UNIT - 4

ILLUMINATION FOR INTERIOR APPLICATION

Standard For Various Location Of Interior Illumination

- The outdoor light level is approximately 10000 lux on a clear day.
- In a building in the area closest to the windows the light level may be reduced to approximately 1000 lux. In the middle area it may be as low as 25 - 50 lux.
- Additional lighting is often necessary to compensate low levels.
- According EN 12464 Light and lighting - Lighting of workplaces -Indoor work places, the minimum illuminance is 50 lx for walls and 30 lx for ceilings.
- Earlier it was common with light levels in the range 100 - 300 lux for normal activities.
- Today the light level is more common in the range 500 - 1000 lux - depending on activity.
- For precision and detailed works the light level may even approach 1500 - 2000 lux.

Recommended light levels for different types of work spaces are indicated below:

Recommended light levels for different types of work spaces(indoor) are indicated below:

Activity	Illuminance (lx, lumen/m2)
Public areas with dark surroundings	20 - 50
Simple orientation for short visits	50 - 100
Areas with traffic and corridors - stairways, escalators and travelators - lifts - storage spaces	100
Working areas where visual tasks are only occasionally performed	100 - 150
Warehouses, homes, theaters, archives, loading bays	150
Coffee break room, technical facilities, ball-mill areas, pulp plants, waiting rooms,	200
Easy office work	250
Class rooms	300
Normal office work, PC work, study library, groceries, show rooms, laboratories, check-out areas, kitchens, auditoriums	500
Supermarkets, mechanical workshops, office landscapes	750
Normal drawing work, detailed mechanical workshops, operation theaters	1000
Detailed drawing work, very detailed mechanical works, electronic workshops, testing and adjustments	1500 - 2000
Performance of visual tasks of low contrast and very small size for prolonged periods of time	2000 - 5000
Performance of very prolonged and exacting visual tasks	5000 - 10000
Performance of very special visual tasks of extremely low contrast and small size	10000 - 20000

Commercial Lightning System

- Commercial lighting is lighting used for commercial spaces such as offices, stores, institutions, hospitals and government buildings, essentially those spaces that are not residential, industrial or for manufacturing.
- Compared to other types of lighting, commercial lighting tends to have a higher initial cost, longer lifespan, better durability, higher maintenance and service costs and better energy saving options.
- A lighting design company should create designs that reflect the type of activity performed in the building to ensure that people working in the space are comfortable and that the lux level requirements and energy efficiency standards are suitable.
- When MEP (Mechanical, Electrical and Plumbing) engineering design teams work with lighting consultants to select designs for a commercial space, some of the aspects that must be considered include; the illuminance of the space, the application for which the space will be used, the type of light fixture appropriate for the space and application and the lux level requirements based on guidelines and codes.

Types of light fixtures for commercial lighting design

When selecting light fixtures in commercial lighting design, their characteristics, application and function must be considered. Commonly-used commercial lighting design fixtures include T5 and compact fluorescent lights, however, given the reduction in prices, LED light fixtures are starting to be preferred.

To understand the type of light fixture best suited for a commercial space, the following descriptions may be useful:

Tubular Fluorescent Light Fixtures

This type of light fixture, based on traditional fluorescent technology, is typically set into ceilings and covered with a frosted lens. Depending on the amount of lighting required in the commercial space, standard fluorescent lights usually have one to four bulbs. They are regarded as one of the longer-lasting and more energy-efficient options for commercial lighting design.

Compact Fluorescent Light Fixtures

As a replacement for incandescent bulbs, compact fluorescent lighting is also built from traditional fluorescent technology and has a compact internal ballast. While it is as energy efficient as tubular fluorescent lighting, the light emitted provides a better natural white colour perception. It is commonly used in lighting application for tasks and downlight lamps in commercial spaces.

T5 Fluorescent Light Fixtures

Suitable for troffer or high bay (high ceiling) applications, T5 fluorescent light fixtures are often considered the best option for commercial lighting designs because they have a long life and their maintenance requirements are minimal. While the T5 fluorescent fixtures were designed with fluorescent lamps sources, they are now more often designed to accommodate LED bulbs.

LED Light Fixtures

In the recent years, LED light fixtures have been widely adopted because they consume less power and have a longer operational life. While the initial adoption of LED fittings was a challenge, the reduction in cost, almost as low as T5 and fluorescent light fixtures, has led to an increase in preference for LED lighting fixtures in commercial lighting design.

Industrial Lighting System

- The illumination (lighting) of industrial areas having different sections of works consisting of different visual tasks require different lighting solutions and also different lighting equipment.
- The task is not always on horizontal planes.
- So many a time local lighting is needed to compensate for the shadows of general lighting.
- The lighting is general as well as local.
- Following table shows the recommended values of illumination in the industry in machine shops and fitting shops.

4.11.1 Recommendations for Machine and Fitting Shops

Table 4.5

	Standard service illuminance (lux)	Position of measurement	Limiting glare index
Casual work	200	Working plane	25
Rough bench and machine work	300	Working plane	25
Medium bench and machine work, ordinary automatic machines, rough grinding, medium buffing and polishing	500	Working plane	22
Fine bench and machine work, fine automatic machines, medium grinding, fine buffing and polishing	1000	Working plane	22

The working plane in the industry is horizontal, vertical and so also inclined in which visual task lies upto any height.

- The trouble of shadows is more predominant in industrial areas than commercial area due to presence of different machines of various size's, worker's frequent movements.
- Low wattage discharge luminiars are on low mounting height and large spacing in sutable for such work task.
- Generally, high efficiency, high pressure sodium vapour lamps are will suited at higher mounting heights and it is being used with ever increasing frequency at lower height.
- Fluorescent lamps are used for general lighting in low mounting height situations at miniature tubes for local lighting applications.
- In colour and pant manufacturing industry and wall paper manufacturing or dyestuff manufacturing, accident repaire vehicles work shops, garment manufacturing, colour printing works, the luminaire required are improved colour and polyphosphor fluorescent lamps are required.
- In place of sodium vapour lamps , now a day mercury vapour lamps are being used.
- Metal halide lamps can be used where colour is important without being critical.
- These lamps provide cool white light , sodium vapour lamps are warmer and not cooled.
- If the task is at high temperature, than fluorescent lamps do not tolerate, so high temperature with standing lamp such as mercury lamps metal helide lamp or sodium vapour lamps are used.

Objectives Of Industrial Lighting

1. Illuminate the work sufficiently to allow to worker to see easily and accurately to work at and efficient speed without fatigue and eyestrain.
2. Illuminate the immediate work area it's surrounding and the room generally, so that excessive brightness, contrasts, glaire and disturbing saddows are eliminated. The over all system should help to create a pleasant atmosphere.
3. Provide the light of correct colour appearance and rendering to enable the worker to judge details of their work such as colour, shape etc quickly and accurately.

Benefits Of Good Industrial Lighting

Following are the benefites of good industrial lighting:

1. Increased productivity.
2. Improve morale and motivation.
3. Better corporate image.
4. Reduced product rejection.
5. Decresed worker eye strain and fatigue.