

Lighting Standards for Concordia University

Introduction

The main purpose of lighting is to provide an environment to enable the individual to perform a specific task. When considering the lighting of an area the correct balance should be attained between illumination (level of light) and the task being performed.

High levels of illumination result in unwanted physiological responses by the eye such as squinting and other protective mechanisms. Low levels of light would make it difficult to distinguish objects for tasks requiring high visual acuity. There is an increased risk for accidents. It may also produce eye fatigue and headaches.

In general people perform well when the environment is comfortable and has enough illumination to enable good visual perception.

Objective

The main purpose is to outline the luminance level standards for Concordia University. These levels will be used as guidelines to identify the problematic areas within Concordia University. The standards will also be applied to new and existing buildings within the university.

However, if there are no set standards for a specific area the category table will be used to determine the appropriate lighting level. This may require an onsite evaluation to determine the nature of the task.

Additional Factor:

Age:

The lighting levels may have to be altered depending on the age of the occupants of an area. Older individuals may develop astigmatism and may require higher lighting levels to compensate for this condition

Light Measurement Terminology:

Intensity is defined as the indication of the amount of light emitted from a source in given direction. The unit of measure is the candela.

Lumen is defined as the unit of light output from a light source.

Illumination level is defined as the amount or quality of light falling on a surface and is measured in footcandles (fc).

For example, if 100 lumens of light fall on one square foot of the top of a table, the illumination level is 100 footcandles. If the unit of surface area is in square meters rather than square feet, the illumination is measured in lux.

Method of Measurement

The protocol for the taking of measurement as outlined by the IES requires the measuring instrument to be placed in a horizontal plane at 760mm (30ins) above the floor. This may require the use of a portable stand. The dimension of the room is measured and divided into square regions. A reading is then taken for each square region. The mathematical average is then calculated to get the illumination level of the room.

Illuminance Levels

The Illuminating Engineering Society of North America (IESNA) has established illuminance categories. The categories are based on the amount of light required for the task and /or activity. This table may be useful in areas involving tasks where visual precision is paramount.

Table 1

CATEGORY	ILLUMINANCE LEVEL
A – Public Spaces	3 fc
B - Simple Orientation	5 fc
C -Workplaces where simple visual tasks are performed	10fc
D - Performance of visual task of high contrast and large size	30fc
E – Performance of visual tasks of high contrast and small size	50fc
F - Performance of visual tasks with low contrast and small size	100fc
G - Performance of visual tasks with extremely low contrast and small size	300-1000fc

The following table shows the lighting levels at Concordia

Table 2

Area	Luminance level (horizontal plane)
Exits	
Main Corridor	20 foot-candles
Secondary Corridor	15 foot-candles
Stairwells	10 foot-candles
Tunnels - two levels of lighting with motion detectors	15 foot-candles-High level 8 foot-candles-Low level

Classrooms: Chalk Board vertical	30 foot-candles 50 foot-candles (vertical)
Library - stacks	30 foot-candles
Library: Reading areas	30 foot-candles
Cubicle with window	30 foot-candles
Cubicle without window	30 foot-candles
Library-circulation desk	30 foot-candles
Laboratory (Science)	50 foot-candles
Computer Lab (Design for Two Levels)	30 foot-candles-High level 15 foot-candles-Low level
Offices: Reception Area	30 foot-candles
Open Plan intensive computer use	30 foot-candles
Open Plan intermittent computer use	30 foot-candles
Private office	30 foot-candles
Conference Rooms (dimmer to vary the level of lighting)	30 foot-candles
Washrooms: Stall	10 foot-candles
Sink	30 foot-candles
Storage Rooms	10 foot-candles
Loading Docks	25 foot-candles

Machine Shops	40 foot-candles
Electrical, Plumbing and Carpentry Shops	30 foot-candles 50 foot-candles (workbench)
Mechanical/Electrical/Boiler Rooms	30 foot-candles
Cafeteria : Kitchen	50 foot-candles
Student Lounge	30 foot-candles
Faculty Lounge (dimmer to vary the level of lighting)	30 foot-candles
Cash Register	30 foot-candles
Book Store: Display Area	50 foot-candles
Cash Register	30 foot-candles
Elevators	15 foot-candles
Parking Areas	5 foot-candles (interior) 2 foot-candles (exterior)
Security Lights: Exterior Building Perimeter	2 foot-candles
Walkways	5 foot-candles
Entrance of Doorways	10 foot-candles
Sports Facilities: Exercise Room	30 foot-candles
Arena (Design for Three Levels)	20 foot-candles Low 50 foot-candles Medium 100 foot-candles High

Sports Facilities cont'd:	
Locker Room	20 foot-candles
Studio/Gym Design for Three Levels	5 foot-candles-Low* (Meditation if required) 30 foot-candles-Medium 50 foot-candles-High
Pool (Design for Two Levels)	20 foot-candles-High 10 foot-candles-Low

References:

CSA-Z412 International Guideline on Office Ergonomics: Toronto 2000

IESNA Lighting Handbook New York 2000

RSST, Gouvernement du Québec (2001). Règlement sur la santé et la sécurité du travail.