DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE CHIEF OF ENGINEERS

STD Detail No. 40-06-04
Change 1
September 1991

LIGHTING FIXTURES

1. Standard Detail No. 40-06-04, February 1991, is changed as follows:

Remove Sheets	Insert Sheets
9	9
19	19
20	20
21	21
22	22
23	23
24	24
39	39
40	40
41	41
42	42
64	64
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76	76
B1	B1
B4	B4

2. File this change sheet in front of the publication.

PREFACE

1. Standard Detail No. 40-06-04, dated February 1991, supersedes Standard Detail No. 40-06-04, dated February 1990 with all changes. This standard detail includes lighting fixtures of the type most generally used in military and civil works construction and has been prepared to establish uniform requirements, reduce project costs and design time, and show specific generic features of fixtures. This is required to optimize competition to comply with the Federal Aquisition Regulations. Trade or copyrighted names, or other proprietary designations and catalog numbers applying exclusively to the product of one company will not be used unless that is the only company which manufactures a suitable lamp or lighting fixture for the specific application.

2. This edition incorporates changes in the state-of-the-art technology since publication of the February 1985 issue. New fixtures include the single and multi-lamp recessed fluorescent troffer type of fixture having a more efficient parabolic louver than diffusers, louvers, or reflectors used in earlier types of recessed fluorescent lighting fixtures. Both the 1-foot by 4-foot and the 2-foot by 4-foot size of fixture are shown in addition to a 20-inch by 4-foot type that has been designed for use in the newer 5-foot by 5-foot modular ceiling system.

3. Comparing Appendix B data in this edition with Appendix B in the February 1985 issue of Drawing No. 40-06-04 will show significant changes in: the wattage rating of different types of lamps; ballast losses in fluorescent and high intensity discharge lighting fixtures; mean lumens; mean lumens per watt; and in the estimated minimum expected life of different types and wattage ratings of lamps. The same type of data can be reasonably expected to change in the next few years as additional changes are made to improve the energy efficiency of ballasts and lamps and the efficacy of lighting fixtures.

4. Most sheets in this edition have been revised for the reasons stated in paragraph 3 above and to allow designers to specify the exact wattage rating and lamp type best suited for the specific design application based on the proven state-of-the-art technology available during design. Generally, wattage ratings of fluorescent lamps have been omitted from sheets which show and specify the details of fluorescent fixtures. Most of the other sheets in this edition preface the wattage rating with "rated for" to indicate the thermal rating of the fixture without restricting the manufacturer or designer to what could be an obsolete or undesirable wattage rating of lamps.

5. Sheets in this edition, therefore, necessarily require the designer to determine the wattage rating of lamps, in addition to other design considerations, and to show, specify, or otherwise indicate the wattage rating of lamps on the proper contract document. Table 1 in Appendix B lists the latest data on the wattage rating of the different types of lamps.

6. Recent and extensive research into the state-of-the-art technology in lamps, lighting fixtures, and lighting controls is the basis of changes discussed above. Adequate competition among manufacturers does not now exist for the various types of lighting controls which offer energy and other economic advantages to standardize specifications for lighting control systems. Therefore, in addition to conventional

lighting control systems, the following types of available control systems must be evaluated on an individual basis and designed when justified by economics or functional necessities:

a. High intensity discharge lighting systems remotely controlled to deenergize fixtures at preset intervals or times when lighting is not needed, or can be minimized during lunch periods, weekends, holidays, etc.

b. Light sensing and automatic control of lighting fixtures installed around the perimeter of buildings having windows; with lumen output maintained constant with varying intensities of natural light.

c. Motion detecting and switching systems using passive sensors to discriminate between occupied and unoccupied offices, rooms, or areas. These systems are designed to automatically deenergize fixtures after a preset period following the exit of the last person, and to energize fixtures following detection of movement of personnel in the area, to conserve energy.

d. Low-voltage (i.e., 24VAC) relays which control individual or a group of fixtures from local or centrally located panels.

e. Motor-operated, low-voltage circuit breakers mounted in lighting panels to locally or remotely control fixtures on individual lighting circuits.

7. Most sheets pertaining to fluorescent lighting fixtures now indicate the requirement for standard ballasts to be the Class P, high power factor type which have been approved for the application by the Certified Ballast Manufacturers. This will ensure that ballasts are manufactured and tested in accordance with current industry standards and practices and preclude the use of ballasts and lamps which do not have compatible characteristics. Incompatible characteristics can cause premature failure of the ballasts or lamps, or both, or the degradation of lumens per watt and the efficacy of the lighting fixture. Consult data published by at least three manufacturers of fluorescent lamps and three manufacturers of fluorescent lighting ballasts prior to developing contract documents to ensure that ballasts and lamps have compatible characteristics relative to the nominal current, frequency, voltage and wattage ratings, and tolerances.

8. Lighting fixtures or luminaries shall be designated in other contract documents by the Type Number, the letter suffix, and any number suffix shown on the respective Standard Detail No. 40-06-04 sheets referenced in the project specifications.

9. It is not the intent to limit approval of fixtures to those having the exact details shown. Details indicated for housings, frames, mounting, etc., are typical. Fixtures varying in nonessential details, but meeting the approximate dimensions as well as the technical requirements, will be considered as meeting these fixture specifications. Critical requirements which must be maintained shall be specified or indicated in the project contract documents.

10. Lighting fixtures and associated equipment in this standard detail will conform to referenced publications and descriptions on the respective sheets of the standard detail. The user of this standard detail must coordinate the ordering data in the reference publications with the specific requirements of the work. The choices made by the user then must be incorporated into the project contract documents. See paragraphs 5 and 8 above in these regards.

11. Standard Detail No. 40-06-04 will be used to the maximum practicable extent. Where Standard Detail No. 40-06-04 needs to be modified for particular applications, modifications will be incorporated into the text or schedules of the project contract documents. Where it is deemed necessary to specify other than Standard Detail No. 40-06-04 fixtures, detail drawings and specifications thereof will be incorporated into the project contract documents.

12. Eight-foot lamps and associated fixtures shown on various sheets of this standard will not be provided without obtaining prior approval from the Facilities or Base Civil Engineer having maintenance responsibility for the facility in which use of such fixtures are intended.

13. Appendix A is a suggested lighting fixture schedule. Its use is not mandatory; however, the project design analysis and contract documents must contain the pertinent information for the complete specification of the lighting equipment including but not limited to the following: for design analysis, a through f below; for contract documents, a, b, c, and f below:

a. Type of fixture.

b. Type, number and ratings of lamps.

c. Voltages of fixtures.

d. Minimum acceptable coefficient of utilization and basis thereof.

e. Maximum allowable spacing to mounting height ratio for uniformity.

f. Fixture mounting heights.

Appendix B is a brief discussion of energy conservation considerations applicable to lighting fixtures. Specific consideration should be given to the conservation of energy in the selection of lighting fixtures.

15. Suggested Criteria in the Application of Fluorescent Diffusers/Lens are as follows:

a. Glass or light stabilized acrylic shields will generally be selected for use in fixtures for permanent construction where normally clean conditions will prevail and frequent maintenance will not be required.

b. Polystyrene may be selected for use in fixtures for temporary construction where gradual yellowing over limited life of facility will not be of material concern. Polystyrene will generally be selected for dusty areas where frequent fixture maintenance will be required.

c. Use of 1/2- by 1/2- by 1/2-inch polystyrene louvers in fluorescent fixtures will generally be limited to areas where lighting intensities are less than 50 foot-candles and to dusty areas where more fragile types of louvers or shields would be subject to excessive maintenance.

d. Drop-dish diffusers may be used for decorative purposes or in small areas where the high brightness of the sides will not create unfavorable seeing conditions and lighting intensities normally will not exceed 30 foot-candles.

16. Lighting designs are to comply with Lighting Criteria, paragraphs 1 through 2c in Appendix C.

17. Standard Detail No. 40-06-04 sheets will be included in project contract specifications derived from the following Corps of Engineers guide specifications (CEGS):

Electrical Work, Interior
Electrical-Distribution and Street-Lighting System; Underground
Electrical-Distribution and Street-Lighting System; Aerial
Protective-Lighting System

18. Standard Detail No. 40-06-04 sheets will not be modified by the Division or District offices. Recommended changes will be forwarded to HQUSACE (CEMP-ET) WASH DC 20314-1000 for action. Where experience indicates that there is a continued need for a particular type of fixture not covered herein, data should be forwarded to HQUSACE (CEMP-ET) for consideration for inclusion in Standard Detail No. 40-06-04.

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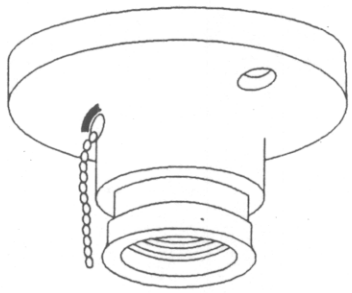
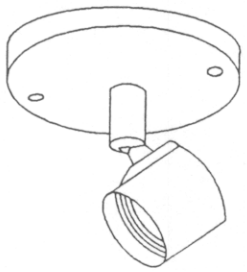


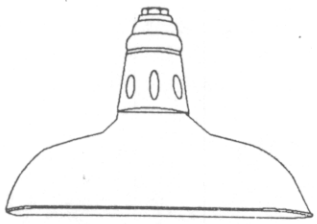
TYPE 101
Incandescent Porcelain Lampholder for Outlet Box Mounting

Suffix	Description
A	Switchless
B	Pull switch, short length of chain, 4-foot length of linen cord and bell



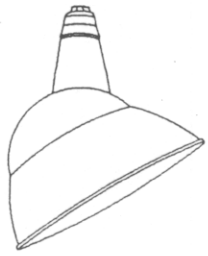
TYPE 102
Incandescent Adjustable Lampholder for Outlet Box Mounting

Fixture types indicated on this sheet shall conform to UL 496, be rated for not less than 100 watts, and conform to requirements specified and indicated in the contract documents.



TYPE 103
Standard Dome

TYPE 104
Deep Bowl



TYPE 105
Symmetrical Angle

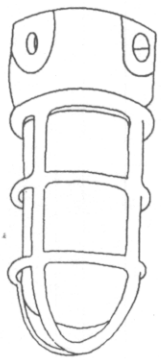
Industrial Incandescent Fixtures

First Suffix	Second Suffix	Description
A		Pendant mounted
B		Ceiling mounted
	1	Wire guard

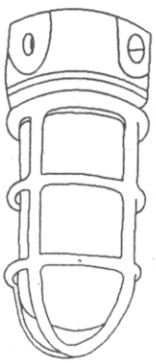
Fixtures shall conform to UL 1571. Reflector shall have a reflection factor of not less than 0.83, and shall be the porcelain enameled steel type unless a fiberglass reinforced polyester or polished aluminum reflector is the manufacturer's standard commercial product. If a porcelain enameled steel type is proposed, the minimum steel thickness after fabrication shall be not less than the thickness recorded in the tabulation below. Other standard commercial product types shall have equivalent strength and rigidity as provided by porcelain enameled steel type listed below for the respective type and wattage size. The wire guard shall be of welded, rust-resistant-steel wire provided with a bright tin finish after welding. Pendant mounted fixtures shall be provided with self-aligning hanger and canopy.

Type	Fixture Rated for Lamp Wattages	Reflector Thickness (inch)
103	100, 150, 200	0.019
	300, 500, 1,000	0.024
104	100, 150, 200, 300, 500	0.019
	1,000	0.024
105	100, 150, 200	0.019
	300, 500, 1,000	0.024

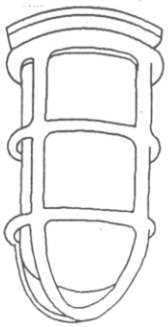
Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 106
Integral Outlet Box



TYPE 107
Exposed Gasketed
Outlet Box



TYPE 108
Concealed Standard
Outlet Box

Enclosed and Gasketed (Vapor-tight) Industrial Incandescent Fixtures

Suffix	Description
A	Ceiling mounted
B	Wall mounted
C	Pendant mounted

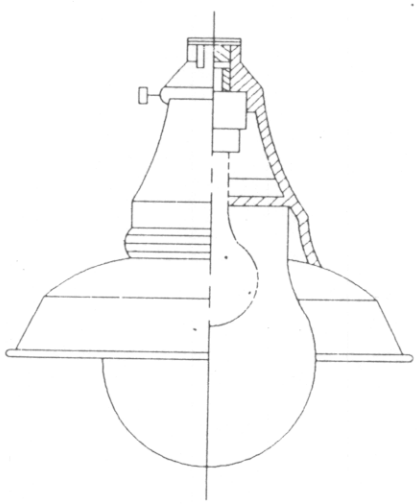
Type 106 fixture body shall be constructed with an enclosed and gasketed chamber as an integral part of the body which shall serve as an outlet box. Fixture shall be suitable for wet locations.

Type 107 fixture shall be suitable for mounting on an exposed, enclosed, and gasketed conduit outlet box. Fixture shall be suitable for wet locations.

Type 108 fixture shall be suitable for mounting on a concealed standard outlet box. Fixture shall be suitable for wet locations.

Type 106, 107, and 108 fixtures shall conform to UL 1571 and shall be provided with a cast aluminum guard of adequate rigidity and strength. A guard shall be attached to the fixture so that its permanence of position is assured. Wattage rating of the fixture shall be as indicated on contract documents.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

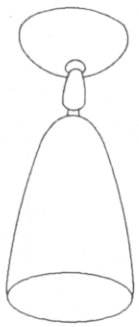


TYPE 109
Heavy Duty Enclosed and Gasketed (Vapor-tight)
Industrial Incandescent Fixture
With Dome Reflector

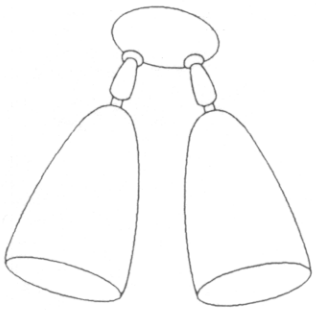
First Suffix	Second Suffix	Description
A		Standard dome reflector
B		30 degree angle dome reflector
	1	Ceiling mounted
	2	Pendant mounted

Fixture shall conform to UL 1571. Fixture shall be suitable for use in wet locations and shall be enclosed and gasketed. A cast aluminum housing shall be provided, in one or two pieces, with a clear acrylic lacquer protective coating. The conduit entry wiring component shall be separated from the lampholder compartment and shall be sealed with a gasket to prevent contamination from entering the raceway system during periods when a globe is broken or removed for lamp replacement. Lampholder shall be medium base glazed porcelain. The lampholder compartment shall be enclosed with a heavy, threaded, glass globe and sealed with a gasket. The specified reflector shall be held securely to the housing with a threaded connection. The reflector shall be porcelain enameled steel. The steel thickness of the reflector shall be not less than 0.019-inch after fabrication. The reflection factor shall be not less than 0.83. A fiberglas reinforced polyester reflector may be provided in lieu of porcelain enameled steel providing it is the manufacturer's standard commercial product. Fixture shall be rated for standard lamps, 60 to 150 watts.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 110
Single



TYPE 111
Double

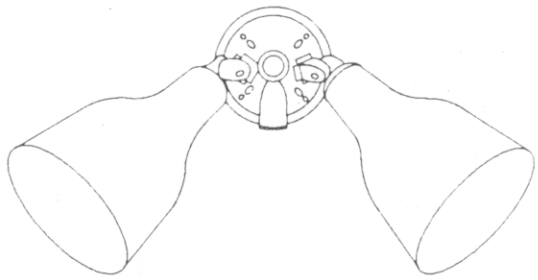
Interior Incandescent Accent Fixture for
Ceiling or Wall Outlet Box Mounting

Suffix	Description
A	Satin aluminum finish
B	Satin brass finish
C	Textured black finish

Fixture shall conform to UL 1571. Fixture shall consist of the indicated number of lampholder housing units with adjustable attachment arm and box canopy. The housing, attachment arms, and canopy shall be aluminum and shall be finished as specified. Satin aluminum and satin brass finishes shall have clear acrylic lacquer protective coating. The housing arm shall attach to the box canopy with 1/2-inch threaded connection. A locknut shall be provided to secure the arm in the desired position. The housing arm shall be provided with a calibrated swivel with serrated locking teeth and compression screw to hold the fixture housing in the desired position. Lampholder shall be medium base glazed porcelain. Housing shall be large enough to provide ample finger room for ease of lamp replacement. Fixture shall be designed for use with R-30, R-40, or PAR-38 standard lamps of 52 to 135 watts. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

TYPE 112
Single



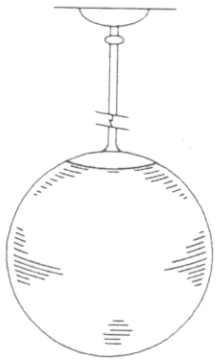
TYPE 113
Double

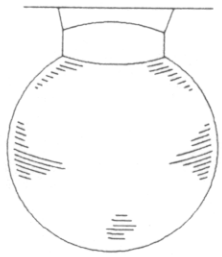
Exterior Incandescent Floodlight for
Soffitt or Wall Outlet Box Mounting

Suffix	Description
A	Satin aluminum finish
B	Textured black finish

Fixture shall conform to UL 1571. Fixture shall be suitable for use in wet locations. The fixture shall consist of the indicated number of lampholder housing units with adjustable attachment arm and box canopy. The housing, attachment arm, and canopy shall be cast aluminum and shall be finished as specified. Satin aluminum finish shall have clear acrylic lacquer protective coating. The housing arm shall attach to the box canopy with 1/2-inch connection. A locknut shall be provided to secure the arm in the desired position. The housing arm shall be provided with a calibrated swivel with serrated locking teeth and compression screw to hold the fixture housing in the desired position. Housing shall be large enough to provide ample finger room for ease of lamp replacement. Fixture shall be rated for PAR-38 standard lamps of 52 to 165 watts. Lampholder shall be medium base glazed porcelain. Fixture shall be furnished with weatherproof gasket. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.





TYPE 114

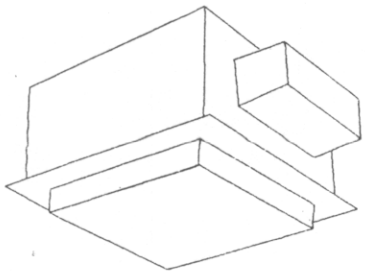
Pendant Mounted Ceiling Mounted

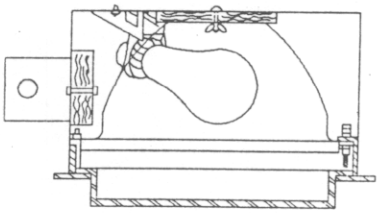
Opal Glass Spherical Globe Incandescent Fixture

First Suffix	Second Suffix	Description
A		12-inch diameter rated 100 watt lamp
B		14-inch diameter rated 150 watt lamp
	1	Pendant mounted
	2	Ceiling mounted

Fixture shall conform to UL 1571. The canopy and safety type glass holder shall be die-cast aluminum or steel. Fixture shall be provided with a medium base glazed porcelain lampholder. Stem for pendant mounted fixture shall be the manufacturer's published standard and shall include self-aligning hanger and canopy. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Exposed steel surfaces shall receive a polished chrome finish. Exposed aluminum parts shall be provided with a brush or spun finish. Chrome and aluminum finishes shall have clear acrylic lacquer protective coating. Globe shall be low brightness, highly diffusing opal glass having a uniform transmission of light at all angles. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.





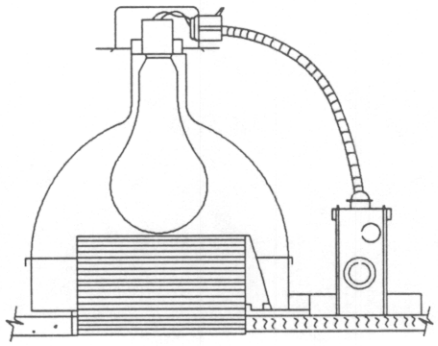
TYPE 115

Recessed Square Incandescent Fixture

First Suffix	Second Suffix	Description
A		Baked white enamel finish steel lens frame
B		Satin aluminum finish lens frame
C		Satin chrome finish steel lens frame
	1	Drop opal glass lens
	2	Flat prismatic glass lens
	3	Semi-flush drop prismatic glass lens
	4	Flat albalite glass lens

Fixture shall conform to UL 1571. Fixture shall have thermal protection or shall be UL listed as suitable for use in direct contact with insulation. The housing shall be aluminum or steel and shall be finished with baked white enamel. Lens frame shall be finished as specified. Lens frame shall be connected to housing by concealed hinges and shall be held in the closed position by a latch that has no projection below the frame. Lens shall be held securely to the lens frame so that it cannot fall when the lens frame is in the open position, but that it shall be easily removed with a screwdriver. Fixture shall be provided with a one-piece highly polished aluminum reflector. Lampholder shall be medium base porcelain. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Satin chrome and satin aluminum lens frame finishes shall have clear acrylic lacquer protective coating. Fixture shall be rated for a 150 watt lamp. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

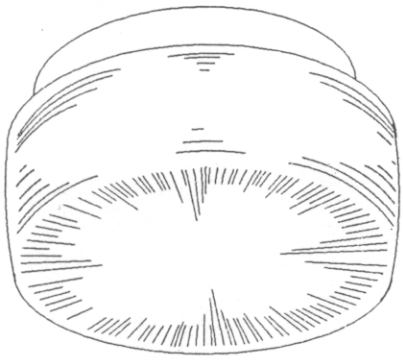


TYPE 116

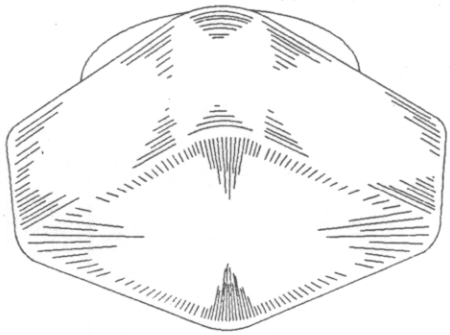
Recessed Round Incandescent Downlight

Fixture shall conform to UL 1571. Fixture shall have thermal protection or shall be UL listed as suitable for use in direct contact with insulation. Fixture shall be rated for a 200 watt lamp. The mounting plate shall be steel. The reflector shall be highly polished aluminum. The baffle shall be black, constructed of aluminum, and multigrooved for low brightness. The baffle shall be securely attached to the fixture housing and shall be easily removed without the use of tools. Fixture shall be provided with a through wiring junction box and shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 117
Round



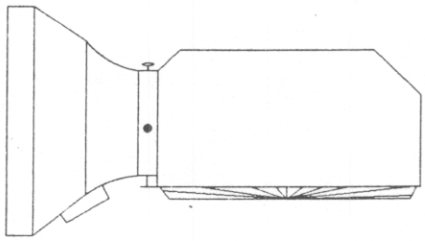
TYPE 118
Square

Surface Mounted Incandescent Fixture

Suffix	Description
A	Rated for two 40 watt lamps
B	Rated for two 60 watt lamps
C	Rated for two 75 watt lamps

Fixture shall conform to UL 1571. Fixture housing shall be steel or aluminum. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Exposed ferrous metal parts shall be provided with a chrome finish. Exposed aluminum parts shall be provided with a brushed finish. Chrome and aluminum finishes shall have clear acrylic lacquer protective coating. Reflector shall be aluminum. Lampholder shall be medium base glazed porcelain. The globe shall be white opal glass and shall be securely fastened to the fixture housing with a concealed hinge and retainer ring or with a steel spring assembly which will permit the globe to hang from either side or to be removed without the use of tools. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



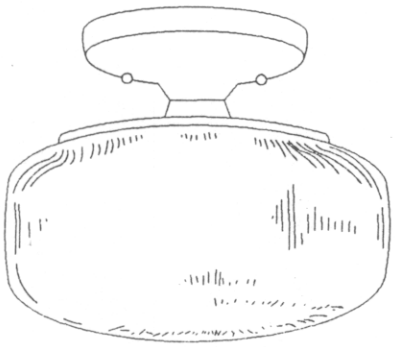
TYPE 119

Incandescent Fixture for Wall Outlet Box Mounting

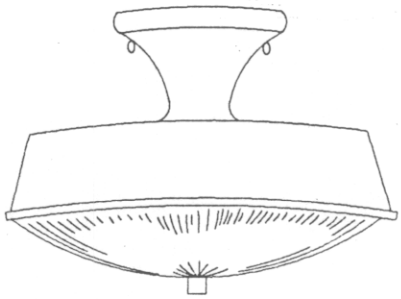
First Suffix	Second Suffix	Description
A		Chrome plated steel base
B		Polished aluminum base
C		Brass finish steel base
	1	With grounded receptacle
	2	Without receptacle

Fixture shall conform to UL 1571. The fixture housing shall be steel or aluminum. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Chrome, polished aluminum, and brass finishes shall have clear acrylic lacquer protective coating. Lampholder shall be medium base glazed porcelain. Shade holder screws shall be finished to match the base. The shade shall be white opal glass with a diffusing glass bottom. Fixture shall be rated for one 75 watt lamp. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 120
Rated for One 60 Watt Lamp



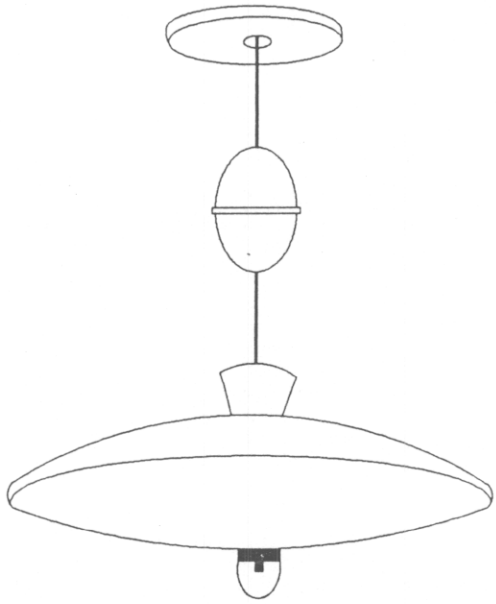
TYPE 121
Rated for Two 60 Watt Lamps

Incandescent Fixtures for Ceiling Outlet Box Mounting

Suffix	Description
A	Brass finish on steel
B	Copper finish on steel
C	Chrome finish on steel
D	Baked white enamel finish on steel
E	Brushed aluminum finish

Fixture shall conform to UL 1571. Fixture housing shall be steel or aluminum. Lampholder shall be medium base glazed porcelain. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Exposed metal parts shall be finished as specified. Brass, copper, chrome, and aluminum finishes shall have clear acrylic lacquer protective coating. The globe for type 120 fixture and the diffuser for type 121 fixture shall be of low brightness, highly diffusing white opal glass having a uniform transmission of light at all angles. Globe and diffuser shall be held securely to the housing with screws finished to match the housing. Tools shall not be required for relamping the fixtures. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



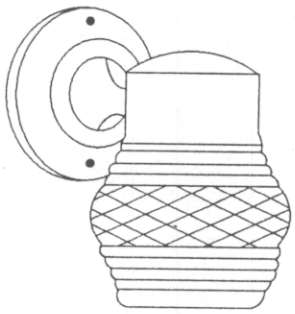
TYPE 122

Ceiling Mounted Adjustable Height Incandescent Fixture

Suffix	Description
A	Antique brass finish
B	Antique copper finish
C	Matte black finish

Fixture shall conform to UL 1571. Fixture height shall be adjustable from approximately 18 to 48 inches below the ceiling by use of a pulldown and latch feature. Fixture housing shall be steel or aluminum. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Exposed metal parts shall be finished as specified. Brass and copper finishes shall have clear acrylic lacquer protective coating. Lampholder shall be medium base glazed porcelain. Fixture shall be provided with a 3-way switch and shall be rated for three 60 watt lamps. The diffuser shall be white or frosted glass and shall be removable without the use of tools. Fixture shall have twist switch for one lamp on, three lamps on, and off. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

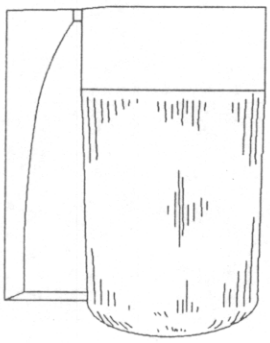


TYPE 123

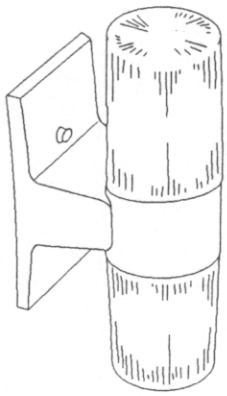
Exterior Incandescent Fixture for Wall Outlet Box Mounting

Fixture shall conform to UL 1571 for use in wet locations. Fixture housing shall be steel or aluminum. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Exposed metal parts and globe holding screws shall be provided with a satin black finish. Lampholder shall be medium base glazed porcelain. The globe shall be clear glass. Fixture shall be furnished with gasket for weatherproof installation. Fixture shall be rated for a 100 watt lamp. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 124
Rated for One 100 Watt Lamp



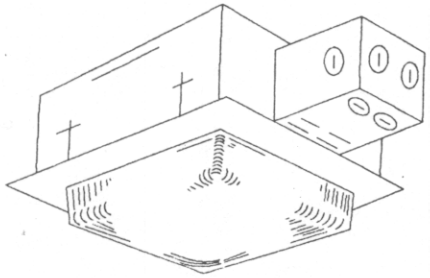
TYPE 125
Rated for Two 100 Watt Lamps

Exterior Wall Mounted Enclosed and Gasketed
Incandescent Fixtures For Wet Locations

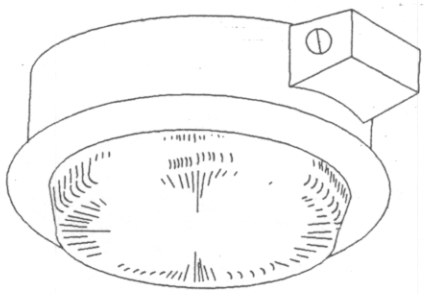
Suffix	Description
A	Without protective guard
B	With protective guard

Fixture shall conform to UL 1571. Fixture shall be suitable for use in wet locations and shall be enclosed and gasketed. The round housing and wall bracket shall be cast aluminum provided with a brushed or satin aluminum finish and a clear acrylic lacquer protective coating. The lampholder shall be medium base glazed porcelain. The housing shall be threaded to receive the threaded globe. The globe shall be white opal tempered glass. The protective guard shall be cast aluminum and finished as specified for housing. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 126
Square



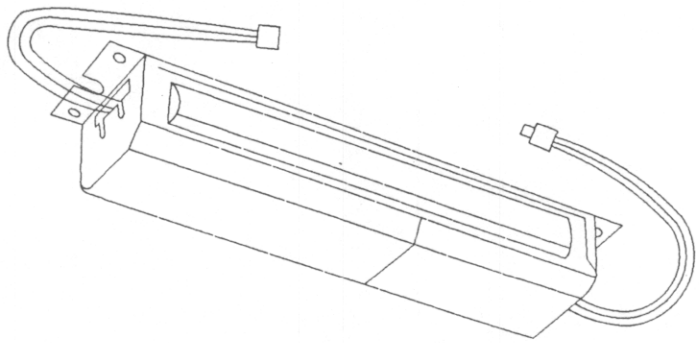
TYPE 127
Round

Weathertight, Insect-proof, Recessed Incandescent Fixture

First Suffix	Second Suffix	Description
A		Drop white opal glass lens
B		Flat prismatic glass lens
	1	Suspended plaster installation
	2	Concrete pour installation

Fixture shall conform to UL 1571 for use in wet locations and shall be enclosed and gasketed. Fixture shall be suitable for installation in outdoor soffitts. The housing shall be 18 gage hot-dipped galvanized steel and shall have sealed seam construction. The housing for suspended plaster installation shall be provided with hot-dipped galvanized steel sheet metal splice compartment and plaster frame. The housing for concrete pour installation shall be provided with a cast aluminum splice compartment. The interior surfaces of the housing shall be finished with baked white enamel. The reflector shall be one piece specular aluminum. The lampholder shall be medium base glazed porcelain. The lens frame shall be one piece cast aluminum with a 1/8-inch minimum wall thickness. The lens frame shall have a brushed satin aluminum finish and be provided with a clear acrylic lacquer protective coating. The lens frame shall be held securely to the fixture housing with a hinge and self-centering captive screws or with a chain-hinge and four self-centering captive screws. A round neoprene factory installed gasket shall be provided between the lens frame and the ceiling. A flat gasket shall be provided between the lens frame and the glass diffuser. The glass lens shall have a minimum thickness of 1/4 inch. The lens shall be held securely to the lens frame and gasket with steel clips and screws. Fixture shall be prewired. Fixture shall be rated for a 150 watt lamp.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

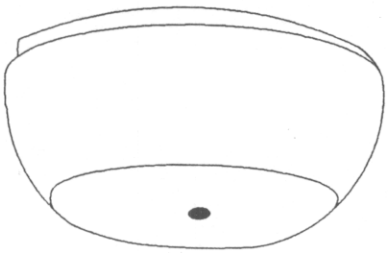


TYPE 200

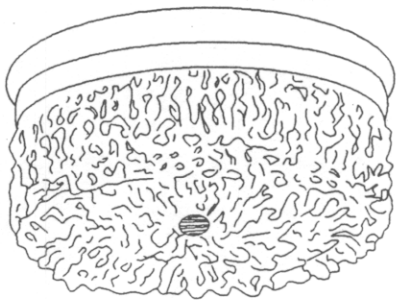
Emergency Battery and Lamp Supply Unit for Fluorescent Fixtures

The unit shall conform to UL 924 and be UL Listed for field or factory installation. The unit shall be dual-rated for use on either 120 or 277 Volt lighting circuits, and shall meet or exceed NFPA 70 time and voltage requirements. The unit shall be capable of automatically supplying a minimum of 15 percent of the rated lumen output of a standard 4-foot, 40 watt rapid start fluorescent lamp in one minute following the failure of the normal power supply. It shall provide a minimum of 60 percent of the initial emergency illumination at the end of the 90-minute discharge period. The battery charger shall be capable of fully recharging the battery within 24 hours after the return of the normal power supply and, under normal operations, shall trickle charge the battery to maintain it in a fully charged condition. The unit shall be capable of operating at least one of the lamps in the fixture which also houses the unit and shall consist of a high temperature, pocket-plate type of nickel cadmium battery, charger, and electronic circuitry in one compact housing. A conveniently located test switch shall be provided to test the solid-state circuitry and the readiness of the battery. The battery shall be designed to require no maintenance during the expected life, be warranted for not less than three years from the date of the purchase of the unit, and be field replaceable without requiring removal of other components of the unit. Other components of the unit shall be fully warranted for not less than 18 months from the date of purchase of the unit.

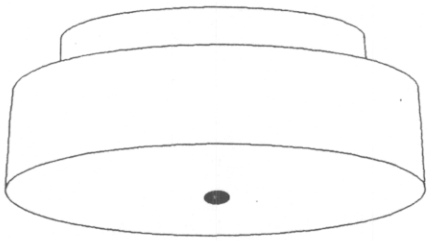
The Emergency Battery and Lamp Supply Unit indicated on this sheet shall be provided as indicated on other sheets, and shall also conform to requirements specified or indicated in the contract documents.



TYPE 201
White Opal or Prismatic Diffuser



TYPE 202
Crystal or Prismatic Diffuser

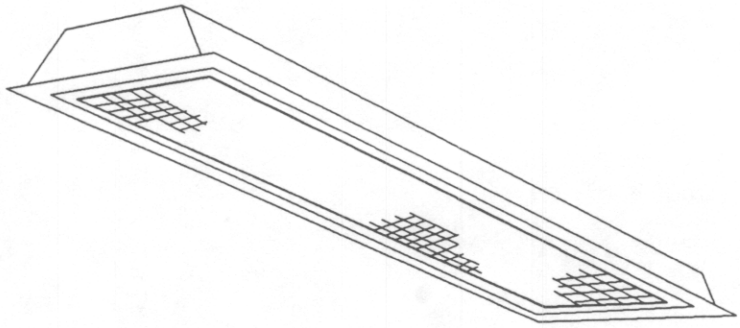


TYPE 203
White Opal or Prismatic Diffuser

Ceiling Mounted, Circular Residential Fluorescent Fixtures

Fixture shall conform to UL 1571. Fixture shall have a steel mounting pan which shall enclose the ballast and provide support for lamps, lampholder, and diffuser. All exposed metal parts shall receive a rust inhibitive coating and a white baked enamel finish. Fixture shall be provided with round frameless diffuser which shall fully conceal the lamp and fit tightly to the mounting pan and be held in place with knurled thumb nut finished to match the trim. Fixture shall be the manufacturer's standard commercial product. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 204
Static Troffer

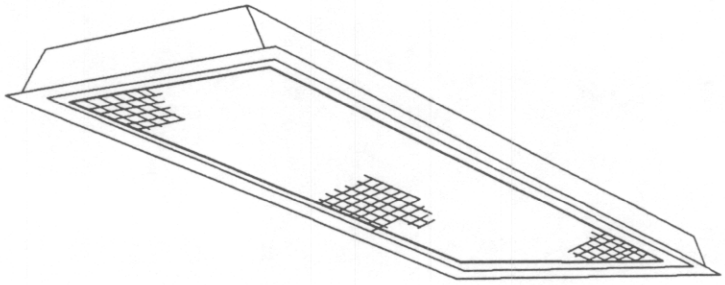
TYPE 205
Air Handling Troffer

Recessed Fluorescent Fixture, 1-foot by 4-foot

First Suffix	Second Suffix	Third Suffix	Description
A			Single lamp
B			Two lamp
	1		Prismatic acrylic lens
	2		1/2- by 1/2- by 1/2-inch acrylic cube louver
	3		1/2- by 1/2- by 1/2-inch polystyrene cube louver
		A	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be complete with integral side trim flanges. Housing and trim flanges shall be cold-rolled steel. The lens or louver shall be installed in a manner that will prevent it from coming loose due to vibration. The ballast and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Lenses and acrylic cube louvers shall be 100 percent virgin acrylic plastic. The lens or louver shall be four feet in length. Acrylic lens shall be flat, 0.125 inch nominal thickness, low brightness, with smooth top surface and a lower surface having a regular array of prismatic elements. Single-lamp ballast shall be used for individually mounted single-lamp fixtures and where single-lamp fixtures occur at the ends of continuous rows, except two-lamp ballasts shall be used for tandem mounted single-lamp fixtures. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 206
Static Troffer

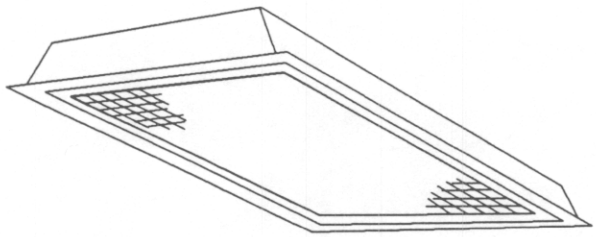
TYPE 207
Air Handling Troffer

Recessed Fluorescent Fixture, 2-foot by 4-foot

First Suffix	Second Suffix	Third Suffix	Description
A			Two lamps
B			Three lamps
C			Four lamps
	1		Prismatic acrylic lens
	2		1/2- by 1/2- by 1/2-inch cube louver
	3		1/2- by 1/2- by 1/2-inch polystyrene cube louver
		A	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be complete with integral side trim flanges. Housing and trim flanges shall be cold-rolled steel. The lens or louver shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked enamel. Lenses and acrylic cube louvers shall be 100 percent virgin acrylic plastic. The lens or louver shall be four feet in length. Acrylic lens shall be flat, 0.125 inch nominal thickness, low brightness, with smooth top surface and a lower surface having a regular array of prismatic elements. Two-lamp ballasts shall be used for individually mounted two-lamp fixtures. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 208
Static Troffer

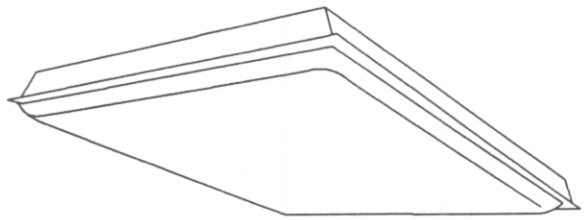
TYPE 209
Air Handling Troffer

Recessed Fluorescent Fixture, 4-foot by 4-foot

First Suffix	Second Suffix	Third Suffix	Description
A			Four lamps
B			Six lamps
	1		Prismatic acrylic lens
	2		1/2- by 1/2- by 1/2-inch cube louver
	3		1/2- by 1/2- by 1/2-inch polystyrene cube louver
		A	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be complete with integral side trim flanges. Housing and trim flanges shall be cold-rolled steel. The lens or louver shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be virgin acrylic plastic. The lens or louver shall be four feet in length. Acrylic lens shall be flat, 0.125 inch nominal thickness, low brightness, with smooth top surface and a lower surface having a regular array of prismatic elements. Two-lamp ballasts shall be used for each pair of lamps. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



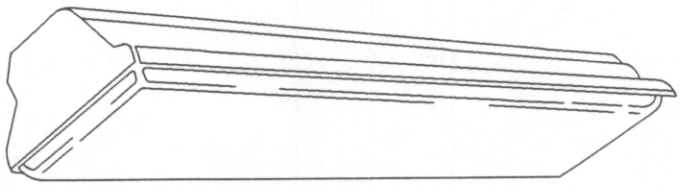
TYPE 210

Recessed Static Fluorescent Fixture, 4-foot by 4-foot, with Drop Opal Lens

First Suffix	Second Suffix	Description
A		Four lamps
B		Six lamps
C		Eight lamps
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be complete with integral side trim flanges. Housing the trim flanges shall be cold-rolled steel. The lens shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Two-lamp ballasts shall be used for each pair of lamps. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



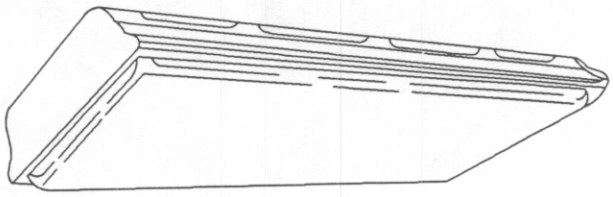
TYPE 211

Recessed Static Fluorescent Fixture, 1-foot by 4-foot, Drop Opal Lens

First Suffix	Second Suffix	Description
A		Single lamp
B		Two lamp
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be complete with integral side trim flanges. Housing and trim flanges shall be cold-rolled steel. The lens shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Single-lamp ballasts shall be used for individually mounted single-lamp fixtures and where single-lamp fixtures occur at the ends of continuous rows except two-lamp ballasts shall be used for tandem mounted single-lamp fixtures. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



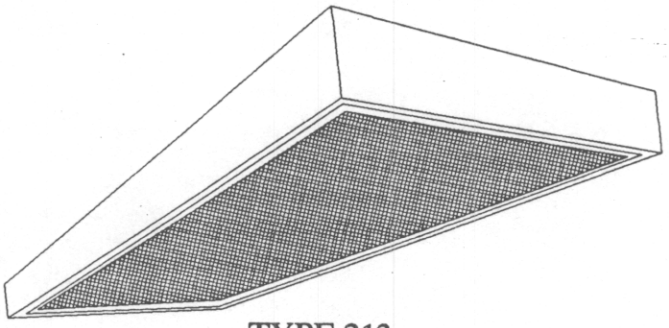
TYPE 212

Recessed Static Fluorescent Fixture, 2-foot by 4-foot, With Drop Opal Lens

First Suffix	Second Suffix	Description
A		Two lamps
B		Three lamps
C		Four lamps
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be complete with integral side trim flanges. Housing and trim flanges shall be cold-rolled steel. The lens shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Two-lamp ballasts shall be used for individually mounted two-lamp and four-lamp fixtures. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



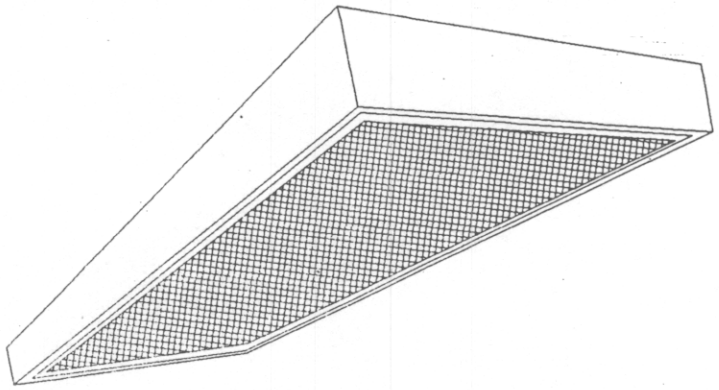
TYPE 213

Surface, Ceiling Mounted Fluorescent Fixture, 1-foot by 4-foot

First Suffix	Second Suffix	Third Suffix	Description
A			Single lamp
B			Two lamps
	1		45x45 Light-Stabilized Polystyrene egg crate louver
	2		35x25 Parabolic Aluminized Louver
	3		Prismatic Acrylic Lens Flat 0.125 inch nominal thickness
		A	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be cold-rolled steel. The lens or louver shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



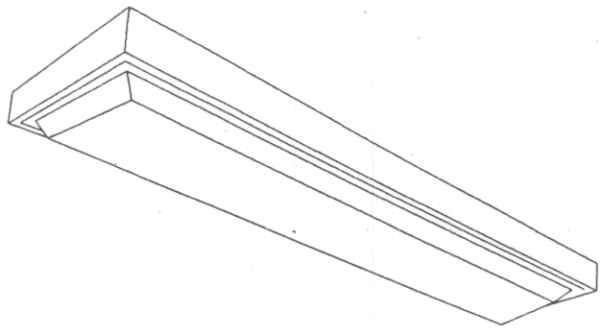
TYPE 214

Fluorescent Fixture, 2-foot by 4-foot

First Suffix	Second Suffix	Third Suffix	Description
A			Two lamps
B			Three lamps
C			Four lamps
	1		45x45 Light-Stabilized Polystyrene egg crate louver
	2		35x25 Parabolic Aluminized Louver
	3		Prismatic Acrylic Lens Flat 0.125 inch nominal thickness
		A	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be cold-rolled steel. The lens shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



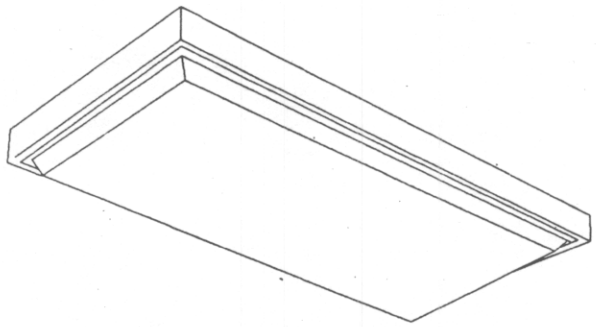
TYPE 215

Surface, Ceiling Mounted Fluorescent Fixture, 1-foot by 4-foot, With Drop Opal Lens

First Suffix	Second Suffix	Description
A		Two lamps
B		Three lamps
	A	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be cold-rolled steel. The lens or louver shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Standard ballast shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



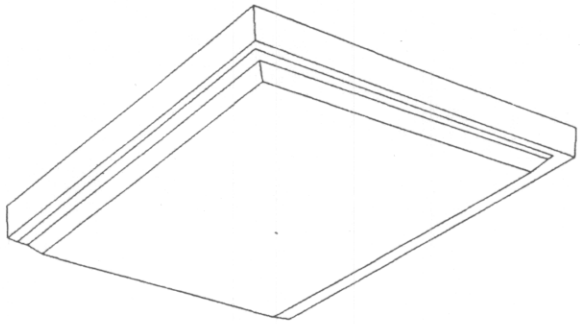
TYPE 216

Surface, Ceiling Mounted Fluorescent Fixture, 2-foot by 4-foot, With Drop Opal Lens

First Suffix	Second Suffix	Description
A		Two lamps
B		Three lamps
C		Four lamps
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be cold-rolled steel. The lens shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Lens shall be 100 percent virgin acrylic plastic. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



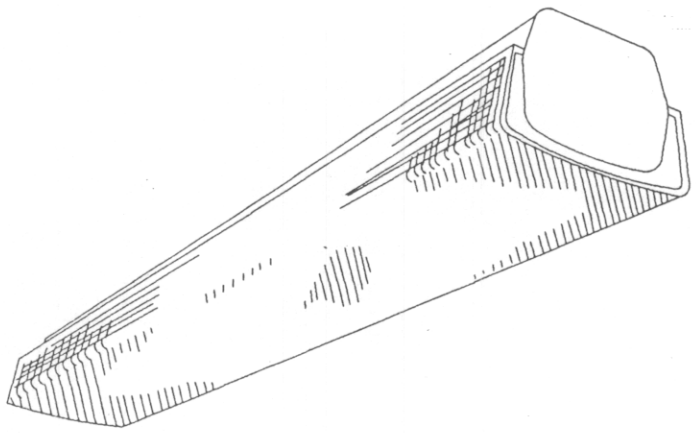
TYPE 217

Surface, Ceiling Mounted Fluorescent Fixture,
4-foot by 4-foot with Drop Opal Lens

First Suffix	Second Suffix	Description
A		Four lamps
B		Six lamps
C		Eight lamps
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be cold-rolled steel. The lens shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Lens shall be 100 percent virgin acrylic plastic. Standard two lamp ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



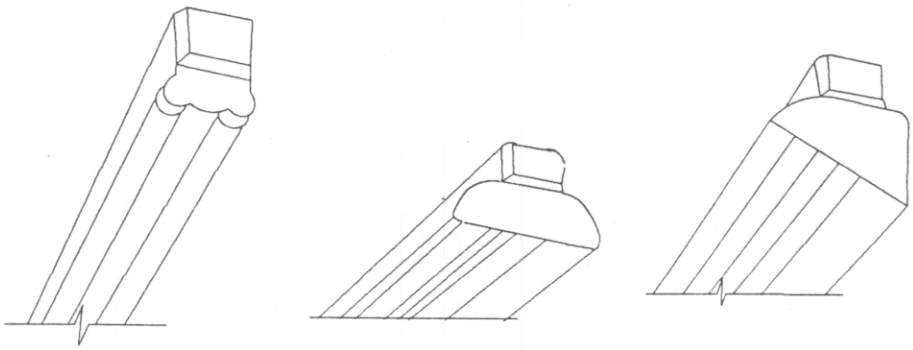
TYPE 218
7-inch by 48-inch
One Lamp

TYPE 219
7-inch by 96-inch
Two Lamps

Surface, Ceiling Mounted, Wraparound Fluorescent Fixture

Fixture shall be constructed of cold-rolled steel and shall conform to UL 1570. The fixture chassis shall be die-formed. Back housing shall be one piece, solid along its entire length, and shall have sufficient knockouts for conventional pendant and surface mounting. The lens shall be of 100 percent virgin acrylic plastic not less than 1/8-inch nominal thickness. The lens shall be easily removed without the use of tools and shall be held in place by concealed hinges and latches, by reinforcing ribs along the edges, or by resting in place on the end plate of the fixture. The lens and end caps or fittings shall fit so there is no light leakage. Removable white plastic or baked white enamel metal end fittings shall be provided on each end of each fixture to permit the installation of continuous rows of fixtures, the closure of ends of fixtures in a continuous row, and the closure of the ends of individually mounted fixtures. All metal parts shall receive a rust inhibitive coating and a white baked enamel finish. Type 218 fixture shall use a single-lamp ballast for individually mounted fixtures and where single-lamp fixtures occur at the ends of continuous rows. Two-lamp ballasts shall be provided for the Type 219 fixtures and for tandem mounted Type 218 fixtures. Type 219 fixture shall be provided with a 2-piece lens, each approximately 48 inches in length, and a light concealing center strap. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



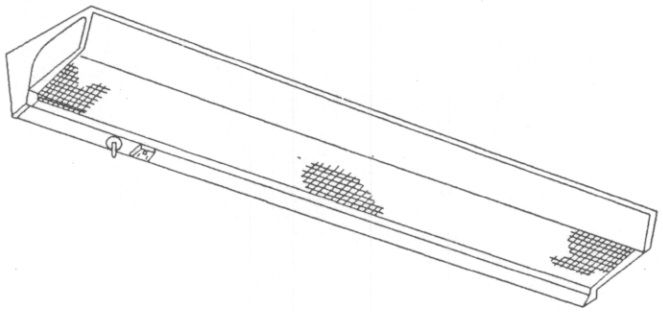
TYPE 220 Without Reflector	TYPE 221 With Symmetric Reflector	TYPE 222 With Asymmetric Reflector

Single- and Two-Lamp Fluorescent Strip Fixture

Suffix	Description
A	One lamp
B	Two lamps

Fixture shall be constructed of cold-rolled steel and shall conform to UL 1570. The fixture shall have a die-formed steel channel, suitable mounting holes, and 1/2-inch knockouts in back. Channel and end fittings shall have a baked white enamel finish. The channel and end fittings shall be removed to permit the installation of a continuous row of fixtures, the closure of fixtures at the ends of continuous rows, and the closure of the ends of individually mounted fixtures with no light leakage. Channel covers shall have threaded fittings for reflector mounting, shall be constructed of die-formed steel, and shall be finished with baked white enamel. All ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. Reflectors shall be designed for direct attachment to the channel cover with suitable threaded fittings. Reflectors shall be manufacturer's standard commercial product and shall be constructed of die-formed aluminum with highly polished finish, or steel with white porcelain enamel finish, or steel with baked white enamel finish. Fixture shall be suitable for pendant and surface mounting. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired. Sockets shall be of the type requiring a forced movement along the longitudinal axis of the lamp for insertion and removal of the lamp. Fluoresent tubes shall be protected by a virgin acrylic protective sleeve and clear plastic vented end caps.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

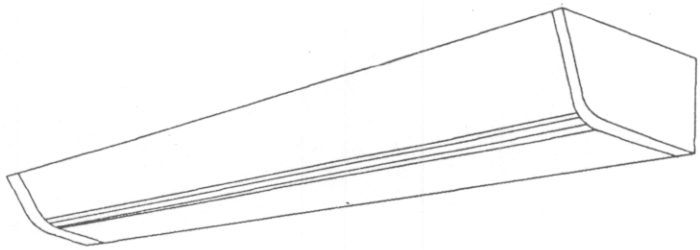


TYPE 223
Two Lamps

Enclosed, Wall Mounted, Direct And/Or Indirect
Fluorescent Fixture

Fixture shall be constructed of cold-rolled steel and shall conform to UL 1570. Ferrous metal surfaces shall be treated with 5-stage coating of zinc phosphate and finished in baked white enamel. Seams shall be sealed or gasketed to prevent light leakage. The lens shall be 0.125 inch nominal thickness (minimum 0.115 inch) of 100 percent virgin clear acrylic plastic, with a regular array of prismatic elements on one surface and smooth on the other. Receptacle shall be 2-pole, 3-wire, rated at 15 amperes and 125 volts, and shall be of the grounding type. On/off pull chain switch shall be provided for downlight. Upward light shall be controlled from a wall switch. Fixture shall have knockouts in the back for wiring through an outlet box and a grounding terminal. Standard ballast shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



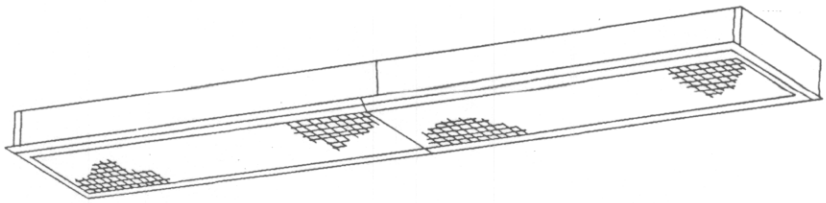
TYPE 224
One Lamp
48-inch Length

TYPE 225
Two Lamps
48-inch Length

Enclosed, Wall Mounted, Direct Fluorescent Fixture

Fixture shall conform to UL 1570. Housing shall be of cold-rolled, die-formed steel. The back housing shall be one piece, solid along its entire length. End plates shall be die-formed and shall be fastened securely to the housing in a manner that permits no light leakage. All metal parts shall receive a rust inhibitive coating and a baked white enamel finish coat. Lens shall be prismatic, one piece, 0.125 inch nominal thickness, and 100 percent virgin acrylic. The lens shall be easily removed without the use of tools and shall be held in place by concealed hinges, by reinforcing ribs along the edges, or by resting on the end plates. The lens shall be attached to the housing so there is no light leakage. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 226
One Lamp
48-inch Length (Individual)

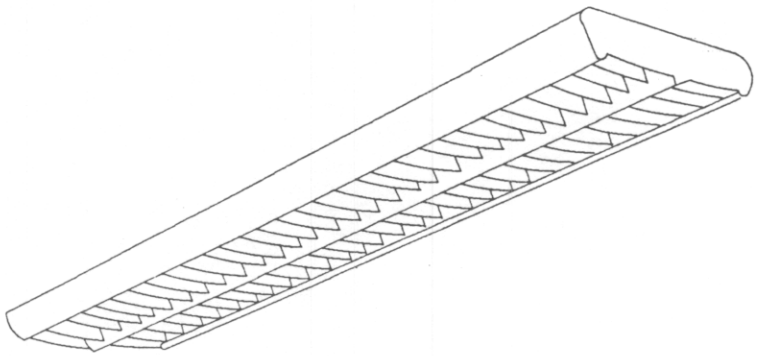
TYPE 227
Two Lamps
96-inch Length (Tandem)

Recessed Fluorescent Fixture For Corridors

First Suffix	Second Suffix	Description
A		Prismatic acrylic lens
B		1/2- by 1/2- by 1/2-inch acrylic cube louver
C		1/2- by 1/2- by 1/2-inch polystyrene cube louver
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing shall be complete with integral side trim flanges and removable end trim flanges. Housing and trim flanges shall be cold-rolled steel. The lens or louver shall be installed in a manner that will prevent it from coming loose due to vibration. The ballasts and wiring shall be enclosed in a wireway that is continuous throughout the length of the fixture and which forms a wireway for circuits through the fixture. All metal parts shall receive a rust inhibitive coating before application of the finish coat. The finish coat shall be baked white enamel. Lenses and acrylic cube louvers shall be 100 percent virgin acrylic plastic. The lens or louver shall be four feet in length. Acrylic lens shall be flat, 0.125 inch nominal thickness, low brightness, with smooth top surface and a lower surface having a regular array of prismatic elements. Single-lamp ballasts shall be used for individually mounted single-lamp fixtures and where single-lamp fixtures occur at the ends of continuous rows. Two-lamp ballasts shall be used for tandem mounted fixtures. Standard ballast(s) shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

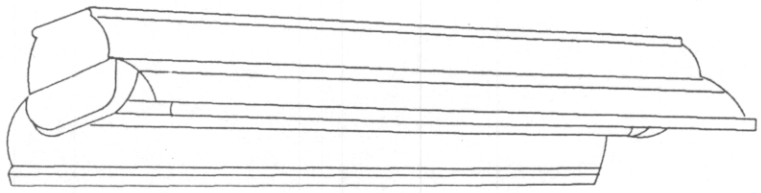


TYPE 228

Pendant Mounted, 1-foot by 4-foot, Two-Lamp Direct-Indirect
Fluorescent Fixture with Metal Louver Diffuser

Fixture shall conform to UL 1570. The fixture housing, and housing channel, reflector, metal louver, and removable end fittings shall be constructed of cold-rolled, die-formed, steel with knockouts required for pendant- or suspension-mounting and the entrance of wiring into the fixture. Metal parts to be painted shall receive one or more rust-inhibitive coatings prior to application of the finish coat. The finish coat shall be white porcelain enamel, or baked white enamel, except the reflectors which may be highly-polished aluminum. End fittings shall be removable if required to permit the mounting of fixtures in a continuous row, to close the end of fixtures in a continuous row, or to close the ends of individually mounted fixtures. The two-lamp ballast shall be the Class P, high power factor type which has been approved for the application by the Certified Ballast Manufacturers.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

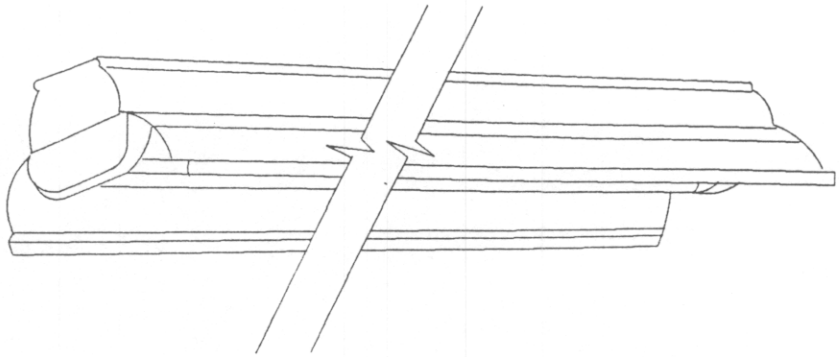


TYPE 230
Suspension Mounted, Industrial,
Open Type Fluorescent Fixture, 4-Foot

First-Suffix	Second-Suffix	Description
A		Two lamps
B		Three lamps
	1	8 to 15 percent uplight
	2	18 to 25 percent uplight

Fixture shall conform to UL 1570. Standard ballast(s) shall be the Class P, high power factor type approved for the application by the Certified Ballast Manufacturers. Channel housing, end fittings, and reflector shall be constructed with die-formed, cold-rolled steel. Reflector finish shall be porcelain enamel, baked white enamel or aluminum oxide. Sockets shall be of the type requiring a forced movement along the longitudinal axis of the lamp for insertion and removal of the lamp. Fixture shall be prewired. Fluoresent tubes shall be protected by a virgin acrylic protective sleeve and clear plastic vented end caps.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



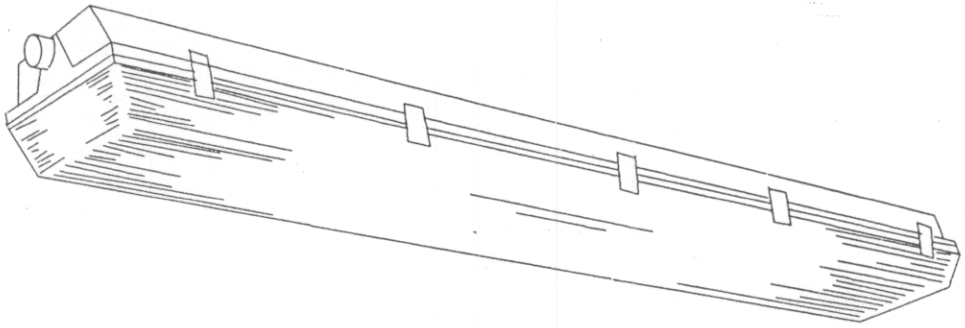
TYPE 231

Suspension Mounted, Industrial
Open Type Fluorescent Fixture, 8-Foot

First-Suffix	Second-Suffix	Description
A		Two 800 ma, 96-inch lamps
B		Three 800 ma, 96-inch lamps
C		Two 1500 ma, 96-inch lamps
	1	8 to 15 percent uplight
	2	18 to 25 percent uplight

Fixture shall conform to UL 1570. Standard ballast(s) shall be the Class P, high power factor type approved for the application by the Certified Ballast Manufacturers. Channel housing, end fittings, and reflector shall be constructed with die-formed, cold-rolled steel. Reflector finish shall be porcelain enamel, baked white enamel, or aluminum oxide. Sockets shall be of the type requiring a forced movement along the longitudinal axis of the lamp for insertion and removal of the lamp. Fixture shall be prewired. Fluoresent tubes shall be protected by a virgin acrylic protective sleeve and clear plastic vented end caps.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



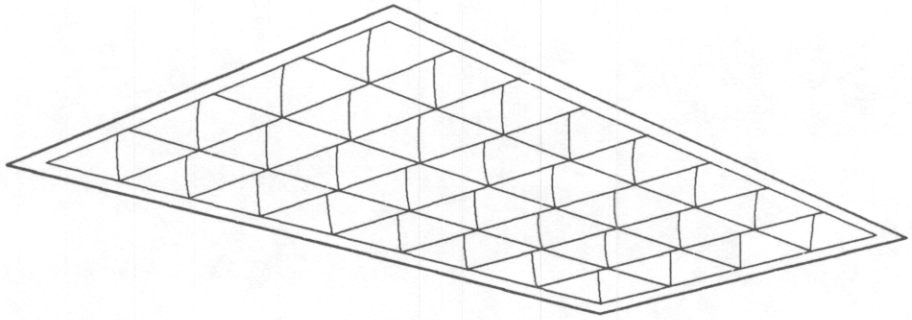
TYPE 232
4-Foot Fixture Length

TYPE 233
8-Foot Fixture Length

Enclosed and Gasketed, Vapor-Tight Fluorescent Fixture
For Surface or Pendant Mounting

Fixture shall conform to UL 1570 and shall be vapor-tight and suitable for use in wet locations. Fixture shall have one-piece housing of molded high-impact plastic or reinforced fiberglass. Housing body shall have an internal, die-formed, cold-rolled steel channel with cover to provide fixture rigidity and to contain electric components. The metal channel and cover shall receive a rust inhibitive coating before application of the finish coat, which shall consist of baked white enamel or porcelain enamel. The lens shall be one piece, of high-impact-resistant acrylic, and shall have smooth exterior surface and stippled or pebbled interior surface. The lens shall be secured to the housing with captive molded plastic or stainless steel spring latches. A continuous gasket shall be provided to form a vapor seal between the lens and the fixture body. All openings in the housing for mounting, conduit, etc., shall be capable of forming a vapor-tight seal. Ballast(s) shall be cold weather type for starting temperatures down to minus 20 degrees F. Standard ballast(s) shall be the Class P, high power factor type approved for the application by the Certified Ballast Manufacturers. Fixture shall be prewired, and provided with lamps that are properly mated to the ballast operating characteristics.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



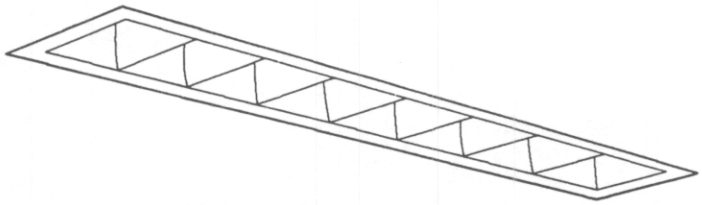
TYPE 234	TYPE 235	TYPE 236
Static Troffer	Air Handling Troffer	Heat Removal/ Transfer Troffer

Recessed Fluorescent Fixture, 2-foot by 4-foot, With Parabolic Louver

First Suffix	Second Suffix	Description
A		Two-lamp, 12-cell louver
B		Three-lamp, 18-cell louver
C		Four-lamp, 32-cell louver
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing, trim flanges if any, shall be die-formed, cold-rolled steel embossed if necessary to ensure structural rigidity. Metal parts to be painted shall receive one or more rust inhibitive coatings before application of the finish coat. Reflective surfaces shall be finished to provide an initial and minimum reflectance of not less than 85 percent. The louver shall be the anodized or semi-specular finished aluminum type consisting of inter- connected cellular baffles not less than three nor more than four inches in depth. The louver shall be hinged on either longitudinal side using die-formed steel hinges, and shall be held securely in place by the hinges and spring-steel latches that are inconspicuous or concealed from view when louver is in place and latches are closed. Securing the louver in place shall prevent light leakage and movement of the louver when subjected to normal vibrations. The ballast(s) and fixture wiring shall be concealed by a snap-in type of metal cover which can be removed and replaced without the use of tools. Standard ballast(s) shall be of the Class P, high power factor type that has been approved by the Certified Ballast Manufacturers for the application. Ballast(s), lampholders, louver and the wireway cover shall be removable and replaceable without removal of the fixture from the ceiling. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



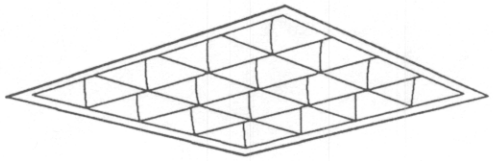
TYPE 237 Static Troffer	TYPE 238 Air Handling	TYPE 239 Heat Removal/ Transfer Troffer

Recessed Fluorescent Fixture, 1-foot by 4-foot, with parabolic louver

First Suffix	Second Suffix	Description
A		Single lamp, 8-cell louver
B		Two-lamp, 8-cell louver
C		Three-lamp, 16-cell louver
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing, trim flanges if any, shall be die-formed, cold-rolled steel embossed if necessary to ensure structural rigidity. Metal parts to be painted shall receive one or more rust inhibitive coatings before the application of the finish coat. Reflective surfaces shall be finished to provide an initial and minimum reflectance of not less than 85 percent. The louver shall be the anodized or semi-specular finished aluminum type consisting of inter- connected cellular baffles not less than three nor more than four inches in depth. The louver shall be hinged on either longitudinal side using die-formed steel hinges, and shall be held securely in place by the hinges and spring-steel latches that are inconspicuous or concealed from view when louver is in place and latches are closed. Securing of the louver in place shall prevent light leakage and movement of the louver when subjected to normal vibrations. The ballast(s) and fixture wiring shall be concealed by a snap-in type of metal cover which can be removed and replaced without the use of tools. Standard ballast(s) shall be of the Class P, high power factor type that has been approved by the Certified Ballast Manufacturers for the application. Ballast(s), lampholders, louver and the wireway cover shall be removable and replaceable without removal of the fixture from the ceiling. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



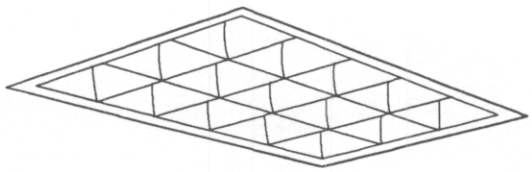
TYPE 240	TYPE 241	TYPE 242
Static Troffer	Air Handling Troffer	Heat Removal/ Transfer Troffer

Recessed Fluorescent Fixture, 2-foot by 2-foot, with parabolic louver

First Suffix	Second Suffix	Description
A		Single U lamp, 9-cell louver
B		Two U lamps, 9-cell louver
C		Two U lamps, 16-cell louver
D		Three U lamps, 8-cell louver
E		Three U lamps, 16-cell louver
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing, trim flanges if any, shall be die-formed, cold-rolled steel embossed if necessary to ensure structural rigidity. Metal parts to be painted shall receive one or more rust inhibitive coatings before the application of the finish coat. Reflective surfaces shall be finished to provide an initial and minimum reflectance of not less than 85 percent. The louver shall be the anodized or semi-specular finished aluminum type consisting of inter- connected cellular baffles not less than three nor more than four inches in depth. The louver shall be hinged on either longitudinal side using die-formed steel hinges, and shall be held securely in place by the hinges and spring-steel latches that are inconspicuous or concealed from view when louver is in place and latches are closed. Securing the louver in place shall prevent light leakage and movement of the louver when subjected to normal vibrations. The ballast(s) and fixture wiring shall be concealed by a snap-in type of metal cover which can be removed and replaced without the use of tools. Standard ballast(s) shall be of the Class P, high power factor type that has been approved by the Certified Ballast Manufacturers for the application. Ballast(s), lampholders, louver and the wireway cover shall be removable and replaceable without removal of the fixture from the ceiling. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



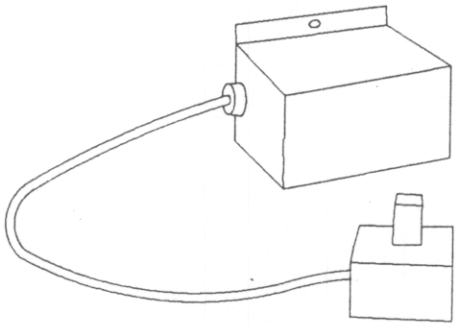
TYPE 243	TYPE 244	TYPE 245
Static Troffer	Air Handling Troffer	Heat Removal/ Transfer Troffer

Recessed Fluorescent Fixture, 20 inch by 4-foot, with parabolic louver for 5-foot by 5-foot modular ceiling systems

First Suffix	Second Suffix	Description
A		Two-lamp, 12-cell louver
B		Three-lamp, 18-Cell louver
	1	Type 200 emergency unit

Fixture shall conform to UL 1570. Housing, trim flanges if any, shall be die-formed, cold-rolled steel embossed if necessary to ensure structural rigidity. Metal parts to be painted shall receive one or more rust inhibitive coatings before the application of the finish coat. Reflective surfaces shall be finished to provide an initial and minimum reflectance of not less than 85 percent. The louver shall be the anodized or semi-specular finished aluminum type consisting of inter- connected cellular baffles not less than three nor more than four inches in depth. The louver shall be hinged on either longitudinal side using die-formed steel hinges, and shall be held securely in place by the hinges and spring-steel latches that are inconspicuous or concealed from view when louver is in place and latches are closed. Securing of the louver in place shall prevent light leakage and movement of the louver when subjected to normal vibrations. The ballast(s) and fixture wiring shall be concealed by a snap-in type of metal cover which can be removed and replaced without the use of tools. Standard ballast(s) shall be of the Class P, high power factor type that has been approved by the Certified Ballast Manufacturers for the application. Ballast(s), lampholders, louver and the wireway cover shall be removable and replaceable without removal of the fixture from the ceiling. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



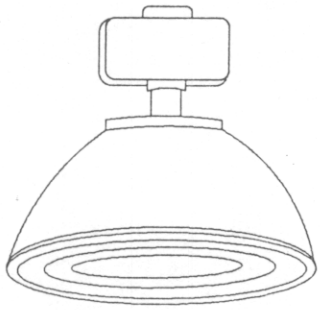
TYPE 300

Emergency 250 Watt Quartz Standby Light System
For High Intensity Discharge Fixtures

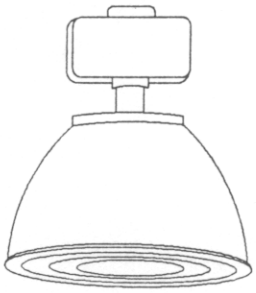
Emergency quartz standby system shall be the delayed type which shall provide standby illumination when the high intensity discharge fixture is energized, following a prolonged period of deenergization. The system shall also automatically cause the energization of the quartz lamp when the input voltage supplied to the fixture drops below the voltage required to maintain the arc in the lamp through the output of the ballast. The system shall deenergize the quartz lamp when the high intensity discharge lamp reaches 40 percent of its rated lumen output. The system shall be provided by the high intensity discharge fixture manufacturer, shall be a separate attachment as illustrated or integrally incorporated into the fixture components, and shall be factory installed and prewired. Maximum power required for the fixture during periods when both lamps are energized shall be indicated on the fixture nameplate. The system shall include step-down transformer if the system operates at a voltage rating different from the voltage rating specified or indicated for the high intensity discharge fixture.

The standby system indicated on this sheet shall be provided as indicated on other sheets and shall also conform to requirements specified and indicated in the contract documents.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 301
High Bay



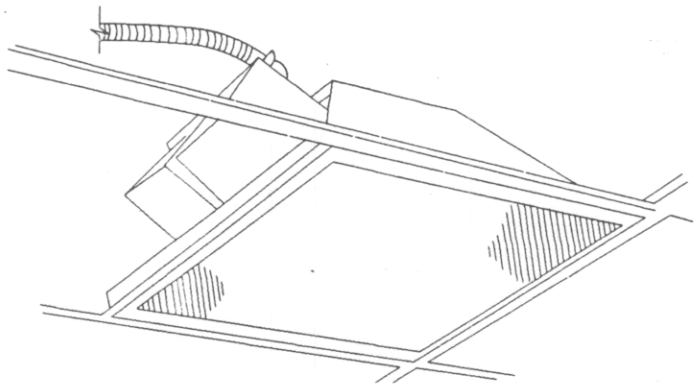
TYPE 302
Low Bay

Enclosed, Pendant, Integrally Ballasted, Industrial,
High Intensity Discharge Fixture

First Suffix	Second Suffix	Description
A		Rated for metal halide lamp
B		Rated for high pressure sodium lamp
	1	Type 300 emergency quartz standby

Fixture shall conform to UL 1572. The ballast housing and structural parts, including the mounting devices, shall be of cast aluminum. The optical assembly shall be enclosed, gasketed, and locked to the ballast housing by a positive vibration-proof means. An optical assembly filter to permit the passage of air during heating and cooling cycles shall be provided. All exposed cast aluminum parts shall have a baked enamel paint finish. The lens shall be heat and impact resistant glass mounted in a gasketed, hinged aluminum door frame. Ballast shall be of the high power factor type. Fixture shall be prewired. Ballast shall start and operate the lamp in an ambient temperature range of minus 20 degrees F to 105 degrees F. Metal halide fixture shall use a lead-peaked autotransformer ballast. High pressure sodium fixture shall use a regulated type ballast. Reflector shall be constructed of aluminum and contoured or formed to provide high lighting efficiency. The exterior of the reflector shall have a clear acrylic lacquer protective coating. The interior of the reflector shall be the manufacturer's standard commercial product finish suitable for light source provided. The fixture shall have a mogul base glazed porcelain lampholder, adjustable for varying the spacing-to-mounting-height ratio in the field. The fixture shall have separate, removable mounting components that can be easily removed and assembled to the structural or mounting hardware before mounting the remainder of the fixture.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



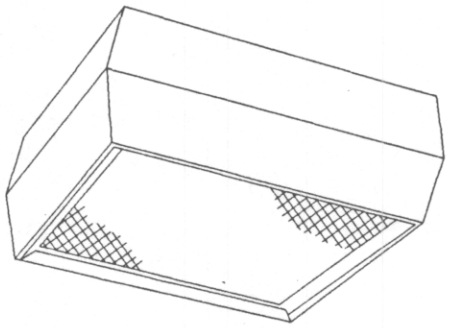
TYPE 303

Enclosed, Recessed, Square, Integrally Ballasted,
High Intensity Discharge Fixture

First Suffix	Second Suffix	Description
		Rated for:
A		175 watt metal halide lamp
B		250 watt metal halide lamp
C		100 watt high pressure sodium lamp
D		150 watt high pressure sodium lamp
	1	Type 300 emergency quartz standby

Fixture shall conform to UL 1572. The fixture shall be designed for installation in a 2-foot by 2-foot grid. The fixture housing shall be steel. All ferrous metals shall receive a rust inhibitive coating and be finished with baked white enamel. The reflector shall be aluminum. Reflector finish shall be the manufacturer's standard commercial product finish suitable for the light source provided. The framing enclosing the diffuser or lens shall be constructed of extruded aluminum with a baked white finish and shall enclose a prismatic glass lens which does not require a heat shield. Lens frame shall be hinged and shall have concealed spring-loaded latches. The lampholder shall be mogul base glazed porcelain. Fixture shall be prewired. Ballast shall be of the high power factor type. Metal halide fixture shall have a lead-peaked autotransformer ballast. High pressure sodium fixture shall have a regulated ballast. Fixture depth shall not exceed 13 inches.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



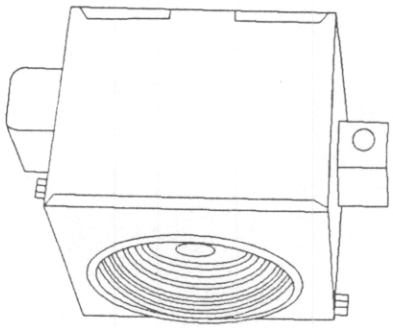
TYPE 304

Enclosed, Surface Mounted, Square, Integrally Ballasted,
High Intensity Discharge Fixture

First Suffix	Second Suffix	Description
		Rated for:
A		175 watt metal halide lamp
B		150 watt high pressure sodium lamp
	1	Type 300 emergency quartz standby

Fixture shall conform to UL 1572. The housing shall be constructed of die-formed, cold-rolled steel and include a fixed upper section and a hinged bottom section which shall be equipped with spring-loaded latches. The upper section shall enclose: the ballast, any capacitors and ignitor required; a glazed porcelain, mogul-base lampholder; lamp; and the lamp reflector. The reflector shall be constructed of aluminum with the manufacturer's standard finish suitable for the type and rating of the lamp. The bottom section shall include a diffuser or lens framing that encloses a flat tempered prismatic glass lens. The lens framing shall be constructed of extruded aluminum with a natural anodized finish sealed with a clear acrylic lacquer protective coating. Gaskets shall be provided as required to prevent light leakage around the lens and the hinged lens framing. Lens framing shall have a nominal 2- foot by 2-foot measurement. The depth of the upper and lower sections of the fixture housing shall not exceed 14 inches. The fixture may have vertical rather than the sloped sides indicated above.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



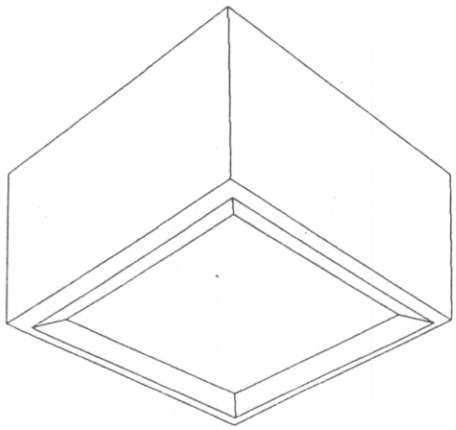
TYPE 305

Enclosed, Recessed, Integrally Ballasted,
High Intensity Discharge Fixture

First Suffix	Second Suffix	Description
		Rated for:
A		175 watt metal halide lamp
B		150 watt high pressure sodium lamp
	1	Type 300 emergency quartz standby

Fixture shall conform to UL 1572 and shall be rated for use in damp locations. The fixture housing shall be constructed of steel or aluminum. An aluminum reflector shall be provided and shall have a diffused surface to minimize direct glare and provide high lighting efficiency. The lens frame and trim shall be 2- by 2-foot die-formed steel or die-cast aluminum with white acrylic baked enamel finish. Ferrous metal parts shall receive a rust inhibitive coating before application of finish coat. The method of lens frame attachment to the fixture housing shall be as indicated in the manufacturer's published literature for the standard commercial product. The lens shall be regressed and framed. The lens shall be either prismatic glass or concentric ribbed glass. Ballast shall be mounted in a manner to minimize vibration and prevent heat distortion. Ballast shall be high power factor type. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. Metal halide fixtures shall have a lead-peaked autotransformer ballast. High pressure sodium fixture shall have a regulated ballast. The fixture shall be prewired and shall have a mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



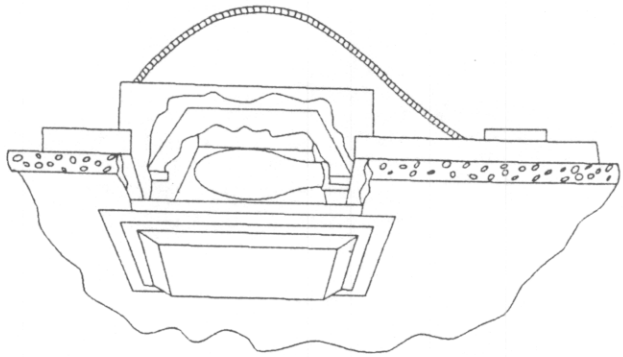
TYPE 306

Enclosed and Gasketed, Surface Mounted, Square,
Integrally Ballasted, High Intensity Discharge Fixture

Suffix	Description
	Rated for:
A	100 watt mercury vapor lamp
B	175 watt mercury vapor lamp
C	175 watt metal halide lamp
D	70 watt high pressure sodium lamp
E	150 watt high pressure sodium lamp

Fixture shall conform to UL 1572 and shall be rated for use in damp locations. Fixture housing shall be galvanized steel or aluminum with welded joints and white baked enamel on interior and exterior surfaces. The reflector shall be aluminum with the manufacturer's standard commercial product finish suitable for the type and rating for the lamp. Lens framing shall be extruded or die-cast aluminum, finished with white baked enamel, hinged on one side and held in place on the other side with captive screws of same finish as the lens framing. Lens shall be tempered and thermal shock and impact resistant flat prismatic glass. The lens framing and lens shall be gasketed to prevent the entrance of insects and light leakage. The fixture shall have knockouts for direct mounting to a ceiling outlet box. Lampholder shall be mogul base glazed porcelain. Ballast shall be of the high power factor type. Ballast shall be of the constant wattage autotransformer type for mercury vapor lamps, of the lead-peak autotransformer type for metal halide lamps and of the regulating type for high pressure sodium lamps. The ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. The fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



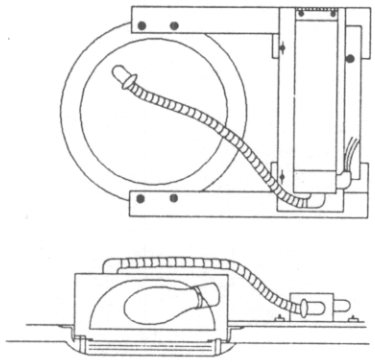
TYPE 307

Enclosed and Gasketed, Recessed, Square,
Integrally Ballasted, High Intensity Discharge Fixture

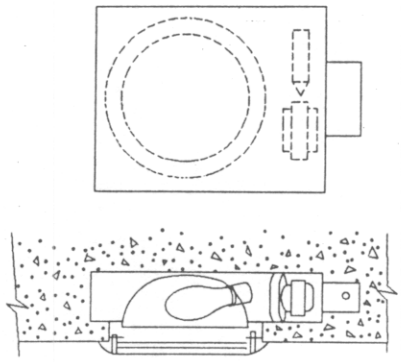
Suffix	Description
	Rated for:
A	75 watt mercury vapor lamp
B	100 watt mercury vapor lamp
C	175 watt mercury vapor lamp
D	175 watt metal halide lamp

Fixture shall conform to UL 1572 and shall be rated for use in damp locations. The fixture shall be enclosed and gasketed. Fixture housing shall be galvanized steel. The interior shall be finished with baked white enamel. The reflector shall be aluminum with the manufacturer's standard commercial product finish suitable for the light source provided. The lens trim shall be one-piece die-cast aluminum with a brushed aluminum finish and clear acrylic lacquer protective coating, and shall be held to the fixture housing with captive screws. The lens shall be tempered, thermal shock and impact resistant, drop prismatic glass. Ballast shall be of the high power factor type. The fixture ballast shall be of the constant wattage autotransformer type for mercury vapor lamps and the lead-peak autotransformer type for metal halide lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. The fixture shall be prewired for connection to 60 degree C rated supply wire, and shall have a mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 308
Plaster Ceiling Installation



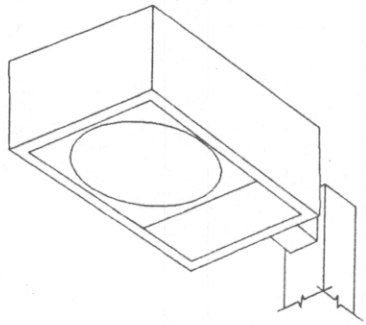
TYPE 309
Poured Concrete Installation

Enclosed and Gasketed, Recessed, Round,
Integrally Ballasted, Mercury Vapor Fixture

First Suffix	Second Suffix	Description
A		Flat prismatic glass diffuser
B		Flat white glass diffuser
C		Drop homogeneous glass diffuser
D		Drop prismatic glass diffuser
	1	Baked white enamel exterior trim
	2	Brushed aluminum exterior trim

Fixture shall conform to UL 1572 and shall be rated for use in damp locations. Fixture housing shall be galvanized steel. The interior shall be finished with baked white enamel. The reflector shall be aluminum with the manufacturer's standard commercial product finish suitable for the lamp type and rating. The fixture shall be gasketed to prevent the entry of insects and light leakage. The lens framing shall be one-piece cast aluminum, 10-inch nominal diameter, finished as specified or indicated, and shall be held to the fixture housing with captive screws of same finish as lens trim. Ballast shall be of the high power factor type. The fixture ballast shall be of the constant wattage autotransformer type rated to operate one 100 watt mercury vapor lamp. The ballast shall be capable of starting and operating the lamp at ambient temperatures from minus 20 degrees F to 105 degrees F. Fixture depth for type 309 shall not exceed 7 inches. The fixture shall be prewired and shall have a glazed porcelain lampholder.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



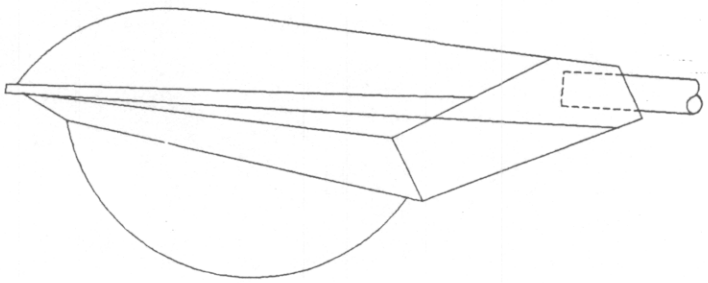
TYPE 401

Enclosed, Integrally Ballasted, Rectangular Shaped,
Side Mounted, High Intensity Discharge Lighting Fixture

First Suffix	Second Suffix	Description
A		Rated for mercury vapor lamp
B		Rated for metal halide lamp
C		Rated for high pressure sodium lamp
	1	IES type II medium light distribution
	2	IES type III medium light distribution
	3	IES type V medium light distribution.

Fixture shall conform to UL 1572. Fixture housing shall have sides and doorframe of one-piece extruded aluminum with welded joints and top of crowned sheet aluminum. The top shall be spot welded and sealed watertight. The housing shall be rigidly attached to a square shaped mounting arm of extruded aluminum. The fixture door shall have a flat heat and impact resistant lens of 3/16-inch nominal, tempered glass, and shall be hinged and held in place with captive screws of the same finish as the door. The lens and door shall enclose the lamp compartment. The reflector shall be aluminum of the manufacturer's standard commercial product finish suitable for the lamp type and rating. The ballast shall be of the high power factor type. The ballast and power components shall be mounted on a single bracket and shall be removable. The fixture, including the mounting arm, shall be gasketed to allow air movement but prevent the entry of dust and insects. Ballast shall be of the constant wattage autotransformer type for mercury vapor lamps, lead-peak autotransformer type for metal halide lamps, and regulating type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. A square extruded aluminum pole including anchor type base, anchor bolts and mounting hardware shall be provided by the fixture manufacturer and shall be the manufacturer's standard commercial product for the number of fixtures and wind load indicated or specified. The fixture housing mounting arm shall have a dark duranodic bronze finish. The fixture shall be prewired and shall have a mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



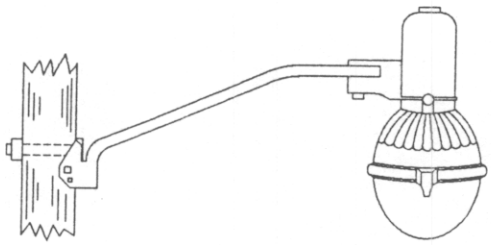
TYPE 402

Enclosed, Heavy Duty, Integrally Ballasted,
High Intensity Discharge Roadway Lighting Fixture

First Suffix	Second Suffix	Description
A		Rated for mercury lamp
B		Rated for metal halide lamp
C		Rated for high pressure sodium lamp
	1	IES type I medium light distribution
	2	IES type II medium light distribution
	3	IES type III medium light distribution
	4	IES type IV medium light distribution
	5	IES type V medium light distribution

Fixture shall conform to UL 1572, and ANSI C136.10 as specified below. Fixture housing shall be of die-cast aluminum with the bottom plate hinged to the top housing. The bottom plate shall be held in place by hinge and spring latch and shall have a continuous, weather-tight gasket that filters air entering or leaving the optical and power compartment. The housing finish shall be baked enamel. The fixture shall have an integral slip-fitter to accept a 1-1/2-inch to 2-inch mast arm. The reflector shall be aluminum of the manufacturer's standard commercial product finish suitable for the type and rating of the lamp. The lens shall be tempered prismatic glass and shall be held securely in the bottom plate. The fixture shall be provided with the locking-type mounting receptacle for photoelectric control in accordance with ANSI C136.10. Photocell shall be provided on top of fixture. Ballast shall be of the high power factor type. Ballast shall be of the constant wattage autotransformer type for mercury vapor lamps, the leadpeak regulated type for metal halide lamps, and the regulated type for high pressure sodium lamps. Ballast shall be capable of starting the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. The fixture shall be prewired, and shall have a mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



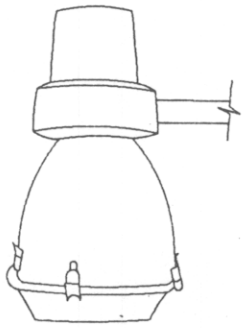
TYPE 403

Enclosed, Integrally Ballasted, High Intensity Discharge Roadway Lighting Fixture With Wood Pole Bracket

First Suffix	Second Suffix	Description
		Rated for:
A		175 watt mercury vapor lamp
B		250 watt mercury vapor lamp
	1	IES type I medium light distribution
	2	IES type III medium light distribution
	3	IES type V medium light distribution

Fixture shall conform to UL 1572. Fixture shall have a die-cast aluminum housing with a standard locking photo-electric control receptacle conforming to ANSI C136.10. Fixture shall be provided with photocell. The refractor ring shall be die-cast aluminum and shall be attached to the housing with integral cast aluminum hinge with stainless steel hinge pin and latches. Ballast shall be of the high power factor type. Refractor shall be glass. Ballast shall be constant wattage autotransformer type and shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. Bracket arm shall be steel conform to ANSI C136.13, shall include all hardware, and shall be capable of supporting the fixture without underbrace, bracket classification C, with a nominal length of 6 feet. Bracket arm shall have manufacturer's standard commercial product finish. The fixture shall be prewired and shall have a mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



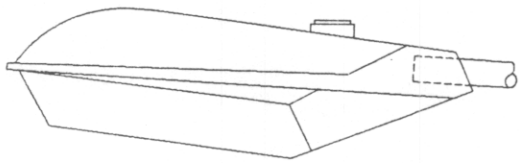
TYPE 404

Enclosed, High Mast, Integrally Ballasted,
High Intensity Discharge Fixture

First Suffix	Second Suffix	Description
		Rated for:
A		1000 watt mercury vapor lamp
B		400 watt metal halide lamp
C		1000 watt metal halide lamp
D		400 watt highpressure sodium lamp
E		1000 watt high pressure sodium lamp
	1	Asymmetrical light distribution
	2	Symmetrical light distribution

Fixture shall conform to UL 1572. Fixture shall consist of an enclosed aluminum optical housing, an integral ballast, and a cast aluminum support designed for a 2-inch tenon. Fixture shall be side mounted. The lampholder shall be mogul base glazed porcelain and shall be installed with lamp support and vibration stabilizer for vertical base-up operations of the lamp. The lampholder shall be field adjustable. The lens shall be tempered, thermal-shock and impact resistant glass and shall be held securely in a die-cast aluminum or stainless steel door frame hinged to the optical housing and held closed with stainless steel clamps. Gaskets shall be provided to seal the optical housing. Air entering or leaving the optical housing as a result of expansion shall be filtered. All ferrous metals shall receive a rust inhibitive coating before application of finish coat. Interior of optical housing shall have the manufacturer's standard commercial product finish suitable for the type and rating of the lamp. Exterior finish shall be the manufacturer's standard commercial product finish. Ballast shall be of the high power factor type. Ballast shall be of the constant wattage autotransformer type for mercury vapor lamps, the lead-peak regulating type for metal halide lamps, and the regulated type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



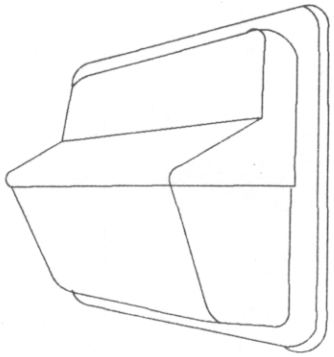
TYPE 405

90^0 Cutoff, Enclosed, Heavy Duty, Integrally Ballasted,
High Intensity Discharge Roadway Lighting Fixture

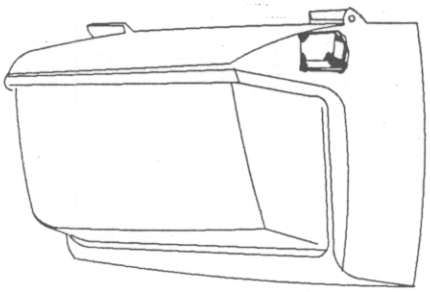
First Suffix	Second Suffix	Description
A		Rated for mercury lamp
B		Rated for metal halide lamp
C		Rated for high pressure sodium lamp
	1	IES type I medium light distribution
	2	IES type II medium light distribution
	3	IES type III medium light distribution
	4	IES type IV medium light distribution
	5	IES type V medium light distribution

Fixture shall conform to UL 1572, and with ANSI C136.10 as specified below. Fixture housing shall be of die-cast aluminum with the bottom plate hinged to the top housing. The bottom plate shall be held in place by hinge and spring latch and shall have a continuous, weather-tight gasket that filters air entering or leaving the optical and power compartment. The housing finish shall be baked enamel. The fixture shall have an integral slipfitter to accept a 1-1/2-inch to 2-inch mast arm. The reflector shall be aluminum of the manufacturer's standard commercial product finish suitable for the lamp type and rating. The lens shall be tempered heat and impact-resistant flat glass and shall be held securely in the bottom plate. The fixture shall be provided with the locking-type mounting receptacle for photoelectric control in accordance with ANSI C136.10. Photocell shall be provided on top of fixture. Ballast shall be of the high power factor type. Ballast shall be of the constant wattage autotransformer type for mercury vapor lamps, the lead-peak regulated type for metal halide lamps, and the regulated type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. The fixture shall be prewired, and shall have a mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 501



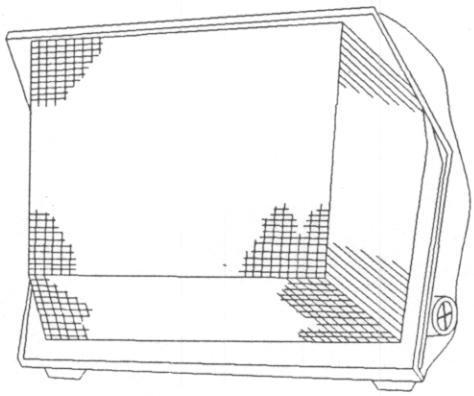
TYPE 502

High Intensity Discharge Fixture for Exterior Wall Mounting, Medium Output

Suffix	Description
	Rated for:
A	50 watt high pressure sodium lamp
B	70 watt high pressure sodium lamp
C	100 watt high pressure sodium lamp
D	150 watt high pressure sodium lamp
E	175 watt metal halide lamp

Fixture shall conform to UL 1572 and shall be rated for use in wet locations. The fixture housing, door assembly, and backplate shall be die-cast aluminum. The door assembly shall have integral cast aluminum hinges. The door assembly shall be held securely to the fixture housing with a stainless steel safety strap when the door is in the open position. The door assembly shall be held firmly against a sealing gasket between the fixture door and housing by stainless steel latches or with stainless steel or brass captive screws when the fixture door is closed. The refractor shall be prismatic borosilicate glass or polycarbonate resin. The refractor shall be gasketed and securely held in the door frame, but shall be easily removed for replacement with a common tool. The reflector shall be aluminum with the manufacturer's standard commercial product finish suitable for the type and rating of the lamp. The fixture shall have manufacturers standard protective coating. Cast knockouts shall be provided in the backplate for recessed outlet box mounting. Ballast shall be of the high power factor type. Ballast shall be of the lead-peak autotransformer type metal halide for lamps and the regulating type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures from minus 20 degrees F to 105 degrees F. The fixture shall be prewired, and shall have a field adjustable, mogul base glazed porcelain lampholder.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



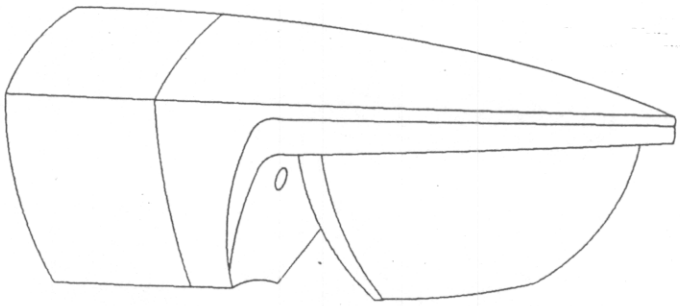
TYPE 503

High Intensity Discharge Fixture for Exterior Wall Mounting,
High Output

Suffix	Description
	Rated for:
A	250 watt mercury vapor lamp
B	400 watt mercury vapor lamp
C	250 watt high pressure sodium lamp
D	400 watt high pressure sodium lamp

Fixture shall conform to UL 1572 and shall be rated for use in wet locations. The fixture housing, door assembly, and backplate shall be die-cast aluminum. The door assembly shall have integral cast aluminum hinges. The door assembly shall be held securely to the fixture housing with a stainless steel safety strap when the door is in the open position. The door assembly shall be held firmly against a sealing gasket between the fixture door and housing by stainless steel latches or with stainless steel or brass captive screws when the fixture door is closed. The refractor shall be prismatic borosilicate glass or polycarbonate resin. The refractor shall be gasketed and securely held in the door frame, but shall be easily removed for replacement using a common tool. The reflector shall be aluminum with the manufacturer's standard commercial product finish suitable for light source provided. The fixture shall have the manufacturers standard protective coating. Cast knockouts shall be provided in the backplate for recessed outlet box mounting. A 3/4-inch threaded and plugged conduit entry shall be provided on each side. Ballast shall be of the constant wattage autotransformer type for mercury vapor lamps and the regulating type for high pressure sodium lamps. The ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. The fixture shall be prewired, and shall have a field adjustable, mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents

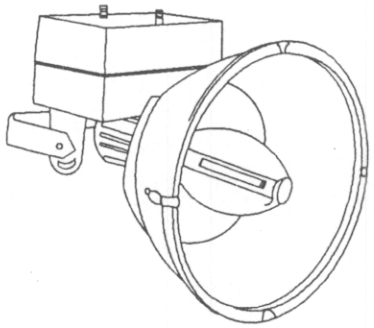


TYPE 504

Rated for 100 Watt Mercury Vapor Fixture For Exterior Wall Mounting

Fixture shall conform to UL 1572, shall be rated for use in wet locations and shall be enclosed and gasketed. The fixture housing shall be one-piece die-cast aluminum. The fixture shall have a cast finishing collar for housing the ballast. The collar design shall conform to the shape of the fixture housing and shall be one-piece cast aluminum. The lens door frame shall be cast aluminum and shall have an integral cast hinge. The door shall be held closed by one captive screw of finish to match housing. Two gaskets shall seal the fixture housing. One shall seal the door to the housing, the other shall seal the lens to the door. Lens shall be tempered, thermal shock resistant prismatic glass. The lens and reflector shall provide an IES type III asymmetric light distribution. The reflector shall be a one-piece, highly polished aluminum type. The collar, housing, and lens door frame shall have an anodized satin aluminum finish and a clear acrylic lacquer protective coating. Ballast shall be of the high power factor type, constant wattage autotransformer type, and shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. The fixture shall be prewired, shall have a medium base glazed porcelain lampholder, and shall be provided with 4-inch cast metal junction box.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



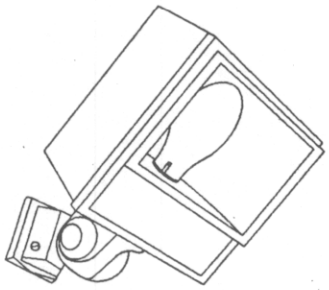
TYPE 505

General Purpose Enclosed, High Intensity Discharge Floodlight
With Symmetrical Light Distribution

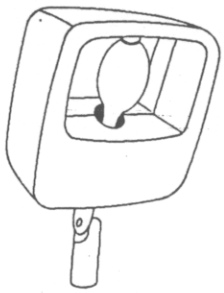
First Suffix	Second Suffix	Description
		Rated for:
A		400 watt metal halide lamp
B		1000 watt metal halide lamp
C		400 watt high pressure sodium lamp
D		1000 watt high pressure sodium lamp
	1	NEMA Type 2 light distribution
	2	NEMA type 3 light distribution
	3	NEMA type 4 light distribution
	4	NEMA type 5 light distribution
	5	NEMA type 6 light distribution

Fixture shall conform to UL 1572 and NEMA FA 1. Fixture mounting shall be adjustable. The fixture shall consist of a die-cast aluminum yoke and integral ballast housing, a galvanized steel trunnion mounting arm, and a spun aluminum housing enclosed with a thermal shock and impact resistant tempered glass lens which is held securely to the housing with a hinged cover ring and stainless steel latches. The spun aluminum housing shall, if specified, be provided with an outer protective housing to protect the inner housing against damage of vandals and hail. The enclosure cover shall be provided with a gasket. All exposed metallic parts shall receive the manufacturer's standard commercial product finish. Interior of spun aluminum housing shall receive the manufacturer's standard commercial product finish suitable for the lamp tree and rating. The fixture shall be prewired, shall have a mogul base glazed porcelain lampholder, and shall be provided with three feet of flexible NEC type SO 14-3 cable. Ballast shall be capable of starting and operating the lamp in an ambient temperature range of minus 20 degrees F to 105 degrees F. Ballast shall be of the high power factor type. Metal halide fixtures shall have a lead-peak autotransformer ballast, and high pressure sodium fixtures shall have a regulated ballast.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 506
Wall Bracket Mounting



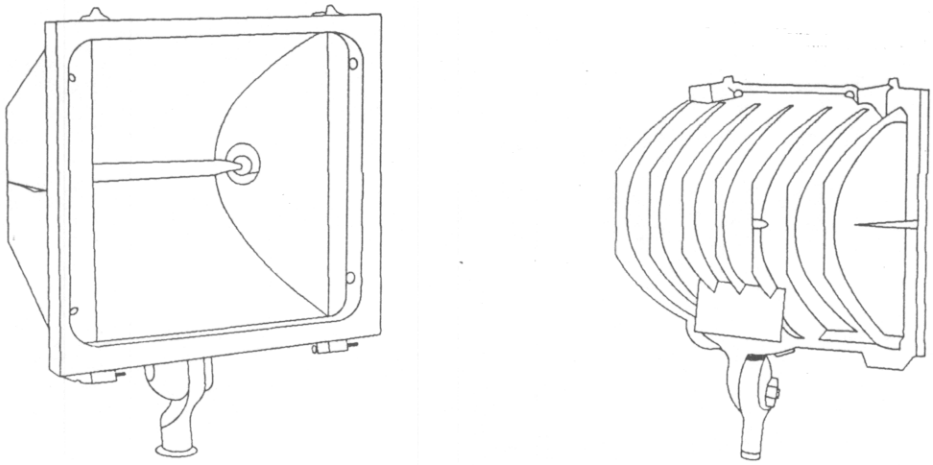
TYPE 507
Slip Fitter Mounting

High Intensity Discharge Floodlight with Asymmetrical Light Distribution

First Suffix	Second Suffix	Third Suffix	Description
A			Rated for metal halide lamp
B			Rated for high pressure sodium (HPS) lamp
	1		NEMA type 6 x 5 light distribution
	2		NEMA type 7 x 7 light distribution
	3		NEMA type 7 x 6 light distribution
		A	Fixture with instant restrike feature
		B	Type 300 emergency unit

Fixture shall conform to UL 1572 and NEMA FA 1, and shall be the heavy-duty, enclosed type. Fixture shall consist of a cast aluminum housing and a cast aluminum door assembly and shall be integrally ballasted unless otherwise shown or approved. The door assembly shall be hinged and gasketed and held in a closed position with screws of finish to match fixture or recessed stainless steel latches. The lens shall be thermal shock and impact resistant tempered glass and shall be held securely in the door frame. Reflector shall be aluminum with manufacturer's standard commercial product finish suitable for light source provided. All metallic parts of the fixture shall receive one or more rust-inhibitive coatings prior to the application of interior and exterior finishes in accordance with the standard practice of the manufacturer for commercially available exterior lighting fixtures. Ballast shall be of the high power factor type capable of starting and operating the lamp in an ambient temperature of minus 20 degrees F to 105 degrees F. Ballast shall be of the lead-peak autotransformer type for metal halide lamps and the regulating type for high pressure sodium lamps. If an instant restrike feature is specified, the fixture shall be equipped to permit restarting of the lamp to full lumen output within 5 seconds following restoration of power after each momentary power interruption. The fixture shall be prewired and shall include a mogul base glazed porcelain lampholder. Mounting hardware for the fixture shall be adjustable, and shall be the cast aluminum type unless otherwise approved.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 508

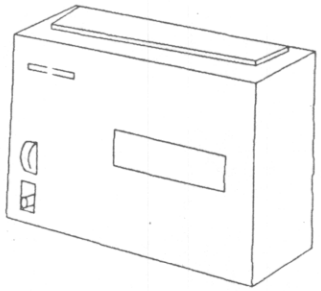
Front View Back View

500-Watt, Tungsten Halogen (Quartz-Iodine) Floodlight

Suffix	Description
A	NEMA type 5 x 2 light distribution
B	NEMA type 5 x 3 light distribution
C	NEMA type 5 x 5 light distribution

Fixture shall conform to UL 1572 and NEMA FA 1, and shall be the heavy duty enclosed type. The housing shall be die-cast aluminum with cast-in fins for heat dissipation. The manufacturer's standard commercial product finish shall be provided on all interior and exterior metal surfaces. The reflector shall be aluminum which shall be suitably finished for the type and rating of the lamp. The lens shall be thermal shock and impact resistant glass securely held in a door frame equipped with gaskets as required to prevent the entrance of insects and light leakage. The fixture housing shall include a horizontal adjustment incorporated in the mounting arm, between the mounting arm and the fixture housing, or as an accessory attached to the mounting arm consistent with the standard practice of the fixture manufacturer. The fixture shall be prewired, and shall have a high-temperature, metal-encased, spring-loaded glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



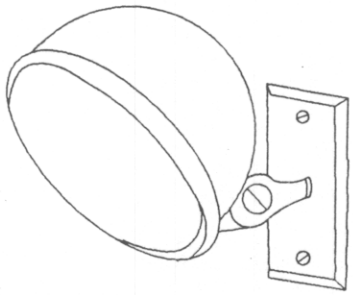
TYPE 600

12 or 24 Volt Emergency Battery Power Supply Unit

The unit shall conform to UL 924, and shall meet or exceed the NFPA 70 time and voltage requirements. The unit shall be dual-rated for use on either 120-Volt or 277-Volt alternating current power supplies. Following sustained loss of the normal power supply, the unit shall be capable of automatically and instantaneously supplying at least 125 percent of the full load current of the quantity and wattage rating of remotely-mounted floodlights indicated on applicable contract documents. It shall also be capable of supplying 125 percent of the full load current of the floodlights for a period of not less than 90 minutes, and until the battery has been discharged to 87.5 percent of the nominal voltage rating of the floodlights. A battery low-voltage cutout or disconnect feature shall be incorporated into the unit to protect the battery against damage if the battery voltage drops below 87.5 percent of the nominal voltage rating of the battery floodlights indicated on applicable contract documents. The battery shall be the sealed maintenance-free type designed for 10 years of maintenance-free service, and shall be provided with hydrometer indicators if of the lead-calcium type containing a sulfuric acid electrolyte. The battery charger shall be capable of fully recharging the battery within 12 hours after discharge to 87.5 percent of the nominal battery voltage. The battery charger shall be the solid-state type, and shall provide a continuous, variable, current-limited, filtered and regulated charge rate. Battery and charger shall be contained in a steel cabinet not less than 18 gauge in thickness with an enamel finish, unless otherwise approved, and shall have an electrolyte-resistant undercoat if a corrosive electrolyte is housed in the battery case. Mounting brackets or a mounting shelf shall be provided for the cabinet, complete with mounting hardware finished to match the cabinet. Mounting slots for wall or shelf mounting shall be provided, as indicated on applicable contract documents. The cabinet shall have separate battery and battery-charger compartments to facilitate removal and replacement of those components, a hinged access door, and provisions for terminating AC and DC conductors and conduits. A load relay with 30-ampere contacts shall be provided in addition to the number of 10-20 ampere distribution circuits as necessary to supply 125 percent of the load demands of the quantity and rating of the remotely-mounted floodlights. The unit shall be prewired and shall be equipped with a charge-indicator light, and a push-to-test switch and suitable meter to indicate the battery voltage when the switch is closed.

The type 600 emergency unit indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



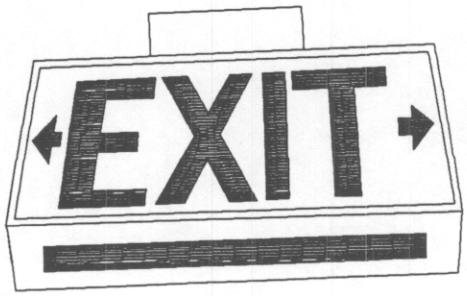
TYPE 601

Emergency Remote Mounted, 12 OR 24 Volt Floodlight, For Use With Type 600 Power Supply Unit

First Suffix	Second Suffix	Description
A	1-12 Volts	13 watt lamp
B	2-24 Volts	18 watt lamp
C		25 watt lamp
D		38 watt lamp

Fixture shall conform to UL 1571 and UL 924. Floodlight housing shall be constructed of steel or aluminum and shall be provided with manufacturer's standard commercial product finish, halogen lamp and lens. Floodlight shall be fully adjustable in all directions with positive screw locking feature and shall be mounted on a single gang mounting plate. Floodlight shall be provided complete with mounting plate and mounting hardware finished to match the housing. The mounting plate shall be suitable for attachment to a standard wall switch outlet box. Fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



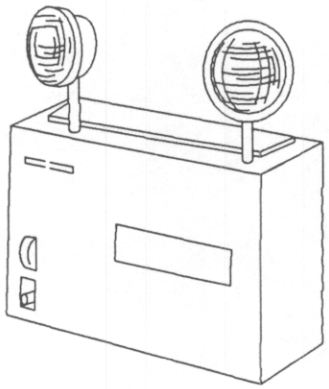
TYPE 602

Remote Mounted, 12 Volt Exit Sign, For Use
With Type 600 Power Supply Unit

First Suffix	Second Suffix	Description
A		Single face
B		Double face
	1	End mounted
	2	Top mounted
	3	Back mounted
	4	Stem mounted

Fixture shall conform to UL 924, UL 1571, and NFPA 101, and shall be equipped for downlighting as indicated. The illuminated exit sign housing shall be constructed of die-cast aluminum and shall have a satin anodized finish. Each stenciled face shall have 6-inch letters with 3/4-inch stroke and shall have a brushed aluminum finish and clear acrylic lacquer protective coating. Concealed universal arrows may be below or aligned with the center of the EXIT letters. The fixture shall have provisions for two 20-watt incandescent lamps to be illuminated during normal fixture use, and two 5-8 watt DC lamps to be illuminated during outage of the normal power source. Lamps shall be provided with the fixture, and shall be sufficient to properly illuminate the EXIT letters through a green or red polymer diffuser, as indicated on applicable drawings. Fixture shall be the manufacturer's standard commercial fixture suitable for the application indiated. Mounting hardware shall be provided for the type mounting indicated on other contract documents, and shall be finished to match the housing finish. The fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

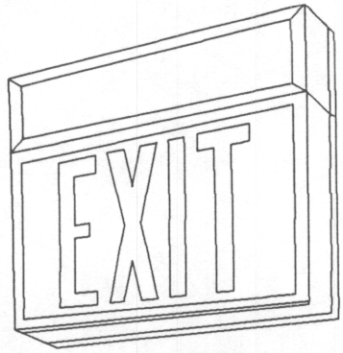


TYPE 603

6-Volt Emergency Battery Pack Unit with Two Floodlights

Unit shall conform to UL 924, NFPA 101, and shall meet or exceed the NFPA 70 time and voltage requirements. The unit shall be dual-rated for use on either 120-Volt or 277-Volt alternating current power supplies. Following sustained loss of the normal power supply, the unit shall be capable of automatically and instantaneously illuminating the two 6-Volt lighting fixtures for a period of not less than 90 minutes at a battery voltage in excess of 87.5 percent of the nominal voltage rating. The battery shall be the nickel-cadmium, pocket plate type designed to be maintenance free during the expected battery life, and shall be warranted for not less than 3 years from the date of the purchase of the unit, and shall be field replaceable without requiring removal of other components. The battery charger shall be the solid-state type and shall provide a continuous, variable, current limited, filtered and regulated charge rate. The battery and charger shall be contained in a steel cabinet not less than 18 gauge thickness with an enamel finish, unless otherwise approved, which shall be equipped with a push-to-test switch and a meter to indicate battery voltage when the switch is closed. Mounting brackets or shelf shall be provided, complete with all mounting hardware, all with a finish to match the finish or color of the cabinet. The unit shall be prewired and equipped with two 6-volt, 5-8 watt floodlights as indicated.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 604

Exit Sign With Self-Contained Emergency Battery

First Suffix	Second Suffix	Description
A		Single face
B		Double face
	1	End mounted
	2	Top mounted
	3	Back mounted
	4	Stem mounted

Unit shall conform to UL 924, NFPA 101, and shall meet or exceed the NFPA 70 time and voltage requirements. The unit shall be dual-rated for use on either 120-Volt or 277-Volt alternating current power supplies. Following sustained loss of the normal power supply, the unit shall be capable of automatically and instantaneously illuminating the two 6-Volt lighting fixtures for a period of not less than 90 minutes at a battery voltage in excess of 87.5 percent of the nominal voltage rating. The battery shall be the nickel-cadmium, pocket plate type designed to be maintenance free during the expected battery life, and shall be warranted for not less than 3 years from the date of the purchase of the unit, and shall be field replaceable without requiring removal of other components. The battery charger shall be the solid-state type and shall provide a continuous, variable, current limited, filtered and regulated charge rate. The battery and charger shall be contained in a steel cabinet not less than 18 gauge thickness with an enamel finish, unless otherwise approved, which shall be equipped with a push-to-test switch and a meter to indicate battery voltage when the switch is closed. Mounting brackets or shelf shall be provided, complete with all mounting hardware, all with a finish to match the finish or color of the cabinet. All ferrous metal parts shall receive a rust inhibitive coating before application of the finish coat. The fixture shall have a light-emitting diode pilot light to show that the battery charger is functioning. Fixture shall be prewired, with wiring concealed in the illuminated portion of the fixture housing.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

TYPE 605
Exit Light, Stencil Face

First Suffix	Second Suffix	Third Suffix	Description
A			Single face
B			Double face
	1		Incandescent
	2		Fluorescent
		A	End mounted
		B	Top mounted
		C	Back mounted
		D	Stem mounted

Fixtures shall conform to UL 924, UL 1571, and NFPA 101, and shall be equipped for downlighting as indicated. The illuminated exit sign housing shall be constructed of die-cast aluminum and shall have a satin anodized finish. Each stenciled face shall have 6-inch letters with 3/4-inch stroke and shall have a brushed aluminum finish and clear acrylic lacquer protective coating. Concealed universal arrows may be below or aligned with the center of the EXIT letters. The fixture shall have provisions for two 20-watt incandescent lamps to be illuminated during normal fixture use, and two 5- to 8-watt DC lamps to be illuminated during outage of the normal power source. Lamps shall be provided with the fixture, and shall be sufficient to properly illuminate the EXIT letters through a green or red polymer diffuser, as indicated on applicable drawings. Fixture shall be the manufacturer's standard commercial fixture suitable for the application indicated. Mounting hardware shall be provided for the type of mounting indicated on other contract documents, and shall be finished to match the housing-finish. The fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

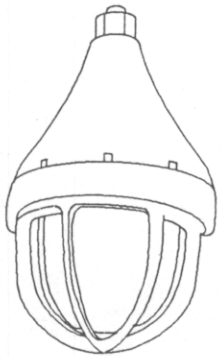
TYPE 606

Exit Light, Edge-Lit Panel

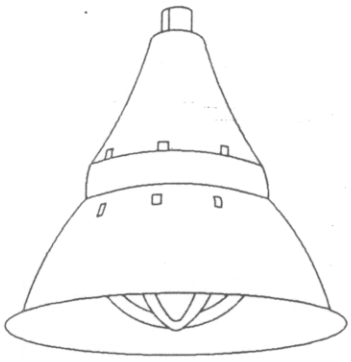
First Suffix	Second Suffix	Third Suffix	Description
A			Single face
B			Double face
	1		Incandescent Lamp
	2		Fluorescent Lamp
		A	End mounted
		B	Top mounted
		C	Back mounted
		D	Stem mounted

Incandescent fixtures shall conform to UL 924, UL 1571, and NFPA 101. Fluorescent fixtures shall conform to UL 924, UL 1570, and NFPA 101. The panel shall be clear acrylic plastic with green or red letters etched into the surface as indicated. Single-face panel shall consist of one inscribed panel and one blank panel with a plastic or metal separator. Double face signs shall consist of two inscribed panels and a plastic or metal separator. The separator shall be white. Letters shall be 6-inches in height with 3/4-inch stroke. Fixture shall contain two lamps. Incandescent lamps shall be 20 watts each. Fluorescent lamps shall be 58 watts each. All wiring in the illuminated portion of the fixture shall be concealed. Fixture shall be designed for extending the lamp life and shall be in the manufacturer's standard fixture suitable for the application. Fixture shall be prewired, provided with a ceiling outlet box cover furnished to harmonize with the fixture, and provided suitable hardware for ceiling mounting.

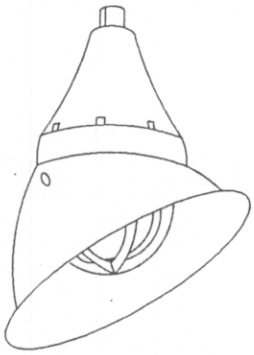
Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



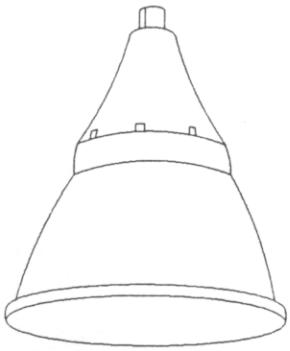
TYPE 701
Without Reflector



TYPE 702
With Standard Dome Reflector



TYPE 703
With 30 Degree Angle Dome Reflector



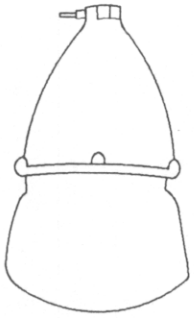
TYPE 704
With Deep Dome Reflector

Industrial Incandescent Fixture for Use in NEC Class I,
Groups C, D, and Class II, Groups E, F, and G Locations

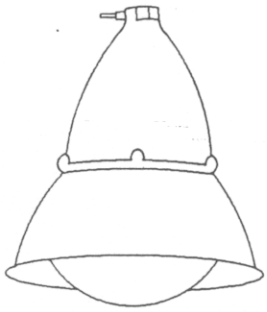
First Suffix	Second Suffix	Description
A		Pendant mounted
B		Ceiling Mounted
C		Bracket mounted
D		Stanchion mounted
	1	With steel guard

Fixture shall conform to UL 844 for use in NEC Division 1 and 2 locations. The housing and guard shall be cast aluminum with the manufacturer's standard commercial product protective finish. The fixture shall be assembled with threaded joints and shall be prewired and factory sealed. Lampholder shall be medium base glazed porcelain. The unit shall be suitable for indoor and outdoor application. The reflector shall be the manufacturer's standard commercial product and finish. The globe shall be heat and impact resistant prismatic glass and shall seal the lampholder compartment. Fixture shall be prewired and rated for use with a 200-watt lamp.

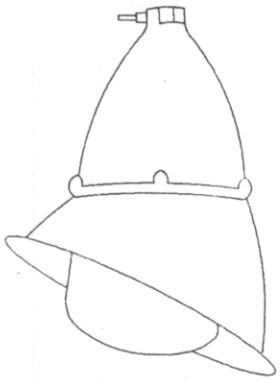
Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



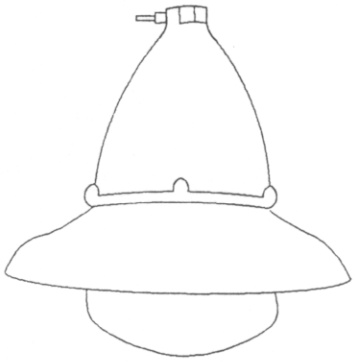
TYPE 705
Without Reflector and Guard



TYPE 706
With Standard Dome Reflector



TYPE 707
With 30 Degree Angle Dome Reflector



TYPE 708
With Shallow Deep Dome Reflector

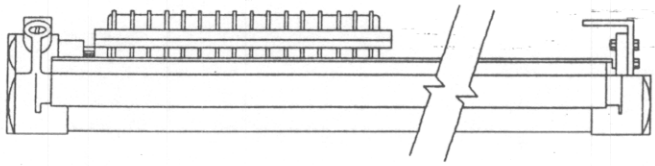
Industrial Incandescent Fixture For Use in NEC Class II,
Groups E, F, and G, and Class III Locations

First Suffix	Second Suffix	Description
A		Pendant mounted
B		Ceiling mounted
C		Bracket mounted
	1	With steel wire guard

Fixture shall conform to UL 844 for use in NEC Division 1 and 2 locations. Housing shall be cast aluminum with the manufacturer's standard commercial product protective finish. The unit shall be suitable for indoor or outdoor application. The reflector shall be the manufacturer's standard commercial product and finish. The globe shall be threaded, heat and impact resistant clear glass and shall seal the lampholder compartment. All sealing gaskets shall be provided with the fixture. Lampholder shall be medium base glazed porcelain. A steel wire guard shall be of the manufacturer's standard commercial product design and finish and shall be provided when specified or indicated. The reflector shall be held securely to the fixture housing with corrosion resistant screws. Fixture shall be rated for use with a 200 watt lamp. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

Left End View



Side View

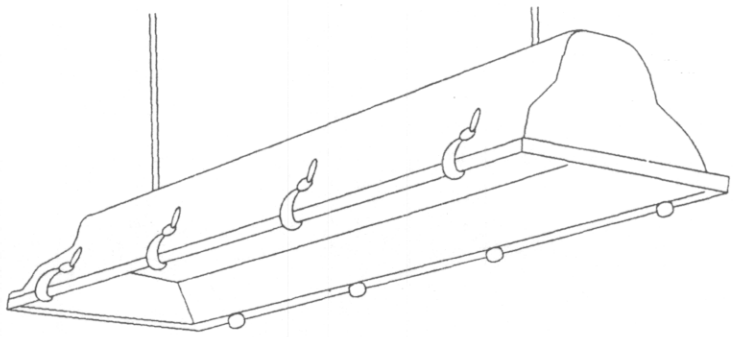
TYPE 709

Four-Foot Industrial Lighting Fixture for use in Class I, Div. 1 and 2, Groups C and D; Class II, Div. 1 and 2, Groups E, F, and G, and Class III Locations.

First Suffix	Description	Second Suffix	Description
A	Two Lamps	1	Rated for rapid start 40 watt, 430 mA lamps
B	Four Lamps	2	Rated for 60 watt, 800 mA lamps
		3	Rated for 110 watt, 1500 mA lamps

Fixture shall conform to UL 595 and 844. Fixture shall be suitable for locations where hazardous fumes, gases, or dust are present, and for wet locations if specified in other contract documents. Fixture, excluding reflectors, shall be constructed of copper-free aluminum and shall be provided with lamps, tempered, heat and impact resistant lamp tubes. Reflectors shall be heavy gauge extruded aluminum which shall have a high gloss reflective finish. Fixture shall be capable of being relamped from either end and shall be provided with lamp guides at each end for ease of relamping. Lamp access covers shall be interchangeable, screw type, with neoprene, "0-ring" seals. Sockets on both ends shall be spring loaded for maximum shock and vibration protection, and shall be the T-12 medium Bi-pin type for the 40 watt lamps and the T-12 recessed type for the 60 and 110 watt lamps unless otherwise approved. Ballast shall be Class P thermally protected. Replacement of ballast shall be feasible with fixture in place. Fixture shall be factory sealed and shall be suitable for vertical or horizontal mounting with 360° rotation permissible. Fixture shall have 90° and 45° mounting provisions as standard.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



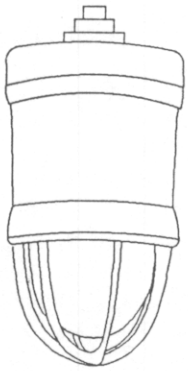
TYPE 710

Pendant Mounted, Industrial Fluorescent Fixture
For Use In NEC Class II, Group F and G and Class III Locations

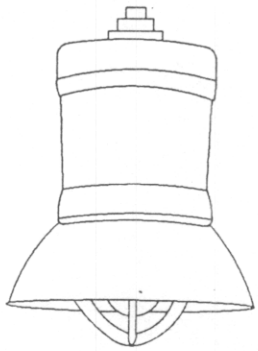
Suffix	Description
A	Two lamps
B	Three lamps

Fixture shall conform to UL 844 for use in NEC Division 1 and 2 locations. Housing shall be fabricated in one piece of 20 gage steel using seamless welded construction. Fixture shall be of standard construction for use in noncorrosive areas. All interiors and exterior metallic surfaces, including reflector and wireway cover, shall be finished with white porcelain enamel. The doorframe shall be 16 gage zinc plated steel. All metallic surfaces shall receive a rust inhibiting coating before application of finish coat. The door frame shall have a full neoprene gasket between flat surfaces of the frame and the housing. The lens shall be 1/4 inch thick tempered and impact resistant glass. Ballast shall be thermally protected or fuse protected. Any fuses shall be installed in fuse holders that will not permit line connections to be accessible when the fuses are removed. Lamp holders shall be white urea plastic. The lens shall be sealed in the door frame. The doorframe shall be hinged and shall be held tightly sealed to the housing with stainless steel clamps. Fixture shall be prewired.

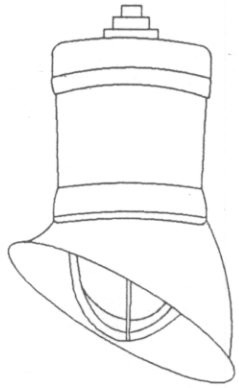
Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 711
Without Reflector



TYPE 712
With Standard
DOME Reflector



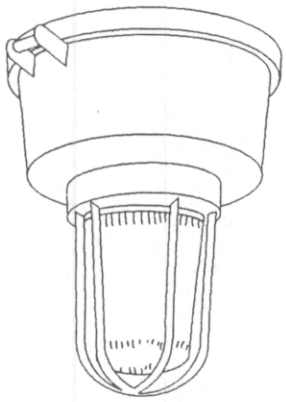
TYPE 713
With 30 Degree Angle
DOME Reflector

High Intensity Discharge, Mogul Base Industrial Lighting Fixture
For Use In NEC Class I, Division 1, Groups C, D,
and Class II, Division 1,Groups E, F, and G

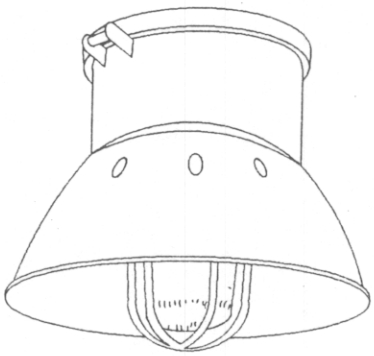
First Suffix	Second Suffix	Description
		Rated for/Mounting:
A		175 watt metal halide lamp
B		100 watt high pressure sodium lamp
C		150 watt high pressure sodium lamp
	1	Pendant mounted
	2	Ceiling mounted
	3	Bracket mounted

Fixture shall conform to UL 844 and UL 1572 for use in NEC Division 1 and 2 locations. The fixture shall be integrally ballasted. The conduit entry wiring compartment shall be mechanically sealed from the ballast compartment. The conduit entry compartment shall contain a wireless terminal block which will connect and disconnect the fixture from the power source when the fixture is installed or removed. The fixture shall be prewired and factory sealed. The housing and guard shall be cast aluminum with the manufacturer's standard commercial product protective finish. Lampholder shall be mogul base glazed porcelain. The fixture shall be provided with the type mounting specified or indicated. The globe shall be heat and impact resistant glass, threaded, fluted, ribbed or patterned. The reflector shall be the manufacturer's standard commercial product and finish. Ballast shall be of the high power factor type. The fix-ture ballast shall be lead-peak regulating type for metal hallide lamps, and regulating type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20°F. to 105°F. Fixture shall be prewired.

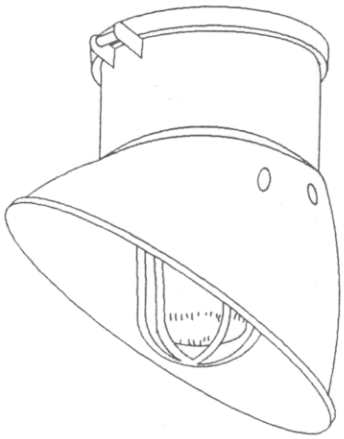
Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 714
Without Reflector



TYPE 715
With Standard Dome Reflector



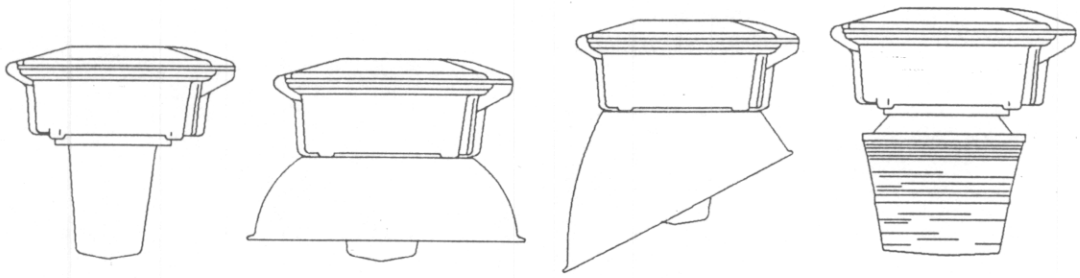
TYPE 716
With 30 Degree
Angle Dome Reflector

High Intensity Discharge, Mogul Base, Industrial Lighting Fixture
For Use In NEC Class I, Division 2, Groups C, D and Class II,
Divisions 1 and 2, Groups E, F, and G and Class III Locations

First Suffix	Second Suffix	Description
A		175 watt metal halide lamp
B		250 watt metal halide lamp
C		50 watt high pressure sodium
D		70 watt high pressure sodium
E		100 watt high pressure sodium lamp
F		150 watt high pressure sodium lamp
G		250 watt high pressure sodium lamp
	1	Pendant mounted
	2	Ceiling mounted
	3	Bracket mounted
	4	Stanchion mounted

Fixture shall conform to UL 844 and UL 1572. The fixture shall be integrally ballasted. The housing and guard shall be cast aluminum with the manufacturer's standard commercial product protective finish. The globe shall be heat and impact resistant glass and shall be fluted, ribbed or patterned. The finished reflector shall be the manufacturer's standard commercial product. Lampholder shall be the mogul base glazed porcelain type. Fixture shall be provided with the type mounting specified or indicated. Ballast shall be of the high power factor type. The fixture ballast shall be of the lead-peak regulating type for metal halide lamps, and regulating type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20°F. to 105°F. Fixture shall be prewired.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

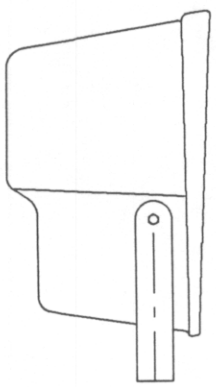


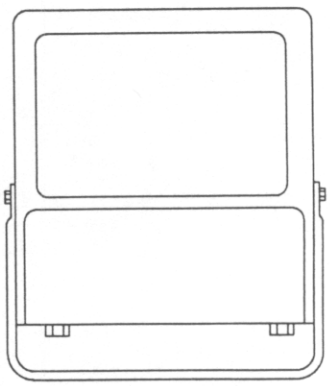
TYPE 717 TYPE 718 TYPE 719 TYPE 720
Dist. Type I and V

High Intensity Discharge, Medium Base, Lampholder Industrial Lighting Fixture for use in Class I, Division 2, Groups A, B, and C, Class II, Divisions 1 and 2, Groups E, F, and G, and Class III locations

First Suffix Rated for:	Second Suffix Refractor:	Third Suffix Guard:	Fourth Suffix Mounting:
A-50 Watt HPS	1-Manufacturer's Standard	A-Copper-free Aluminum	1-Pendant
B-70 Watt HPS	2-Glass, Type V	B-Steel with Corrosion Resistant Finish	2-Ceiling
C-100 Watt HPS	3-As indicated on contact documents	O-None required	3-Bracket
D-150 Watt HPS			4-Stanchion
E-100 Watt Mercury Vapor			

Fixture shall conform to UL 1572, 844 and 595, and shall be suitable for use in wet locations. Housing and any hood reflector shall be constructed of copper-free aluminum and all external hardware shall be stainless steel. Globe shall be impact and heat resistant glass unless otherwise indicated by type and number (e.g. 7181B1.) Ballast shall be high power-factor type, auto-transformer type for mercury vapor (MV) and regulating type for high pressure sodium (HPS). Ballast shall be capable of starting and operating the lamp at ambient temperatures from minus 20^{o}F to $+105^{o}$F. Reflector shall be ultraviolet stabilized, fiberglass reinforced polyester. Fixture shall be prewired.





TYPE 721

High Intensity Discharge, Industrial Floodlight Fixture
for use in Class I, Division 2, Groups C and D

First Suffix	Second Suffix	Third Suffix Mounting:
A-150 Watt High Pressure Sodium	1-Top Visor	A-Bracket
B-250 Watt High Pressure Sodium	2-Mesh Guard	B-Trunnion
C-400 Watt High Pressure Sodium	3-Polycarbonate Shield	
D-250 Watt Metal Halide		
E-400 Watt Metal Halide		
F-250 Watt Mercury Vapor		
G-400 Watt Mercury Vapor		

Fixture shall conform to UL 595, 844, and 1572 and shall be listed for use in hazardous areas identified above. Fixture shall be constructed of a one-piece die-cast copper-free aluminum housing finished in manufacturers standard finish. All external hardware shall be stainless steel. Door to be one- piece, die-cast, copper-free aluminum, double hinged with stainless steel pins, secured with stainless steel captive screws and stainless steel latches for watertight seal. Lens to be thermal shock and high impact resistant glass. Fixture shall have photometrically efficient reflectors formed from high-purity, heavy-gauge reflector-grade aluminum with finish to assure precise, efficient light control. Fixture shall be provided with continuous high-temperature, silicone-rubber gasket mounted in door frame body slot with no corner breaks, to ensure full weather-tight protection lamp, reflector, wiring. Ballasts shall be of the high power factor type. The fixture ballasts shall be of the lead-peak regulating type for metal halide lamps, regulating type for high pressure sodium lamps and constant wattage autotransformer type for mercury vapor lamps.) The trunnion arm shall be constructed of not less than 3/16-inch heavy-duty stainless steel, and shall be provided with suitable stainless hardware for mounting of the fixture. The fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified in contract documents.

LIGHTING FIXTURE SCHEDULE

CONTRACT DRAWING FIXTURE MARK	DET. NO. 40-06-04		LAMP			FIXTURE VOLTAGE	ZONAL CAVITY METHOD RCR = 1				SPACING TO MTG. HTG. RATIO	NOTE NO.
	TYPE	SHEET NO.	TYPE	NO.	WATTS		EFFECTIVE REFLECTANCE			COEF. OF UTIL.		
							CLG.	WALL	FLOOR			

APPENDIX "B"

ENERGY CONSERVATION CONSIDERATIONS

1. The highest efficiency light source and equipment compatible with the intended application should be used. High intensity discharge (HID) lamp fixtures provide the highest lumens per watt, and should be considered whenever they are suitable for the application. Normally, the use of the low pressure sodium (LPS) should be avoided because of monochromatic color and the lack of adequate competition among LPS lamp manufacturers in the United States, which could lead to difficulty in obtaining spare lamps when required. Possible danger to personnel during handling and disposal of the LPS lamps should also be determined before LPS fixtures are specified. High pressure sodium (HPS) lamp fixtures should not be specified when color rendition is important, or when the closeness of lamp source would produce excessive brightness or glare and cause visual discomfort to personnel. The same is true for other HID foures.

2. In evaluating the use of HID fixtures, consideration must also be given to the increased cost of HID fixtures and reduced lamp life when they will not normally be used on an average of 10 hours per start. Also, HID fixtures require a warm-up period from a "cold" start, after a brief power interruption, and after "drop out" caused by excessive voltage drop. There are two methods available to compensate for those abnormal conditions: the use of the Type 300 quartz standby light system included in the standard drawings details; and the use of fixtures now available which are equipped with "instant restrike" "hot start" or "rapid restart" features. Consult data published by various manufacturers' HPS fixtures to determine the availability of those features, the period of proven successful use, and details of a "rapid re-start" feature, or contact a representative of the manufacturers if necessary before this type of fixture is specified. The cost of the fixture equipped with a "rapid re-start" feature should be compared to the cost of the same fixture equipped with a Type 300 standby system, and the operational advantages of each before specifying the exact type of fixture to be provided for the functional application. Depending on the work performed in the area, it may be necessary to specity that only a limited number of fixtures be provided with the stand-by system or with a rapid-start feature. That feature has an operational advantage in that work can be continued with a minimum of interruption throughout the work area.

3. If available from at least three manufacturers, use of the magnetic type of energy-efficient fluorescent ballasts, having the same wattage rating as the rating of the fluorescent lamps specified, should be specified if the use of lower wattage lamps does not cause the need for a larger quantity of fixtures to achieve the proper illumination level and, thereby, negate the attempt to conserve energy. Caution, however, must be exercised to ensure that at least three major fixture manufacturers regularly manufacture these types of fixtures, and that the fixtures include the Class P, high power factor ballast approved for the application by the Certified Ballast Manufacturers (CBM). Approval or certification by CBM indicates that the ballasts for the various types of lamps have been tested and found to be in conformance with the applicable industry standard.

4. The electronic type of fluorescent fixture ballast is available to operate some types of fluorescent lamps which are compatible with the higher frequencies generated by the ballasts. Higher frequency of operation of the electronic ballasts reduces the internal ballast losses when compared to the magnetic-type of ballast, and offers the potential advantage of improving the efficency of the fluorescent lamps. Electronic ballasts use solid-state switching techniques to convert from 50 to 60 Hz to a higher frequency and, therefore, offers the potential for generation of radio-frequency interference and the reflecting of harmonics back into the 50 or 60 Hz power source. If harmonics are developed and reflected back into a common power source, there is a possibility that sensitive electronic equipment supplied from the same power source could occasionally malfunction, and even be damaged. Harmonics are additive in neutral circuits and can, therefore, overheat neutral conductors in single-phase circuits and overheat neutral buses in panels. Extreme caution should therefore be exercised before specifying the relatively new type of electronic ballasts and fluorescent lamps which are compatible with the output of those ballasts. Limited use of such fixture and lamp types in other than electronic equipment areas or rooms would be beneficial in evaluating the advantages and disadvantages of the lamps and electronic ballasts. Extensive use of them is not yet recommended until they have been tested and proven successful in use for a period of at least 2 years,without creating operational problems, and until they have been approved for the application by CBM.

5. Table 1 is a comparison of the several available sources. Figures are averaged from published industry data. Any specific lamp, ballast, or lamp and ballast combination may differ slightly from the figures shown. Not all lamps are shown, especially in the incandescent lamp grouping. However, the table is sufficiently representative to compare lamps, ballasts, and operating characteristics. Note that lumens per watt are based on mean lumen (rather than initial), and on wattage of lamp plus ballast. These factors must be considered when comparing light sources.

TABLE B-1

Lamp Watts	Ballast Watts	Total Watts	Mean Lumens	Mean Lumens Per Watt	Life Hours
Incandescent					
34	-	34	410	12	1500
52	-	52	775	14	1000
67	-	67	970	14	750
90	-	90	1490	16	750
135	-	135	2250	16	750
200	-	200	4000	20	750
300	-	300	6200	21	750
500	-	500	10,000	20	1000

TABLE B-1 (Continued)

Lamp Watts	Ballast Watts (Max)	See Note	Total Watts (Max)	Mean Lumens	Mean Lumens Per Watt	Life Hours (Min)
			Preheat			
2x8	4	-	20	640	32	7,500
2x20	10	1	50	2,160	43	9,000
			Rapid Start			
2x40	16	1	96	5,040	53	20,000
2x34*	4	2	72	4,640	64	20,000
2x32**	4	2	68	4,640	68	20,000
			Rapid Start-800mA			
2x60	30	-	150	5,440	36	12,000
			Rapid Start - 800 mA - 8-foot			
2x95	65	1	255	13,040	51	12,000
2x110	35	1	255	14,400	56	9,000
			Rapid Start - 1,500 mA			
2x115	5	-	235	10,880	46	10,000
			Rapid Start - 1,500 mA - 8-foot			
2x195***	60	1	450	22,400	50	10,000
			Rapid Start, U-Tube			
2x40	16	-	96	5,400	53	18,000
Tungsten Halogen (quartz-iodine)						
250			250	4500	18	2000
300			300	5700	19	2000
400			400	9,000	22	2000
1000			1000	18,000	18	4000
1200			1200	29,000	24	2000
Mercury Vapor - Medium Base						
40/50	34/24	74	91	912/1260	12/17	16,000
75	18		93	2240	24	16,000
100	18		118	3200	27	18,000
Mercury Vapor - Mogul Base						
100	25		130	3360	26	24,000
175	25		205	5000	24	24,000
250	30		285	8,000	28	24,000
400	40		450	15,600	35	24,000
1000	65		1075	46,400	43	24,000

TABLE B-1 (Continued)

MetalHalide					
175	40	215	11,200	52	7500
250	50	300	16,400	55	10,000
400	60	460	28,800	63	20,000
1000	80	1080	88,000	81	12,000
1500	50	300	16,400	55	10,000
High Pressure Sodium - Medium Base					
35	11	46	1,800	39	16,000
50	13	63	3,200	51	24,000
70	18	88	4,640	53	24,000
100	30	130	7,600	58	24,000
150	38	188	12,800	68	24,000
High Pressure Sodium-Mogul Base					
50	16	66	3,200	48	24,000
70	20	90	4,640	52	24,000
100	30	130	7,600	58	24,000
150	38	188	12,000	64	24,000
150	Note 3	175	9,600	55	12,000
250	55	305	20,800	68	24,000
360	Note 4	400	38,000	95	16,000
400	65	65	40,000	86	24,000
1000	100	1100	112,000	102	24,000

NOTES:

1. Using low energy ballast, total input: 74 watts.

2. Using phantom tube and 40-watt lamp, total input: 30 watts. (Do not use in new construction or major upgrade and modernization projects.)

3. Special lamp for use with 175-watt mercury vapor ballast, 25 watts ballast loss.

4. Special lamp for use with 400-watt mercury vapor ballast, 40 watts ballast loss.

Symbol	Explanation of Symbol
*	A 34-watt lamp is recommended for use in one-and two-lamp fixtures equipped with an energy efficient 34-watt, Class P, high power factor type ballast approved for the application by the Certified Ballast Manufacturers.

** Same as explained for the single-asterisk except for the wattage of the ballast and lamp. The 32-watt lamp, however, may require up to one minute to reach full-lumen output following power interruptions lasting less than 1 minute.

*** If approved for use by the Base Civil Engineer at Air Force installations, and by the Directorate of Engineering and Housing at Army installations, the 195-watt, 1,500-mllliampere (mA) is recommended for use if the ballast is the Class P, high power factor type approved for the application by the Certified Ballast Manufacturers, and has the same wattage rating as the lamps. To ensure that lamps operate satisfactorily, the output of the ballast must limit the current and provide the voltage that is compatible with the type and rating of the fluorescent lamps specified.

NOTES:

1. A ballast-efficiency factor should be included in the contract specifications and should not be less than:

a. 1.805 for single-lamp ballasts which supply single-lamp fixtures rated at 40 Watts or less, excluding 20- or 30-watt fixtures;

b. 1.06 for two-lamp ballasts rated at or less than 40 Watts; and

c. 0.57 for two-lamp ballasts included in 8-foot long fluorescent fixtures, with ballasts rated at 96 Watts or less.

d. The Ballast-Efficiency Factor shall be calculated in accordance with the following equation:

$$BEF = \frac{BF}{\text{Power Input}}$$

where:

BEF = Ballast Efficiency Factor

BF - Ballast Factor, expressed as a percent

Power Input - Total wattage of combined lamps and ballasts.

2. Rapid start, energy-saving ballasts and lamps are not intended for use:

a. In drafty-air locations or when ambient temperatures drop below 60 degrees Fahrenheit;

b. On low power factor lighting ballasts;

c. With dimming ballasts, or with reduced current/reduced light output ballasts; and

d. On inverter-operated emergency lighting systems.

3. Mean lumens were calculated by using the initial vertical-output lumens, and multipling those lumens by 0.8.

APPENDIX "C"

LIGHTING CRITERIA

1. LIGHTING.

a. Design Requirements. The design of interior, exterior, and sports lighting at Army installations will be according to the fundamentals and recommendations of the IES Lighting Handbook, published by the Illuminating Engineering Society (IES), subject to the modifications and clarifications noted in subparagraphs 1.b. through 1.f., below.

b. Lighting Intensities for Facilities. Maintained lighting intensities will conform to those recommended in the current edition of the IES Lighting Handbook, except as modified in this appendix. The IES intensities were published as minimums for specific tasks. However, the IES intensities will be considered as maximum design levels not to be changed significantly except in areas designed for an integrated air-conditioning and lighting system. The recommended intensities required for the predominant specific visual tasks in an area may be provided by the general illumination for the area. However, maintained general illumination will not exceed 75 footcandles [807 lux] in any area, unless otherwise indicated in this appendix. Where fluorescent general lighting levels exceed 50 footcandles [538 lux] in air-conditioned areas, an integrated air-conditioning and lighting system will be evaluated, and the lighting fixtures will meet the necessary requirements.

(1) Conservation Requirements. Normally, general illumination levels in administrative areas will not exceed 50 footcandles [538 lux] at work stations, 30 footcandles [323 lux] in work areas, and 10 footcandles [108 lux] in nonworking areas. These illumination levels, in conjunction with energy conservation, will be obtained by the most life cycle cost-effective techniques including, but not limited to, the following:

(a) Multiple switching of multilamp fixtures or multiple switching of fixture groups in large rooms, or both, to permit lights to be turned off at unoccupied work stations and installing two lamps in four-lamp fixtures having integral toggle switches capable of disconnecting one ballast (two lamps) from the supply source.

(b) Time clock or photoelectric control, or both, of general indoor and outdoor lighting.

(c) Multilevel switched ballasts to provide nonuniform general lighting.

(d) More efficient lighting sources, fixtures, lamps, and use of solid-state ballasts. See Appendix B, paragraph 4, page 2 for caution in use of solid state ballasts.

(e) Grid-type ceilings with the capability of interchanging relocatable panels and lighting fixtures without rewiring. This type of ceiling will provide the flexibility to accommodate changes in functional requirements of the occupants.

(f) Lower wattage lamps (35-watt versus 40-watt fluorescent lamps).

(2) Special Requirements. If an intensity greater than 75 foot-candles [807 lux] is required for a particular task, the additional foot-candles will be provided by

localized (supplementary) lighting. The ratios between general and supplementary illumination will not exceed those recommended by the IES. Supplementary lighting normally will be provided by the user of the facility. However, power for such lighting will be provided by the facility.

(3) Environmental Factors. The finish and color of surrounding surfaces, equipment, and furniture will be selected for reduced glare, increased light use, and acceptable brightness balance. Lighting equipment and layout will be coordinated with other building design features to prevent interferences and to promote a good appearance.

(4) Cross-Reference of DA Facilities to IES Tables: In some instances, the names and functions of facilities used by the Department of the Army are not the same names and functions of similar facilities given in the IES Tables of Recommended Levels of Illumination, IES Lighting Handbook. For the purpose of comparison, the following cross-reference of types of facilities are shown in table 1.

TABLE C-1

DA-IES CROSS-REFERENCE OF FACILITIES

DA Facility Designation Name or Function	IES Tables Designation Name or Function
Administrative Areas	Offices, Drafting, Conference, and Accounting Rooms
Chapels	Churches and Synagogues
Classroom Buildings	Schools
Confinement Facilities	Municipal Buildings-Fire and Police
Dining Facilities	Food Service Facilities
Exchange Facilities	Stores
Parking for Military Vehicles (with minor repair areas)	Parking Areas and Service Stations
Service Clubs	Applicable Areas of Auditoriums, Food Service Facilities, Offices, Schools, and Stores
Unaccompanied Personnel Housing	Hotels
Vehicle Maintenance Facilities	Garages and Service Stations
Warehouses	Storage Rooms or Warehouses

(5) Hangar Illumination. The maintained general illumination level of hangars will not exceed 75 footcandles [807 lux].

(6) Warehouse Illumination. The general illumination level in warehouses will not exceed the values shown in table 2 as measured at 4 ft. [1.2 m] above the finished floor.

TABLE C-2

ILLUMINATION IN WAREHOUSES

Types of Warehousing	Intensity Footcandles	[Lux]
Active-Bulk 1	10	108
Bin 2	5	54
Inactive	5	54
Mechanical Material Handling:		
Accumulative Conveyor Lines (Unmanned)	10	108
Control Centers and Stations	30	323
Loading and Unloading Areas	20	215
Rack	20	215

1 Main aisles may be lighted to 15 footcandles [161 lux].

2 Specialized lighting designed to illuminate the bins, as required, will be provided by the building user.

(7) Exterior Sports Illumination. Outdoor sports lighting will conform to the classifications stated in the IES Lighting Handbook as shown in table C-3.

TABLE C-3

IES SPORTS CLASSIFICATIONS

Sports Activity	IES Classification
Baseball	Municipal and Semiprofessional
Football	Class III or IV
Softball	Industrial League
Other	Recreational

(8) Illumination in Functional Areas of Other Facilities. The general illumination levels in functional areas of other facilities will not exceed the intensities shown in table C-4.

TABLE C-4

ILLUMINATION IN FUNCTIONAL AREAS OF OTHER FACILITIES

Functional Areas	Intensity Footcandles	[Lux]
Accounting Rooms	75	807
Auditoriums	20	15
Cafeterias	25	269
Computer Rooms	50	538
Conference Rooms	30	323
Corridors	10	108
Drafting Rooms	75	807
Elevator Machine Rooms	15	161
Emergency Generator Rooms	15	161
Garage Driving and Parking Areas	5	54
Garage Entrances	30	323
General Office Space	50	538
Janitors' Closets	5	54

TABLE C-4 (Continued)

ILLUMINATION IN FUNCTIONAL AREAS OF OTHER FACILITIES

Functional Areas	Intensity Footcandles	[Lux]
Kitchens	70	753
Lobbies	15	161
Lounges	15	161
Mechanical and Electrical Equipment Rooms	15	161
Parking Lots	0.5	5
Stairways	20	215
Storage Rooms	5	54
Switchgear Rooms	15	161
Toilet Facilities	20	215
Transformer Vaults	15	161

(9) Special Facility Illumination. When fluorescent or high-intensity discharge lighting is prohibited and the required intensity exceeds 30 footcandles [323 lux], the general lighting system should be designed for incandescent lighting of 30 footcandles [323 lux] with supplementary incandescent lighting for specific tasks where required.

c. Emergency Lighting. Emergency lighting systems will be provided in accordance with the requirements of NFPA 101. Provisions will be made to transfer the exit lighting system to a standby generating source in facilities with standby electric power systems. Emergency supplementary incandescent or fluorescent lighting of one footcandle [10.76 lux] will be provided along aisles and walkways in high-bay areas where high-intensity discharge lighting is used. In buildings with large electrical loads, full consideration will be given to the possible economies from the use of higher voltages or frequencies, or both, for the lighting system. See subparagraphs 2.b.(1) and (2), below.

d. Exit Lighting. Exit lighting and exit signs will conform to NFPA 101. Exits, exterior steps and ramps will be adequately lighted to prevent accidents. Separate lighting will not be provided if street or other permanent lighting provides at least one footcandle [10.76 lux] at the exit, exterior steps or ramps.

e. Maintenance Area Lighting. Crawl spaces with utility services, interior utility tunnels, and walk-in pipe chases will be lighted as required at approximately one footcandle [10.76 lux] for the safety of maintenance personnel. Switches for these lights will be equipped with pilot lights and located in areas that are normally occupied.

Keyed switches may be used if required. Receptacles will be located at reasonable intervals in these maintenance areas for temporary work lights and portable tools.

f. Street, Area, and Security Lighting.

(1) Street and Area Lighting. Streets, parking areas, and walks in administrative, community support, and residential areas will be lighted to provide safe pedestrian and vehicular circulation. Lights will be at street intersections and between intersections at a spacing of approximately 150 ft [45.8 m] to 200 ft [61 m]. Walks and steps in public walks, not adjacent to streets, will be separately lighted. Control of exterior street and area lighting normally will be automatic timers or photoelectric cells, or both.

(2) Security Lighting. Since most security lighting must meet specialized requirements, the lighting will be designed to meet the needs of the users, using the most energy-efficient lighting practicable.

g. Installation Requirements.

(1) Unaccompanied Enlisted Personnel Housing (UEPH). In open sleeping areas, low-level night lights will be located so that beds are not directly illuminated. Sleeping rooms may have a night light or a secondary room light of low illumination located to facilitate moving about during night hours without disturbing sleeping occupants, and will have one or more switches conveniently located inside the room to control the general room illumination. UEPH with open sleeping areas or partial partitions will have separate switches in an easily accessible location for each subarea. Switches will be located so that access is not blocked by double-decked beds or lockers. Luminaries used in UEPH with open areas, or UEPH with partial partitions, will direct the light into the area served by each switch so that spillage into adjacent areas is held to a minimum.

(2) Communications Facilities. General lighting will be arranged parallel to equipment aisles, when possible, to provide maximum illumination and to avoid overhead cable trays. In areas where manual equipment is used, operator efficiency must be assured by carefully positioning luminaries to avoid glare and excessive light on the face of the equipment, while maintaining a reasonable light level on the horizontal surfaces. Supplementary lighting may be provided over work benches in maintenance and test areas.

(3) Officers' Open Messes, NCO Open Messes, and Service Clubs. Ballrooms and lounges serving multiple functions will have the general lighting arranged for multiple switch control so that different intensities may be selected. Small hand-operated dimmers may be used, in lieu of multiple switch control, provided that the costs are comparable. Facilities will be provided to permit connections of portable spots, floods, or accent lights as required. For the general lighting, ballrooms may be provided with motor-operated dimmers controlled from the bandstand and main entrance.

(4) Training Facilities.

(a) Classroom lighting immediately in front of the lecture platform may be controlled from a point convenient to the speaker's platform and also at the entrance to the room. Auditorium lighting may be controlled by motor-operated dimmers from the platform (off stage) and the main entrance to facilitate use of audio-visual aids. Lighting may also be controlled from those points by switches. Low-level lighting capability will be provided so that notes may be taken during the use of visual aids.

(b) Indoor rifle ranges will be provided with indirect or low-brightness luminaries in the firing area to avoid undesirable reflections. Target luminaries and those luminaries in the firing lanes will be protected by shields from stray bullets.

(5) Warehouse Facilities.

(a) Lighting arrangements will suit the employed warehousing techniques. For pallet storage, the general lighting may be confined to the aisles with supplementary lighting units provided in the aisles and directed to illuminate the storage areas. Storage area lighting will be controlled separately from the aisle lighting. Trolley-mounted luminaries may be employed where the shifting of the luminaries is practicable. Lights will be controlled from panelboards, except that lights at aisle intersections and in- termediate key points may be remotely controlled by low-voltage switches from multiple points to permit passage of security guards and access to panelboards.

(b) Provisions will be made at loading platform doors for supplementary or portable lighting for the illumination of truck or rail car interiors.

(6) Weapons Systems Control Areas. Lighting for weapons systems control areas will be specially engineered. Low levels of lighting may be required to permit observation of luminous panels without reflected glare or undesirable contrasts in brightness. Separately controlled luminaries will be provided for normal illumination operations and cleaning purposes.

h. Luminaries. Generally, luminaries will be standard commercial types and will conform to the applicable Underwriters' Laboratories, Inc., Standards.

(1) Architectural Considerations. Luminaries will be integrated with the interior design of rooms or areas. The correct use of luminaries is of special importance in large rooms or areas with high or sloping ceilings, or both. Therefore, the type and hanging of luminaries will ensure that the desired architectural effect and function of the space are not impaired. Where facilities are modified for different uses, luminaries will be installed at the most economical height and manner to provide for the new functions.

(2) Specialized Luminaries. Specialized luminaries may be provided when required by the seeing task or architectural treatment of the building. For specific areas, explosion-proof, dust-tight, dust-ignition proof, or weatherproof luminaries will be provided according to the requirements of NFPA 70, National Electrical Code.

2. INTERIOR ELECTICAL FACILITIES.

a. Codes. Electric lighting and power systems within buildings and facilities will be installed according to the latest revisions to the applicable National Fire Protection Association (NFPA) Codes.

b. System Characteristics. System characteristics will provide for the most economical and efficient distribution of energy.

(1) Voltages. Voltages will be of the highest order consistent with the load served. Single-phase 120/240 or three-phase 208Y/120 volts will generally be used to serve combined incandescent and fluorescent, high-intensity discharge lighting, and small power loads. Where practical and economically feasible, a three-phase 480Y/277 volt system will be used. Other voltages may be used where required.

(2) Frequencies. Where other than 60 Hz power is supplied, for example 50 Hz, the frequency supplied will be used where practical. Where frequencies other than that locally available are required for technical purposes, frequency conversion equipment may be provided, or if economically justified, generation equipment may be installed. Such equipment normally will be provided by the user of the facility. For special facilities where inhouse prime generation must be provided and gas turbines are used, consideration will be given to higher frequency generation, for example 800 Hz, to achieve greater efficiency from fluorescent lighting and to simplify the speed reduction from turbine to generator.

REFERENCES

12-1 "Illuminating Engineering Society (IES) Lighting Handbook," Illuminating Engineering Society, 345 East 47th Street, New York, NY 10017

12-2 NFPA 101, "National Fire Protection Association Life Safety Code," National Fire Protection Association, Battermarch Park, Quincy, MA 02269

12-3 Underwriters' Laboratories, Inc., Publications (available from Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120)

12-4 NFPA 70, "National Electrical Code," National Fire Protection Association.