

SCOPE

- I 1.1 This practice covers lighting design.
- I 1.2 **An asterisk (*)** indicates that additional information is required. If a job is contracted, this additional information is furnished in the Job Specification.

DEFINITIONS

- I 2.1 **In-service levels** are defined as the levels required in service, averaged over the area involved and averaged in time.
- I 2.2 **Maintenance factor** is defined as a factor which must be included in the design calculations in order to allow for the following:
- a. Average loss of lamp lumens due to aging.
 - b. Decrease in lamp and luminaire output resulting from dust, dirt, insects, and chemical changes in luminaire reflecting surface.
 - c. Increased absorption of the light output by dust, dirt, and chemical changes in the room or other reflecting surfaces.
 - d. Known low voltage condition.
- I * 2.3 **Acceptable and preferred practices.** Where this practice lists more than one type of equipment or method as acceptable, the contractor shall make the selection after determining whether reduced maintenance and operating cost for one type provides sufficient cost benefit to offset an initial added investment. The Owner's Engineer shall approve alternative choices.

DESIGN

- S 3.1 **Lighting** shall be provided to obtain at least the **in-service illumination levels** specified in [Table 1](#) at the elevations indicated. They are on the horizontal plane except when labeled vertical. When high-pressure sodium lighting is installed, initial lighting levels shall be 140% of the in service levels shown in [Table 1](#), or the initial level values shown in [Table 1](#), whichever is less.
- S 3.2 **Lighting uniformity** shall be such that the ratio of maximum to minimum level within the area does not exceed the limit specified in [Table 1](#).
- C * 3.3 **Lighting is not required** in the following areas unless otherwise specified:
- a. Tank fields (specify if required for stairways and accessways).
 - b. Auxiliary or low traffic volume roads.
 - c. Refinery boundary fences.
- R 3.4 **For areas or equipment not covered by [Table 1](#)**, where **personnel** are regularly required to perform operating or maintenance duties, adequate **lighting** for tasks performed shall be provided.
- S 3.5 **Aviation obstruction lights** shall be installed **on structures and stacks** as required by authorities having jurisdiction.
- S 3.6 **Marine navigational lights** shall be installed **on piers** as required by authorities having jurisdiction.
- R 3.7 Where step-down transformers are used for lighting, these transformers shall be used for lighting only.

GAGE GLASS LIGHTING

- C * 3.8 **Gage glass lighting** shall be provided only to the extent specified.
- R 3.9 Gage glass lighting shall be supplied from **circuits which are intended to remain energized** day and night. Gauge glass lighting circuits shall be independent of all other lighting circuits.
- O 3.10 **An on-off switch** shall be provided **for each column of illuminated gage glasses**, to control all the illuminators for that column. The switch shall be located so that it can be operated from the normal viewing position.

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FIXTURES AND LAMP TYPES

- R 3.11 **Lighting fixtures**, with the exception of floodlights, shall be equipped with a **gasketed globe** (or lens) and **guard** for the following locations:
- Outdoor process area.
 - Pump rows.
 - Compressor or pump houses.
 - Outdoor areas of boiler, power, and water treating plants.
 - Loading racks.
 - Marine trestles and piers.
- Note:** "Globe" and "guard" are generic terms for the protection required by the lamp and fixture against physical damage and water entry. Acceptable methods are conventional globe and guard, protective covers, approved impact tested glass, etc. acceptable to the authorities having jurisdiction.
- R 3.12 **Lamps** shall be one of the following acceptable types:
- High-pressure sodium.
 - Metal halide.
 - Mercury vapor.
 - Fluorescent.
 - Incandescent.
- R 3.13 **High Intensity Discharge (HID) fixtures are preferred** and shall be of the **self-regulating type**.
- R 3.14 **HID lamp ballasts** shall be high power factor constant wattage or regulating type. **Ballasts for high-pressure sodium** shall have a safety start feature to prevent premature ballast burnout as a result of attempted restrike on an open circuit lamp.
- S 3.15 **Any working area** which is illuminated only by HID lamps with a restarting delay after voltage dips, shall also have sufficient rapid restarting lighting to achieve at least 10% of normal illumination level but not less than 0.04 ft-candle (0.4 lx)
- R 3.16 **Fluorescent lamp ballasts** shall be of the rapid start (starterless) high power type or shall be electronic type.

FIXTURE LOCATION

- M,S 3.17 **Fixture location** shall allow safe and convenient relamping and cleaning. In no case shall lighting fixtures be located directly over electrical equipment having exposed energized parts or equipment having exposed moving parts.
- M 3.18 **All lighting fixtures mounted along platform handrails**, shall have the stanchion mounted outside the handrail and supported in such a manner that clearance between stanchion and handrail is a minimum of 3 in (75 mm). Fixtures shall be accessible for relamping or cleaning from the platform.

FLOODLIGHT POLES

- I * 3.19 **For new work in existing plants having standardized pole types**, the existing plant standard shall be used.

LIGHTING CONTROL

- O 3.20 **Street lighting and lighting for outdoor operating areas** which are not continuously attended shall be either of the following:
- Automatically controlled (2-wire system) by photo-cell. An **auto-on-off selector switch** shall be located at the controller location to permit manual control of the lighting.
 - When specified, remotely controlled (2-wire system) from an attended location.
- O 3.21 **Photo-cell units shall be located** such that they:
- Are readily accessible for cleaning and servicing
 - Are not activated by local artificial light sources
 - Are not obstructed by buildings or other structures, and
 - Activate only one lighting contactor per photocell.