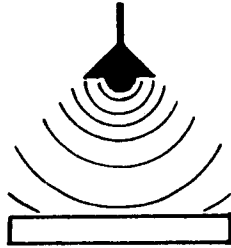


LIGHTING

SUMMARY

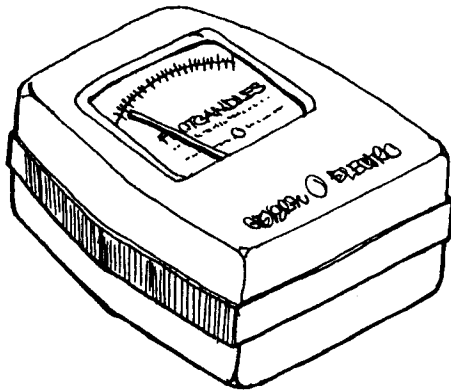


The primary objective of the lighting subsystem is to provide a satisfactory quantity and quality of illumination for the activities in the building.

Though specifying the quantity of illumination is now standard operating procedure in almost all environments, the quality of the illumination provided has not been considered in most cases. This includes direct and indirect glare, contrast rendition and contrast ratios.

PERFORMANCE OBJECTIVE: PROVIDE SUFFICIENT QUANTITY AND QUALITY OF LIGHT

TEST # 1: Provide Sufficient Quantity of Light

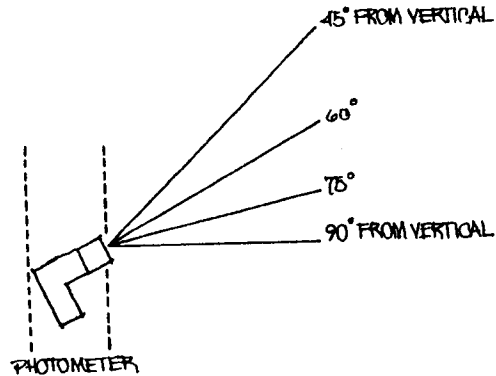


Test Method: Determine past performance, if possible. Use a footcandle meter which reads from 3-8000 footcandles. Multiple readings are taken in each room under luminaires, between luminaires, in the center of the room, at the edge of the room and at the windows. Readings are made under the following conditions - daylight only (between 9 a.m. & 3 p.m.), artificial illumination only (nighttime is best) and a combination of the two. All readings are taken 30 inches above the floor (table height).

Measures: Natural light, artificial light, combined natural and artificial light

- Artificial illumination only (nighttime) under luminaires, between luminaires, at walls
- Natural illumination only, at windows, at 5 foot intervals from windows to opposite wall
- Combination of artificial and natural illumination, at all of the above locations.

TEST # 2: Minimize Direct Glare



Test Method: Determine past performance, if possible. Use a spectra photometer reading in footlamberts or a (Minolta, Honeywell, etc.) lightmeter whose readings can be converted to footlamberts. Readings are taken with a 1° spot.

Readings are taken at eye level directly under and perpendicular to lighting fixtures in the viewing directions most frequently used. Readings are taken from 45 - 90° from the vertical. Use artificial lighting only.

Measures: Footlamberts of illumination

- Footlambert measurements parallel and perpendicular to fixtures at the following angles - 45°, 60°, 75°, 90°, and graphed on a I.E.S. scissors curve.

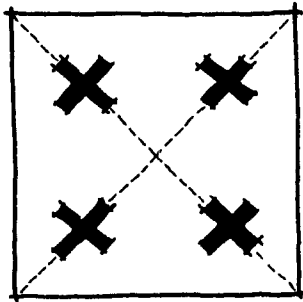
TEST # 3: Control Brightness Contrast Ratios

Test Method: Determine past performance, if possible. Use a photometer as in Test #2. This test is made under artificial light only, daylight only, and combinations of the two with window shades open and closed. Readings are taken from most of the work surfaces in the room.

Measures: Brightness contrast ratios

- Measures are taken on the ceiling on and between lighting fixtures, on upper wall(s), wall at eye level on various surfaces, on task, immediate task surround, window, wall adjacent to window, floor.
- Measures are taken under the following conditions: artificial light only, daylight only, combination artificial and daylight with shades open and closed.

TEST # 4: Eliminate Shadows on Task Surfaces



Test Method: The following test is made at the fourth points of both room diagonals. These are used as task locations and the footcandle level is read with and without a user at the task location to compare the possible effects of shadow on the task.

Measure: Task illumination

- The footcandles on the task with and without the seated user.

TEST # 5: Maintain Quantity and Quality of Illumination

Test Method: Using a photometer as described in Test #2, measure the luminaire brightness from seated eye level on the diffuser and/or bulb before and after cleaning a diffuser and bulb with a dry rag. Install a new bulb and again measure luminaire brightness.

Measure: Luminaire brightness

- Luminaire brightness, diffuser and/or lamp under three conditions - actual usage; bulb and diffuser cleaned; new bulb (diffuser cleaned).

REFERENCES

"I.E.S. Handbook", Illuminating Engineering Society, 1966. This contains almost all standard tests. A standard text.

"Contrast Rendition in School Lighting", Foster Sampson, Educational Facility Laboratories, N.Y., 1970. This is very significant and goes far beyond the I.E.S. Handbook.

SUMMARY OF LIGHTING PERFORMANCE TESTS

PERFORMANCE OBJECTIVE: PROVIDE SUFFICIENT QUANTITY AND QUALITY OF LIGHT

TEST # 1: Provide sufficient Quantity of Light

TEST # 2: Minimize Direct Glare

TEST # 3: Control Brightness Contrast Ratios

TEST # 4: Eliminate Shadows on Task Surfaces

TEST # 5: Maintain Quantity and Quality of Illumination