

136 AIR FIELD PAVEMENT LIGHTING

Airfield pavement lighting includes facilities for lighting all airfield pavements and approaches thereto. The various lighting systems are planned with due regard to other airfield facilities so that integrated control is achieved and the resultant overall lighting system is compatible with the operational mission of the air installation. Based on missions assigned by CNO, lighting facilities are developed to meet visual flight rules (VFR) or instrument flight rules (IFR) conditions as shown in Table 136-00. See OPNAVINST 3721.1 (latest revision) for definitions of naval airfield categories for instrument flight rules (IFR) operating capability.

TABLE 136-00
Airfield Lighting Systems

Lighting System		VFR Conditions	IFR Category			
<u>Code</u>	<u>Title</u>		<u>D</u>	<u>C</u>	<u>B</u>	<u>A</u>
136 30	Runway edge	X	X			
136 60	Threshold	X	X	X	X	X
136 50	Taxiway edge	X	X	X	X	X
136 20	Parking/service area	X	X	X	X	X
136 30	Runway edge (high intensity)			X	X	X
136 10	Approach (Cat. I) (1) (Cat. II) (1)			X		
136 35	Runway centerline				R	X
136 55	Touchdown zone				R	X

X = System required; R = System recommended.

(1) For description of approach lighting systems, see Code 136 10. Cat. I and II ALS are comparable with ICAO (Annex 14 to the Convention on International Civil Aviation, Precision Approach Category I and II Lighting Systems).

The following other airfield lighting requirements are determined by individual airfield needs as described under the referenced category code:

Lighting	Category Code
Circling guidance	136 30
Simulated carrier deck	136 36
Wheels-up wave--off	136 45
Taxiway centerline, hold lights and guidance signs	136 50
Displaced threshold and runway end identification	136 50
Helipad	136 65

Obstruction lighting, beacons, and other visual navigation and traffic aids are discussed under basic Category 134. For airfield perimeter lighting, street lighting, and other general illumination, see Basic Category 812.

136 10 APPROACH LIGHTING (LF)

Approach lighting enhances the pilot's ability to acquire the runway environment visually when making an approach for landing during periods of reduced visibility. Visual cues for directional and roll guidance are provided to the pilot for operations at night and in marginal weather conditions by day. The system includes both approach lights and sequenced flashers.

Approach lighting is provided for primary instrument approach runways. Planning of Category I or Category II approach lighting systems is accomplished in accordance with mission requirements as listed in Basic Category 136. With sufficient justification approach lighting may also be authorized for other runways. Factors to be considered in the justification of any approach lighting system include, but are not limited to:

- (1) Existing and desired precision approach minimal.
- (2) Number of actual instrument approaches.
- (3) Climatology.
- (4) Surface features, obstructions and feasibility of construction.

A. Approach Lighting System with Sequenced Flashing Lights, Category I (ALS/SFL CAT I) Configuration.

The approach lights in this configuration are barrettes of white lights placed perpendicular to the extended runway centerline and spaced for a distance of 3,000 feet from the runway threshold. In addition to the approach lights, sequenced flashing lights are provided at each station from the 1,000 foot crossbar to the end of the system (3,000 feet). Operational considerations or factors, such as real estate limitations or natural barriers, may indicate that a shortened ALS/SFL CAT I configuration is acceptable. Normally, 1,500 feet is the minimum length that will be approved by NAVAIRSYSCOM.

B. Approach Lighting System with Sequenced Flashing Lights, Category II (ALS/SFL CAT II) Configuration.

For planning purposes, this configuration is the same as ALS/SFL CAT I. It varies by the addition of one center barrette and 14 side barrettes in the area between the threshold and the 1,000 foot bar. CAT II lighting extends 3,000 feet from the threshold along the runway centerline extended.

For design criteria, see NAVFAC P-272 and NAVFAC DM-23.

136 20 PARKING AND SERVICE AREA LIGHTING (LF)

Parking and service area lighting enables a pilot to guide his aircraft into position for loading, servicing, or parking and provides illumination to perform such functions as fueling, maintenance, loading, and unloading.

Lighting of the parking and service areas is accomplished by a combination of high- and surface-mounted floodlights and roadway luminaries. Parking and service area lighting is provided at all air installations where night or all-weather operations are conducted. The overall lighting scheme is developed after a study of the functions to be performed and the physical layout of pavements and structures of the particular airfield. The minimum lighting requirements for each area are set forth in NAVFAC DM-23.

136 30 RUNWAY EDGE LIGHTING (LF)

Runway edge lighting is a system of lights defining the lateral limits of the usable runway surface. Included in this category are the circling guidance lights which enable the pilot to locate the runway, while off to the side of the runway, and establish the proper traffic pattern.

Runway edge lights are white lights on each side of the runway at nominal 200-foot intervals. Runway edge lighting is planned for all-weather and night operations. High-intensity lighting is required for certain IFR categories as noted in Basic Category 136. Requirements are expressed in feet of runway length; that is, runway lights programmed for a runway 10,500 feet long will be shown as 10,500 feet of runway lights.

Circling guidance lights have a nominal 1,000-foot spacing and are placed outboard of the runway edge in line with Runway Distance Markers (Category Code 134 64). They are white lights with the beam emitted perpendicular to and away from the runway centerline. They are used only for visual flight operations where conditions around the air installation, such as a metropolitan area or smog, confuse or obscure the runway when viewed from a circling aircraft. The need for circling guidance lights at a given air installation is determined by the particular airfield environment. Circling guidance lights requirements are also expressed in feet of runway length.

For design criteria, see NAVFAC P-272 and NAVFAC DM-23.

136 35 RUNWAY CENTERLINE LIGHTING (LF)

Runway centerline lighting provides visual aid to assist the pilot in keeping the aircraft centered on the runway during take-off and after landing at night or in reduced visibility conditions. It is a supplement to runway edge lights. White in-pavement lights are placed along the runway centerline at nominal 25-foot spacings. Runway centerline lighting is planned in accordance with mission requirements as listed in Basic Category 136. Requirements are expressed in feet of runway length.

For design criteria, see NAVFAC P-272 and NAVFAC DM-23.

136 36 SIMULATED CARRIER DECK LIGHTING (EA)

A simulated carrier deck is used to train pilots ashore for landing aircraft under simulated conditions of a carrier at sea. Simulated carrier deck lighting permits training at night and during adverse visibility conditions.

The carrier deck lighting consists of centerline lights, edge lights, and athwartship lights. The edge lights form a 70-foot by 748 foot rectangle outlining the simulated carrier deck which is on the left side of the runway, as seen from landing aircraft, and approximately 320 feet beyond the runway threshold.

Simulated carrier deck lighting is required at all air installations designed by the Chief of Naval Operations for fleet mirror landing practice (FMLP). Normally, two sets are installed, one at each end of the runway selected for FMLP.

For design criteria, se NAVFAC DM-23 and NAVFAC P-272.

136 45 WHEELS-UP/WAVE-OFF LIGHTING (EA)

Wheel watches are posted in the approach zone of the duty runway when the majority of flight operations involves single-piloted aircraft or during periods of high-density traffic. The wheels-up/wave-off lighting system is an aid in preventing the landing of an aircraft when the landing gear has not been lowered. It consists of two lighting systems, wheels-up lighting, and runway wave-off lighting.

Wheels-up lighting illuminates the underside of the aircraft for observation by the wheel watch. A row of white floodlights is located in the approach zone 980 feet in front of the runway threshold and on the same side of the runway as the control tower. The lights are aimed upward and toward the threshold, away from approaching aircraft.

Runway wave-off lighting signals the pilot to execute a missed approach. Wave-off lights are placed at six locations (three on each side of the runway), each having a triangular cluster of three red floodlights. The lights are aimed in the direction of approaching aircraft and flash when actuated. Where an Optical Landing System (OLS), Category Code 134 60 is also installed, the OLS wave-off lights are operated simultaneously with the runway wave-off lights.

A portable shelter for the wheels watch booth is made available for each lighting site. It is located adjacent to the wheels watch handhole. For criteria see category code 133-80.

For design criteria, see NAVFAC DM-23 and NAVFAC P-272.

136 50 TAXIWAY LIGHTING (LF)

Taxiway lighting defines the lateral limits and direction of a taxiway to guide aircraft movement between the runway operational area and the aircraft parking area during night operations or conditions of poor visibility. Taxiway lighting requirements are expressed in feet of lighted taxiway length, not length of lighting circuit. Included in this category code, in addition to taxiway edge and centerline lights, are hold lights and guidance signs.

Taxiway edge lights are blue lights located on each side of the taxiway at sufficiently frequent intervals, as set forth in NAVFAC DM-23, to guide the aircraft. Taxiway edge lighting is planned for all air installations conducted all-weather or night operations.

Taxiway centerline lights are green lights placed in the pavement on the centerline of the taxiway. They are used to add the directional guidance required at high speed taxiway exits. They are also used to supplement edge lights wherever more positive guidance of aircraft is necessary, such as at complex taxiway intersections or large ramp areas where pilot confusion might occur.

Hold lights (yellow) are used for night marking of the painted hold positions. Hold lights are installed whenever taxiway centerline systems are installed and separately at other hold positions as determined by operational requirements.

Taxiway guidance signs are internally lighted signs used to supplement taxiway lighting systems. They are placed at intersections of runways, taxiways with runways, taxiways with aprons, taxiways with taxiways, and at refueling stations and generally where direction or location information is required. The number of signs is based on the particular airfield requirements and is kept to a minimum.

The use of runways as taxiways should be avoided; however, where the existing airfield layout requires the use of the runway as a taxipath, separate taxifway fixtures and circuits, in addition to the runway lighting system, are used.

For design criteria, see NAVFAC P-272 and NAVFAC DM-23.

136 55 TOUCHDOWN ZONE LIGHTING (EA)

Touchdown zone lighting delineates the touchdown zone on the runway and provides directional and roll guidance for aircraft approaching the threshold. The lighting consists of bars of white lights in the pavement on each side of the runway centerline. Thirty pairs of bars are spaced along the runway at 100-foot intervals beginning at the threshold for a total distance of 3,000 feet. Touchdown zone lighting is planned in accordance with mission requirements as listed in Basic Category 136. A set of lights is required only on the end of the runway with approach lighting.

For design criteria, see NAVFAC DM-23.

136 60 THRESHOLD LIGHTING (EA)

Threshold lighting is a system of lights defining the ends of the usable runway surface. The threshold lights are displaced from the extremity of the runway when a portion is unavailable for normal operations. Runway end identification lights enable a pilot positively to identify the ends of the runway from a distance during night-non-precision approach operations.

Threshold lighting consists of two groups of lights located symmetrically about and perpendicular to the runway centerline at each end of the runway, both inboard and outboard of the line of the runway edge lights. The lights show green toward the approach zone and, if at the extremity, red toward the runway. Threshold lights are planned for all lighted runways, but more lights are required where an approach lighting system is used.

Displaced threshold lighting is used only if a portion of the end of the runway is unusable for landing but is available for rollout and takeoff. When this condition exists because of obstructions or other reasons, the lighting is modified to delineate the extent of runway which is available to aircraft approaching from either direction. This is accomplished by displacing and changing the threshold lights to indicate the new threshold location for landing aircraft and equipping the intervening runway edge lights with filters.

Runway end identification lights are single rotating lights mounted in line with the threshold lights but outboard of the runway edge lights, for a total of two lights per runway end. The need for runway end identification lights is determined by the particular air installation environment. Runway end identification lights are effective for overriding surrounding lighting that might cause pilot confusion; for example:

- (a) A general preponderance of metropolitan or other lighting located within two miles of the circling approach to the runway.
- (b) A configuration of nonaviation lighting, such as a boulevard, expressway, or railroad yard, which presents a false or misleading runway identification.

For design criteria, see NAVFAC DM-23.

136 65 HELIPORT PAD LIGHTING (LF)

Helicopter lighting is a system of lights arranged to clearly define the helicopter landing pad for operations at night and during periods of poor visibility. Lighting in this category code is limited to single heliports. Criteria for lighting of helicopter runways is under development.

The basic heliport lighting requirement is perimeter lighting and landing direction lights. Approach direction lights and depth perception lighting may also be required. Perimeter lighting and landing direction lights are planned for all helicopter pads designated for night or all-weather operations and when authorized as an operational requirement at a specific location. Landing direction lights are used to indicate a preferred

landing direction and to give side orientation as wing bars. Approach direction lights are added if additional approach guidance is required. The need for depth perception lighting (pad inset lights and/or flood lights) is determined by-heliport location, steepness of approach, and prevailing environmental conditions.

For design criteria, see NAVFAC DM-23.