

SECTION 7

LIGHTING

07.A GENERAL

07.A.01 Proper illumination of work spaces, project sites, roadways and vessels is imperative to a safe working environment. It is of significant importance in safe vehicular operation and the prevention of slips and falls. USACE operations and projects shall conform to the illumination standards detailed herein.

07.A.042 While work is in progress, offices, facilities, accessways, working areas, construction roads, etc., shall be lighted by at least the minimum light intensities specified in Table 7-1. If lighting provided is questionable as to intensity, light monitoring shall be performed to insure proper light intensities are provided. Safety and Occupational Health Offices (SOHOs) shall maintain a calibrated light meter and train their personnel in its use. Illumination readings shall be taken and recorded whenever proper lighting of an area is in question. This also applies to accident investigations when illumination is a suspected contributing factor.

07.A.023 Office lighting shall be in accordance with ANSI/Illuminating Engineering Society of North America (IESNA) RP-1, 2011 Handbook.

07.A.034 Roadway lighting shall be in accordance with ANSI/IESNA RP-8, 2005, which is available on the Whole Building Design Guide website.

07.A.045 Marine lighting shall be in accordance with American Bureau of Shipping, "Guide for Crew Habitability on Ships." shall be in accordance with ANSI/IESNA RP-12.

07.A.056 Means of egress.

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a. Means of egress shall be illuminated, with emergency and non-emergency lighting, to provide a minimum of 1 footcandle (fc), [1 lumen per square foot (lm/ft²)], (11 lux (lx), measured at the floor. > **Reference NFPA 101.**

b. The illumination shall be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb, will not leave any area in total darkness, impeding the means of egress.

07.A.067 Lamps and fixtures will be guarded and secured to preclude injury to personnel. Open fluorescent fixtures will be provided with wire guards, lenses, tube guards and locks, or safety sockets that require force in the horizontal axis to remove the lamp.

07.A.078 Lamps for general illumination shall be protected from accidental contact or breakage. Protection shall be provided by elevation of at least 7 ft (2.1 m) from normal working surface, suitable fixture or lamp holder with a guard. Additionally, fixtures may be no closer than 18 in (0.5 m) to overhead sprinkler systems, if the building is so equipped, per NFPA Standards.

07.A.089 If work is to be performed at night, a night operations lighting plan shall be developed to ensure that all activities, areas and operations are adequately illuminated to perform work safely. On task lighting shall be in conformance with Table 7-1. Lighting near roadways and other public transportation areas shall be positioned as to avoid creating a glare hazard to public vehicles.

07.A.10 Generator-powered portable lighting units shall be grounded in accordance with manufacturers instructions.

07.A.0911 For temporary lighting, see Section 11.E.06.

TABLE 7-1

MINIMUM LIGHTING REQUIREMENTS

<u>Facility or Function</u>	<u>Lux</u>	<u>Foot Candles (lm/ft²)</u>
<u>Accessways</u>		
- general indoor	<u>150</u>	<u>15</u>
- general outdoor	<u>33</u>	<u>3</u>
- exitways, walkways, ladders, stairs	<u>150</u>	<u>50</u>
<u>Administrative areas (offices, drafting and meeting rooms, etc.)</u>	<u>500</u>	<u>50</u>
<u>Chemical laboratories</u>	<u>540</u>	<u>50</u>
<u>Construction areas</u>		
- general indoor	<u>110</u>	<u>10</u>
- general outdoor	<u>33</u>	<u>3</u>
- tunnels and general underground work areas (minimum 110 lux required at tunnel and shaft heading during drilling, mucking, and scaling)	<u>110</u>	<u>10</u>
<u>Conveyor routes</u>	<u>110</u>	<u>10</u>
<u>Dam Operating Areas (Interior)</u>		
- tunnels and underground work areas	<u>110</u>	<u>10</u>
-Control Stations	<u>150</u>	<u>15</u>
<u>Docks and loading platforms</u>	<u>200</u>	<u>20</u>
<u>Elevators, freight and passenger</u>	<u>50</u>	<u>5</u>
<u>Electrical (Interior Stations)</u>	<u>300</u>	<u>30</u>
<u>Electrical (Exterior Stations)</u>	<u>50</u>	<u>10</u>
<u>First-aid stations and infirmaries</u>	<u>300</u>	<u>30</u>
<u>Maintenance/operating areas/shops</u>		
- vehicle maintenance shop	<u>300</u>	<u>30</u>
- carpentry shop	<u>150</u>	<u>15</u>
- outdoors field maintenance area	<u>150</u>	<u>15</u>
- refueling area, outdoors	<u>150</u>	<u>15</u>
- shops, fine detail work	<u>3000*</u>	<u>300*</u>
- shops, medium detail work	<u>500</u>	<u>50</u>
- welding shop	<u>300</u>	<u>30</u>
<u>Mechanical/electrical equipment rooms</u>	<u>110</u>	<u>10</u>
<u>Outdoor parking areas</u>	<u>50</u>	<u>5</u>
<u>Toilets, wash, and dressing rooms</u>	<u>110</u>	<u>10</u>
<u>Visitor areas</u>	<u>215</u>	<u>20</u>
<u>Warehouses and storage rooms/areas</u>		
- indoor stockroom, active/bulk storage	<u>110</u>	<u>10</u>
- indoor stockroom, inactive	<u>55</u>	<u>5</u>

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- indoor rack storage	<u>270</u>	<u>25</u>
- outdoor storage	<u>33</u>	<u>3</u>
Work areas – general (not listed above)	<u>300</u>	<u>30</u>

NOTE: The Illuminating Engineering Society 2011 Handbook provides thousands of detailed and specific lighting recommendations for multiple tasks, structures and settings. In some cases, exact standards were not listed in the manual, so the closest possible task was used. Table 7-1 above lists a number of common tasks associated with the construction industry and USACE Operations. Readings are measured vertically. If more-specific illumination guidelines are necessary the IES handbook should be used as a reference.

***Denotes illumination on task.**

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DRAFT #1