ white)

Common CCT Ranges and Their Effects

CCT (Kelvin)	Color Description	Typical Applications
2200K–2700K	Warm white / amber	Residential, hospitality, mood lighting
3000K	Soft white	Restaurants, lounges, upscale retail
3500K–4000K	Neutral white	Offices, classrooms, healthcare
5000K–6500K	Cool white / daylight	Warehouses, hospitals, task lighting

Layered Lighting

To create a functional and visually dynamic space

Three Core Layers

1. **Ambient Lighting - basic layer**
2. **Task Lighting - Functional layer**
3. **Accent Lighting- Drama layer**


BLINK
Accent Lighting
Ambient Lighting
Task Lighting
Every Light Beam Has a Purpose

Daylight Metrics (sDA & ASE)

Spatial Daylight Autonomy

(sDA300,50%):

% of floor area receiving ≥ 300 lux for ≥50% of occupied hours

Annual Sunlight Exposure (ASE1000,250):

% of area receiving >1000 lux for >250 hours/year

Daylight Simulations

Figure 2a. Classroom with Exterior Overhang and Light Shelf

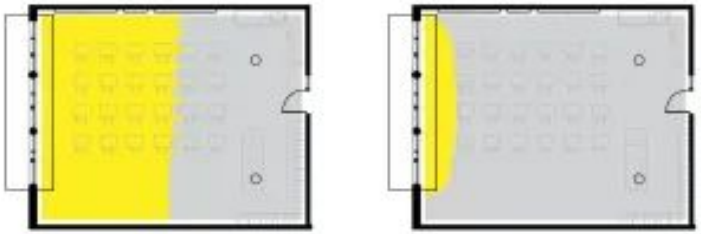
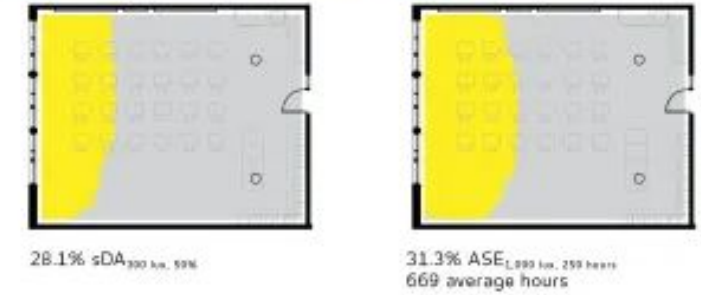


Figure 2b. Classroom without Exterior Overhang or Light Shelf

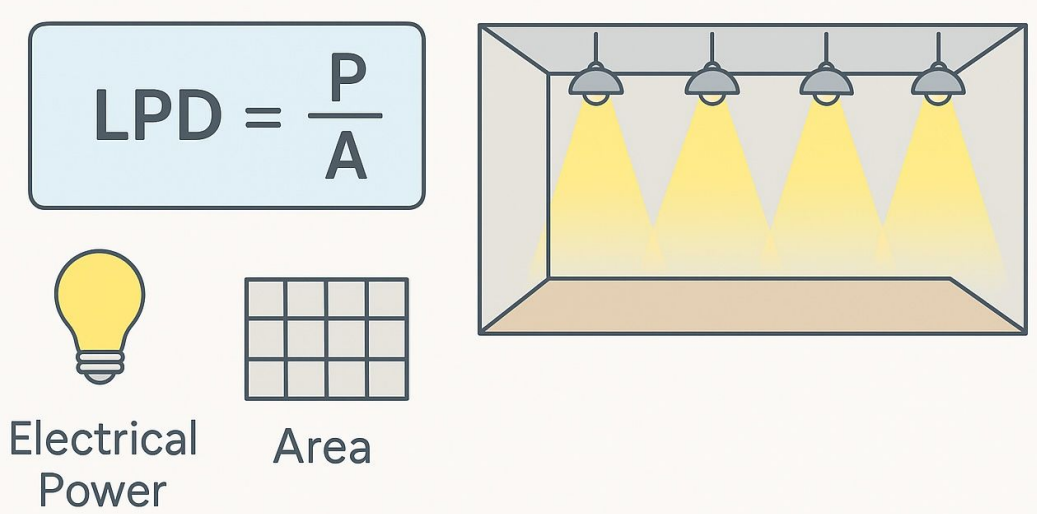


Lighting Power Density (LPD)

Installed lighting wattage per unit area

Watts/ square feet

IECC and ASHRAE for Energy Efficiency



4.DAY LIGHTING & SOLAR GLARE CONTROL

Large Spaces

Directly under a roof and having high ceilings

Minimum Daylight Area - 50% of the floor area

Visible Light Transmittance (VLT) of Skylights and Roof Monitors

Skylight Optical Diffusion Characteristics

Minimum Side Lighting Effective Aperture

For all facades in Daylit spaces,

width of primary sidelighted areas ≥ 75% of facade wall length

North,south and east facades - minimum side lighting effective aperture

EA = (Vertical Fenestration Area x VLT) / Primary sidelighted area

TABLE 801.10.2B (TABLE 8.10.2B)MINIMUM SIDELIGHTING EFFECTIVE APERTURE

CLIMATE ZONE	MINIMUM SIDELIGHTING EFFECTIVE APERTURE
0, 1, 2, 3A, 3B	0.10
3C, 4, 5, 6, 7, 8	0.15

Visible light reflectance ≥80% for ceiling and 60% for walls

Window to Wall ratio = Total Window Area / Total Wall Area

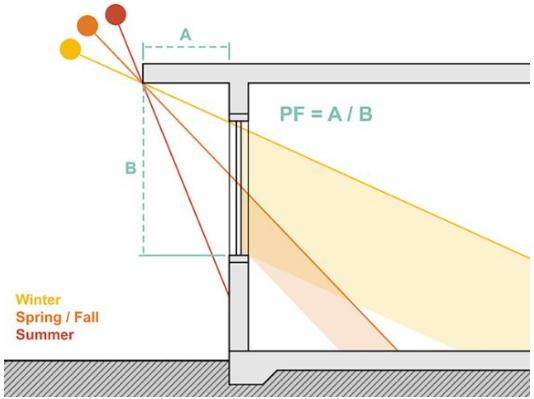
Shading for Offices

Facade Design with Shading Projection Factor (PF)

Not less than 0.5 for Ground Floor and 0.25 for others

External or Internal Shading Devices

PF = Overhang depth / Distance from Overhang to window sill



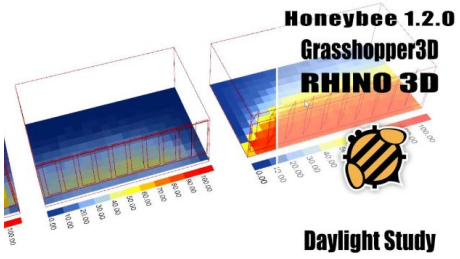
Daylight Simulation

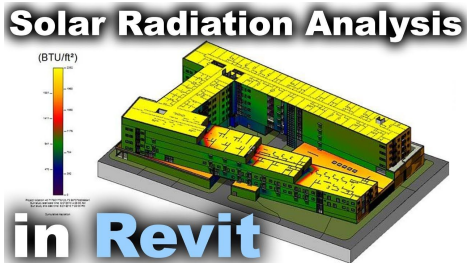
Spatial Daylight Autonomy - sDA

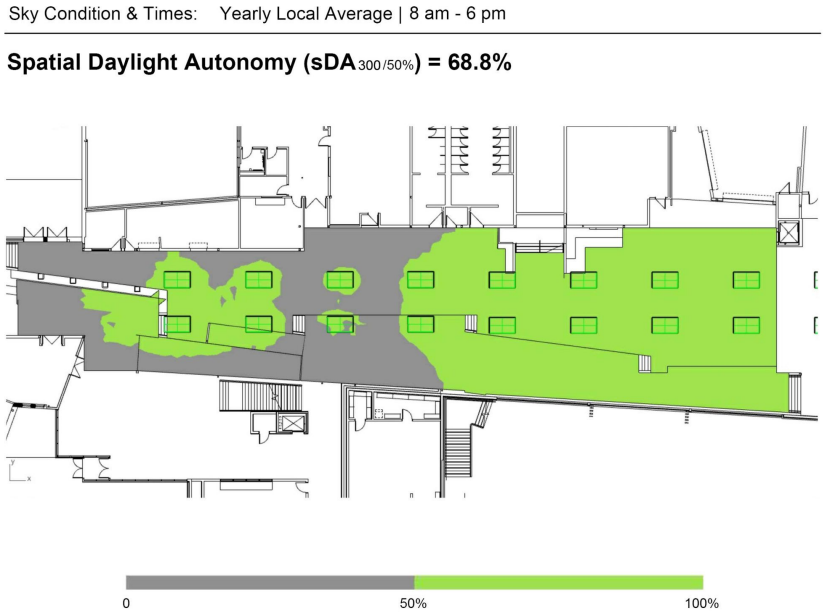
IES LM 83, 300 lux for 50% annually

Minimum daylight -

sDA not less than 40% of the floor area







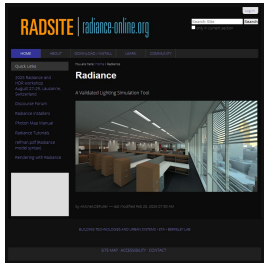
Daylight Simulation

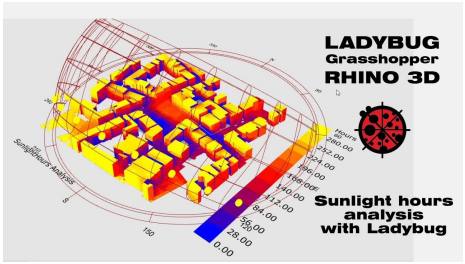
Annual Sunlight Exposure - ASE

1000 lux for 250 hours annually

Excessive Sunlight ?

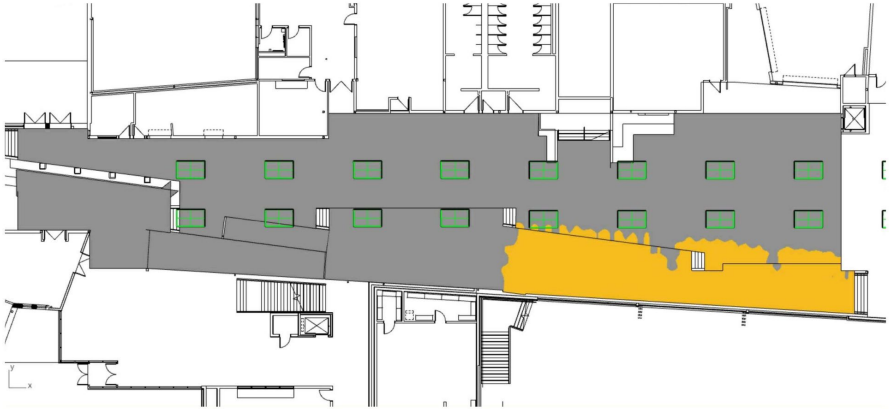
Not more than 20 % of the floor area





Sky Condition & Times: Yearly Local Average | 8 am - 6 pm

Annual Sunlight Exposure (ASE$_{1,000/250hrs}$) = 16.4%



83.6%
sunlight area <250 hours

16.4%
sunlight area >250 hours

0 >

Glare Control

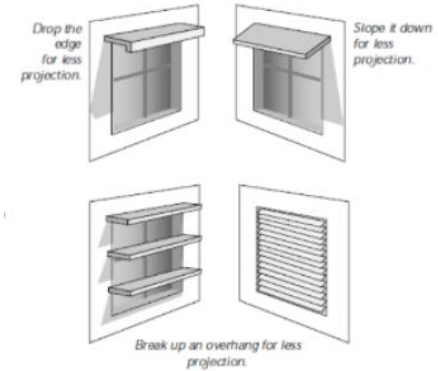
Operable Glare Control

Movable interior and exterior devices

Dynamic Glazing

Low Annual Sunlight Exposure

Not more than 3% for daylit spaces



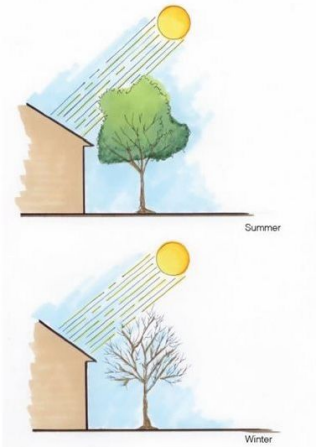


TABLE 801.10.2A (TABLE 8.10.2A)DAYLIT SPACES

Classroom/training room
Conference /meeting/multipurpose room except in convention centers
Lounge/breakroom
Enclosed office and open plan office
Library reading area
Patient rooms and physical therapy rooms within a health care facility

THANK YOU
LET’S GO GREEN TOGETHER