

GP 16-05-01	Lighting	December 2001
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Lighting

GP 16-05-01

Scope

- 1) [I] This Global Practice (GP) covers lighting design.
 - 2) [I] An asterisk (*) indicates that additional information is required. If a job is contracted, this additional information is furnished in the Job Specification.
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1. Definitions

Term	[I] Description
Acceptable and Preferred Practices	Where this GP 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.
In-Service Levels	In-service levels are defined as the levels required in service, averaged over the area involved and averaged in time.
Maintenance Factor	Maintenance factor is defined as a factor which must be included in the design calculations in order to allow for the following: (1) Average loss of lamp lumens due to aging (2) Decrease in lamp and luminaire output resulting from dust, dirt, insects, and chemical changes in luminaire reflecting surface (3) Increased absorption of the light output by dust, dirt, and chemical changes in the room or other reflecting surfaces (4) Known low voltage condition

2. General Design Requirements

- 1) [S] Lighting shall be provided to obtain at least the in-service illumination levels specified in Tables 2 and 3 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 percent of the in-service levels shown in Tables 2 and 3, or the initial level values shown in Tables 2 and 3, whichever is less.
- 2) [S] Lighting uniformity shall be such that the ratio of maximum to minimum level within the area does not exceed the limit specified in Tables 2 and 3.
- 3) * [C] 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
- 4) [R] For areas or equipment not covered by Tables 2 and 3, where personnel are regularly required to perform operating or maintenance duties, adequate lighting for tasks performed shall be provided.
- 5) * [S] Aviation obstruction lights shall be installed on structures and stacks as required by authorities having jurisdiction. Unless otherwise specified, aviation obstruction lighting fixtures shall have safe access for maintenance by means of permanent ladders and platforms.

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- 6) [S] Marine navigational lights shall be installed on piers as required by authorities having jurisdiction.
- 7) [R] Where step-down transformers are used for lighting, these transformers shall be used for lighting only.

Table 1: Equivalent Metric Dimensions

Acceptable Elevation Conversions for Tables 2 and 3							
in.	18	30	36	37	45	48	60
mm	450	750	900	925	1125	1200	1500

Notes for Tables 2 and 3:

- (1) Foot candle = 10.76 lux, lux equivalents above 4 foot candles rounded to nearest 5.
- (2) To the extent required for operator tasks.
- (3) Refer to Authorities having jurisdiction. Use table values if no direction is provided.
- (4) Where substation contains CRT (Cathode Ray Tube) displays, LCD (Liquid Crystal Displays) or computer terminals, lighting for these areas shall be selected to avoid glare, reflections and shadows on the viewing surfaces of these units.
- (5) Initial levels have to be higher than the specified in-service levels.
- (6) Lighting uniformity, maximum/minimum ratio. (See Section 1, Item 2)
- (7) For ladders only: lighting required at access, landing platforms, and grade areas

Table 2: Lighting Illumination Levels for Process Areas

Table 2

Working Areas	Illumination Levels ^{(1) (5)}					
Process Areas	Initial		In-Service		Elevation	Max/
	Ft-Candles	Lux	Ft-Candles	Lux		Min ⁽⁶⁾
Outdoor Pump Rows	8.5	90	5	55	Grade	4
Exchanger Areas	5	55	3	32	Grade	4
Main Operating Platforms	8.5	90	5	55	Floor	2
Ordinary Platforms	3.5	38	2	22	Floor	44

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Table 2

Working Areas		Illumination Levels ^{(1) (5)}					
Process Areas		Initial		In-Service		Elevation	Max/ Min ⁽⁶⁾
		Ft-Candles	Lux	Ft-Candles	Lux		
Stairways and Ladders ⁽⁷⁾	Frequently Used	8.5	90	5	55	Floor	4
	Other	1.5	16	1	11	Floor	4
Fired Heaters		5	55	3	32	Grade	4
Manual Sampling Points		30	325	20	215	Task level	2
Gauge Glass		8.5	90	5	55	Eye level	4
Compressor Houses		25	270	15	160	Floor	2
Yard Areas		0.8	9	0.5	5	Grade	10
Individual Control Houses/Rooms							
General		30	325	20	215	Floor	2
Console & Desk Areas		45	485	30	325	30 in.	1.5
	Panel Vertical	45	485	30	325	60 in.	1.5
	Panel Vertical	45	485	30	325	45 in.	1.5
	Panel Vertical	40	430	25	270	18 in.	1.5
	Back of Panel Vertical	25	270	15	160	48 in.	4
Central Control House/Rooms							
General		50	540	35	375	Floor	2
Console & Desk Areas		75	805	50	540	30 in.	1.5
	Panel Vertical	75	805	50	540	60 in.	1.5
	Panel Vertical	75	805	50	540	45 in.	1.5
	Panel Vertical	65	700	40	430	18 in.	1.5
	Back of Panel Vertical	25	270	15	160	48 in.	4
Streets		0.7	7	0.4	4	Grade	10
Instrument Walk-In Shelters		45	485	30	325	Floor	2
Remote Terminal Stations		15	160	10	110	Floor	2
Stairways and Ladders		Same as process areas					

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