Listing Constructional Data Report (CDR)

1.0 Reference and Address			
Report Number	240923091GZU-001	Original Issued: 28-Oct-2024	Revised: 22-Apr-2025
Standard(s)	Luminaires [UL 1598:2021 Ed.5+R:18Jun2021] Luminaires [CSA C22.2#250.0:2021 Ed.5+U1]		

Applicant	Zhongshan Dengku Lighting Co., Ltd	Manufacturer	**Zhongshan Dengku Lighting Co., Ltd**
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2.0 Product Description	
Product	General Coverage Luminaires
Brand name	NA
Description	Products covered by this Report are General Coverage Luminaries utilizing Incandescent type light sources as allowed within this report. The products are to be installed in accordance with all applicable intallation codes. Products and configurations not covered by this report are: - Type IC Recessed Luminaires - Wet Location Luminaries - HID Luminaries - Tungsten-Halogen Incandescent Luminaries - Luminaries Suitable for use with through Branch Circuit Conductors - Luminaries for Use as Air Handling Registers - Luminaries for use in Environmental Air Handler Spaces - Luminaries for Use in Exhaust Ducts or Foods above Cooking Equipment - Luminaries for Use in Elevated Ambient - Open Wiring System Luminaries - Landscape Lighting - Low Voltage Lighting Systems - Illuminated Cabinets or Furnishings - Marine or Underwater Luminaries - Hazardous Location Luminaries - Portable Luminaries, Hand Lamps, Stage/Studio Lighting - Medical or Dental Lights - Emergency Lighting - Germicidal Products
Models	PDK, CDK or WDK; followed by up to twenty characters.
Model Similarity	Model PDK followed by up to twenty characters denote pendent luminaire; Model CDK followed by up to twenty characters denote ceiling mount luminaire; Model WDK followed by up to twenty characters denote wall mount luminaire.
Ratings	The maximum input power is determined by the summation of individual incandescent wattage.
Other Ratings	NA

3.0 Product Photographs

Photo 1 - Representative photo not shown as no specific photos are used in this report.

4.0 Critical Components

Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
1	1	Luminaire	Various	Various	See Section 6 for specific requirements for construction of luminaires.	cULus or cCSAus or cETLus

NOTES:

1) Not all item numbers are indicated (called out) in the photos, as their location is obvious.

2) “Various“ means any type, from any manufacturer that complies with the "Technical data and securement means" and meets the "Mark(s) of conformity" can be used.

3) Indicates specific marks to be verified, which assures the agreed level of surveillance for the component. "NR" - indicates Unlisted and only visual examination is necessary. "See 5.0" indicates Unlisted components or assemblies to be evaluated periodically refer to section 5.0 for details.

5.0 Critical Unlisted CEC Components

No Unlisted CEC components are used in this report.

6.0 Critical Features

6.1 - 6.3 Reserved for future use.

6.4 Components

Recognized Component - A component part, which has been previously evaluated by an accredited certification body with restrictions and must be evaluated as part of the basic product considering the restrictions as specified by the Conditions of Acceptability.

Listed Component - A component part, which has been previously Listed or Certified by an accredited Certification Organization with no restrictions and is used in the intended application within its ratings.

Unlisted Component - A part that has not been previously evaluated to the appropriate designated component standard. It may also be a Listed or Recognized component that is being used outside of its evaluated Listing or component recognition.

Critical Features/Components - An essential part, material, subassembly, system, software, or accessory of a product that has a direct bearing on the product's conformance to applicable requirements of the product standard.

All components shall be Listed by a Nationally Recognized Testing Laboratory for the intended application. All components shall be used in an application consistent with the component evaluation, and used within their listed ratings except as allowed in section 4.

Fluorescent ballast shall have a rating consistent with the application and consistent with the marking on the luminaire. Open core and coil constructions (i.e., ballasts without complete metal enclosures) are intended for use within an overall enclosure.

In general, the use of generic (manufacturer's name and type designation not controlled) Recognized Components in luminaire constructions is not allowed. However acceptability of the following recognized components may be evaluated at the factory:

a) Marking and Labeling Systems – A Recognized Component Marking and Labeling System (reference clause 20.1.7) shall be rated for the type of surface to which it is affixed and for a temperature of at least 150˚C.
b) Appliance Wiring Material – Any Recognized Component AWM complying with the construction details of this report.
c) Insulating Bushing – Recognized Component used for protection of conductors that pass over edges of metal.
d) Other Recognized Components – No other Recognized Components may be utilized in General Coverage Luminaries unless they are specifically itemized and described in this Report Section 23.

Construction Details - For specific construction details, reference should be made to the photographs and descriptions. All dimensions are approximate unless specified as exact or within a tolerance. In addition to the specific construction details described in this Report, the following general requirements also apply.

6.0 Critical Features

6.5 Mechanical

6. 5.1 GENERAL COVERAGE LUMINAIRE DETAILS – MECHANICAL

6. 5.1.1 A part removed during user maintenance shall be designed to prevent replacement in a position that would affect the intended operation or be marked to indicate proper replacement. There shall be no sharp edges, burrs or method of construction that could damage electrical insulation or reduce spacings. See Section 6.20.2 for Marking Format Tables (S16-L5, etc.).

6. 5.2.1 ASSEMBLY AND PACKAGING

All splices and electrical connections shall be completed at the factory, unless packaging requires partial disassembly. Only assembly and electrical connections that can be accomplished with ordinary tools or tools supplied with the luminaire shall be completed at the installation site. A luminaire that requires partial assembly in the field shall be provided with assembly instructions as specified in **item 33 of table in section 6.20**.

All the parts required to complete a luminaire shall be shipped together, or shipped separately and marked in accordance with **item 1.8 of table in section 6.20**, except for the decorative glassware. An unassembled luminaire with accessible non-current-carrying parts that can be energized after the luminaire is installed shall be provided with means for fastening and bonding those parts. The use of screws or snap-in or tab-mounted parts shall meet the intent of this requirement.

The number of conductors shall not exceed 5 when using a twist-on wire connector for field wire connection. Conductors intended for field connection shall have matching identification by color, number, letter, or other acceptable means. A field connection between conductors of adjoining sections shall be accessible for inspection without the disconnection of any portion of the wiring

6. 5.3 ENCLOSURE

A luminaire enclosure shall be constructed of metal, glass or ceramic (3 mm (0.118 in)) shall perform the following functions:

a) reduce the risk of contact with live parts;
b) enclose electrical parts and components that can involve a risk of fire;
c) protect internal parts from mechanical damage; and
d) protect internal parts from the environment.

All splices, open coil devices, capacitors, leads or terminals for field connection of supply wires, and other

6. 5.4 BARRIERS

A barrier shall be constructed of one of the following:

a) ferrous or nonferrous metal at least 0.41 mm (0.016 in) thick;
b) glass or ceramic at least 3 mm (0.118 in) thick;
c) impregnated glass fiber sleeving at least 0.25 mm (0.010 in) thick that is rated for the temperature involved;
d) vulcanized fiber at least 0.71 mm (0.028 in) thick

6.0 Critical Features

6 .5.5 THICKNESS OF METAL ENCLOSURE

Sheet metal and extruded aluminum shall be in accordance with Table 1 or be submitted to Intertek.

Cast metal shall be in accordance with Table 2 or be submitted to Intertek.

The thickness of a metal surface for mounting a convenience receptacle of the snap-in type shall comply with the receptacle manufacturer's metal thickness specification but shall not be less than 0.51 mm (0.020 in).

6 .5.6 CORROSION PROTECTION

All ferrous metal parts, including hinges, bolts, and fasteners, exposed after assembly shall be protected against corrosion by painting, coating, or plating. Copper, aluminum, alloys of copper and aluminum, stainless steel, and similar materials having inherent resistance to atmospheric corrosion are not required to have additional corrosion protection. Edges, punched holes, and spot welds in prefinished steel, enclosed steel pipe, and hanger locations for painting or plating in ferrous metals do not require any corrosion protection. The above requirements shall not apply to the following:

a) bearings, sliding surfaces of a hinge or shaft, hinge pins, and similar parts located on the exterior of enclosures where such protection is not practicable; and
b) decorative parts.

Vitreous enamels may be used as a protective coating for ferrous sheet metal having a minimum thickness of 0.6 mm (0.025 in).

6.0 Critical Features

Table 1
Minimum thickness of uncoated sheet metal and extruded aluminum for enclosures

Specific construction		Steel				Copper, brass, aluminum sheet, and extruded aluminum			
		Unreinforced		Reinforced		Unreinforced		Reinforced	
		mm	inch	mm	inch	mm	inch	mm	inch
At opening for conduit connection		0.66	0.026	0.66	0.026	0.81	0.032	0.81	0.032
Length more than 660 mm (26 in)	No electrical component support	0.51	0.020	0.41	0.016	0.56	0.022	0.43	0.017
	Electrical component support	0.66	0.026	0.51	0.020	0.71	0.028	0.56	0.022
Length not more than 660 mm (26 in)	No electrical component support	0.41	0.016	0.33	0.013	0.51	0.020	0.41	0.016
	Electrical component support	0.51	0.020	0.41	0.016	0.64	0.025	0.51	0.020
Length not more than 380 mm (15 in)	No electrical component support	0.41	0.016	0.33	0.013	0.51	0.020	0.41	0.016
	Electrical component support	0.41	0.016	0.41	0.016	0.51	0.020	0.51	0.020

NOTES
(1) "Reinforced" refers to a form of construction that provides equivalent mechanical strength.
(2) "No electrical component support" refers to the minimum thickness required for mounting of non-electrical parts.
(3) Examples of acceptable methods of reinforcement are

(a) a single piece of sheet metal that is formed to result in a maximum internal angle of 120 degrees;
(b) 13 × 13 mm (0.5 × 0.5 in) 90 degrees formed from sheet steel, 0.81 mm (0.032 in) minimum thickness, used to divide a surface into small sections and, unless along the greater dimension, are additionally secured to the adjacent sides of the enclosure;
(c) flat steel bars, 9.5 mm (0.375 in) wide minimum, 3.2 mm (0.125 in) thick minimum, used and secured as in (b); and
(d) curved, ribbed, or flanged surfaces. A surface is considered to be flanged if the two opposite sides are bent 13 mm (0.5 in) or wider at right angles to the surface.

(4) For coated or finished metals, the minimum thickness is considered to be obtained if the overall thickness exceeds that required in this table by at least 0.013 mm (0.0005 in) for each side coated or finished.
(5) "Length" refers to the longest straight line that can be drawn on any unreinforced flat section.

Table 2
Minimum thickness of cast metal for enclosures

Material	Unreinforced		Reinforced	
	mm	inch	mm	inch
Cast metal	3.2	0.126	2.4	0.094
Cast malleable iron	2.4	0.094	1.6	0.063
Permanent mold – cast aluminum	2.4	0.094	1.6	0.063
Die-cast metal	2.0	0.079	1.2	0.047

NOTE Reinforced dimensions are acceptable at the root of threads, for a surface that is curved or otherwise reinforced, and for a surface of such shape or size, or both, that the strength contemplated is provided. Areas for breakouts or similar reasons, may have thinner sections providing the strength of structure is not affected, but in no case be thinner than permitted for sheet metal. See Table 5.5.1.

6 .5.7 POLYMERIC ENCLOSURE, BARRIER AND METALLIZED PARTS
Not to be used unless submitted to Intertek for evaluation and specifically described in Section 4.

6.0 Critical Features

6 .5.8 BAFFLES

A baffle shall:

a) Be made of metal that complies with the minimum thickness of enclosure; or
b) If made of perforated material, have one of the following constructions:

1) A galvanized steel screen, or the equivalent, having a 14 x 14 mesh per square inch and wire with a minimum diameter of 0.46 mm (0.018 in);

2) A perforated metal plate, having evenly distributed openings that are not more than 11 per cm^2 (71 per in^2) and that have a maximum dimension of 1.6 mm (0.63 in)

6 .5.9 CONDUIT KNOCKOUTS AND TWISTOUTS

A conduit knockout or twistout shall be secured in place so it can be removed without distorting the enclosure but it remains in place during normal handling and shall comply with the conduit knockout and twistout test. To be initially evaluated by Intertek. See Table of Type Tests Section 6.14.

6 .5.10 MECHANICAL JOINTS AND FASTENINGS

The method of making a joint shall provide strength and rigidity and prevent turning that can result in movement of conductors or wiring devices after the assembly is completed.

Self-threading screws, including sheet-metal crews, used to secure electrical or enclosure component parts in place or together, shall comply with the self-threading screw torque test when the screw threads into nonferrous metal or polymeric material. A self-threading or sheet metal screw used for mounting or supporting a part that weighs more than 3.4 kg (7.5 lb) per screw shall comply with the self-threading screw torque test. If threads of sheet-metal or self-tapping screws extend into a wiring compartment for a distance of more than 5 mm (0.2 in), the conductors shall be reliably positioned away from the projecting screws, or the conductors shall be sufficiently loose to prevent damage to the insulation.

Frictional contact between parts alone shall not be acceptable as means of preventing turning. Turning may be prevented by the use of a suitable lockwasher properly applied, a locknut seated against another nut, or an equivalent threaded assembly, or by some other equivalent method such as swaging or suitable adhesive. A sheet metal nut for bolts larger than 6.4 mm (0.250 in) in diameter may be used to prevent turning or loosening if it is not depended upon for mechanical strength. Sheet-metal nuts fabricated of heat-treated steel may be used:

a) For assembly;
b) To prevent turning of threaded tubing no larger than 1/4 IPS; or
c) On bolts or studs that are no larger than 6.4 mm (0.250 in) in diameter.

When used as a supporting device, unthreaded tubing joints shall comply with the loading test.

Fasteners, such as ferrules secured to the end of steel support cable, cast metal fasteners, such as chains, hooks, threaded nipples, and hickeys used to support all or part of the luminaire, shall comply with the loading test.

6.0 Critical Features

Enclosure parts shall be secured by positive mechanical means, such as screws, welding, or interference fit. Enclosure parts may be secured by frictional contact alone under the following conditions:

a) the part does not have a knockout or conduit opening and complies with the snap-in or tab-mounted parts pull test without conduit opening; or
b) The part has a knockout or conduit opening and complies with the snap-in or tab-mounted parts pull tests with conduit opening.

Snap-in and tab-mounted parts that are secured together by interference fit alone and that have a knockout or conduit opening shall comply with the snap-in and tab-mounted parts test with conduit opening.

Decorative parts of a luminaire secured by friction alone or an adhesive alone shall comply with the loading test.

All above tests are to be initially evaluated by Intertek. See Table of Type Tests Section 6.14.

An assembly of glass and frame or glass and recessed trim, where the combination is secured to the luminaire using friction such as spring loaded clips, shall comply with the loading test and be initialy evaluated by Intertek.

6 .5.11 MEANS OF MOUNTING

A luminaire shall have means for mounting, and if special hardware is required, the hardware shall be provided and shall comply with the loading test to be initially evaluated by Intertek. See Table of Type Tests Section 6.14.

6 .5.12 MOVABLE JOINTS

A movable joint, such as a swivel joint or telescoping arm, containing conductors shall be constructed so that movement of the joint will not result in damage to the insulation of conductors. Rotation shall be limited to 370 degrees, or the movable joint shall comply with the movable joint endurance test as conducted initially by Intertek and specifically described in Section 4 of this Report.

A movable joint containing conductors shall comply with the movable joint torsion and pull tests and shall remain intact and operable

Above tests to be initially evaluated by Intertek. See Table of Type Tests Section 6.14.

6 .5.13 RACEWAY TUBING

Tubing shall be free from kinks or cracks, and if it is:

a) unthreaded metal tubing, it shall be at least 0.5 mm (0.020 in) thick;
b) threaded metal tubing, it shall be at least 1.0 mm (0.040 in) thick; or
c) metal tubing with rolled threads, it shall be at least 0.5 mm (0.020 in) thick

6 .5.14 CONDUCTOR PROTECTION

Conductors that pass over edges or through openings in metal shall be secured from contacting the edges or be protected from cutting and abrasion. For sheet metal less than 1.1 mm (0.042 in) thick, protection shall be provided by one of the following methods:

a) rolling the edge of the metal not less than 120 degrees;
b) a bushing or grommet of a material other than rubber at least 1.2 mm (0.047 in) thick; or
c) glass sleeving at least 0.25 mm (0.010 in) thick.

6.0 Critical Features

6 .5.15 STRAIN RELIEF

A strain-relief shall be provided for a flexible cord or conductor that can be subjected to pulling, pushing, flexing, or twisting after the luminaire has been installed. A strain-relief device, including a bushing with an integral strain-relief means, shall be designed to limit the holding pressure without damaging the cord jacket or conductor insulation.

A strain relief for a flexible cord shall comply with the 15.9 kg (35 lb) strain-relief test.

A strain relief shall be provided at both ends of a flexible cord when the cord supports a luminaire or luminaire part.

A strain relief shall be provided at only one end of a flexible cord under the following conditions:

(a) the cord is attached directly to a wiring device, such as an attachment plug, by the wiring device manufacturer; or
(b) comply with the strain-relief test.

A strain relief shall not be required at the canopy end of a cord-pendant luminaire if instructions, in accordance are furnished with the luminaire to show the method of strain relief that shall be applied in the field, such as a knot in the cord.

A cord-equipped luminaire without an attachment plug shall be provided with one of the following:

a) a strain-relief device for use in a standard conduit opening; or
b) instructions to identify the strain relief to be used, in accordance.

The strain relief for a conductor shall comply with the pull test.

Above tests to be initially evaluated by Intertek. See Table of Type Tests Section 6.14.

6 .5.16 GLASS

Edges of glass accessible during normal use or maintenance shall be seamed, swiped, fire-polished, or similarly treated to eliminate sharpness.

The minimum thickness and exposed area of glass used as an enclosure shall be in accordance with Table 3.

Table 3
Thickness of glass panels

Exposed area of glass		Minimum thickness of glass			
		Flat glass		Curved glass	
cm^2	in^2	mm	in	mm	in
0 – 968	0 – 150	2.11	0.083	2.11	0.083
969 – 3226	150 – 500	2.54	0.100	2.11	0.083
3227 – 7097	500 – 1100	3.56	0.140	2.54	0.100
7098 – 9316	1100 – 1444	3.56	0.140	2.54	0.100

6.0 Critical Features

The minimum thickness and exposed area of flat glass panels smooth or otherwise shall be in accordance with Table 3.

The minimum thickness and exposed area of glass that is curved or bent, or of globes of any shape shall be in accordance with Table 3 unless the exposed area is less than 1774 cm^2(275 in^2).

Untempered glass that is not in accordance with the minimum thickness shown in Table 3 shall be submitted to Intertek for evaluation and shall be described in section 4 of the report.

Tempered glass that is not in accordance with the minimum thickness and exposed area shown in Table 3 shall comply with the tempered glass impact test to be initially evaluated by Intertek and specifically described in this Report Section 4.

The minimum thickness of fluted, ribbed, or patterned glass shall be measured from a valley of one side to the other flat side, or between valleys on opposite sides

6 .5.17 GLASS SUPPORT

Glass shall be secured in place and shall not be subjected to undue strain that can result in breakage or release during normal use or maintenance. Glass mounted in a frame that is required to be opened or removed for maintenance shall be secured to the frame.

Clips that are used to secure a glass panel to the frame shall overlap the glass at least 5 mm (0.20 in).

An adhesive material used as the sole support of glassware shall comply with the adhesive support test to be initially evaluated by Intertek and specifically described in this Report Section 4.

A channel or frame for holding glass diffusers shall be:

a) Steel at least 0.4 mm (0.016 in) thick;
b) Nonferrous metal at least 0.5 mm (0.020 in) thick; or
c) Polymeric material at least 1.5 mm (0.059 in) thick.

Glass globes, glass panels, or decorative glass parts shall be secured by one or more of the following means:

a) A circular fitter with at least three supports;
b) A threaded stud and nut;
c) A threaded glass part and associated fitter;
d) A frictional contact assembly that complies with the glass support test;
e) An adhesive that complies with adhesive support test shall be described in section 4 of report with details;
f) Its own weight in a frame or fitter that is not hinged; and
g) A straight rod with a stop or a hook through a hole in the glass.

6.0 Critical Features

6 .5.18 THERMAL INSULATION

Thermal insulation shall be fire-resistant material, such as glass fiber or inorganic material. If polymeric material is to be used, it needs to be initially evaluated by Intertek and specifically described in Section 4.

Thermal insulation shall be reliably secured in place. It shall be attached to the luminaire in the correct position by at least one of the following means:

a) Staples or bolts;
b) Adhesive applied to at least one-third of the surface of the insulation;
c) Parts of the luminaire that do not have to be removed for installation. A supply conductor projecting through the insulation is not acceptable for securing the insulation in place; and
d) Other means if investigated and found to be mechanically equivalent.

Thermal insulation shall not be located within 6.4 mm (0.25 in) of any opening for the connection of conduit unless the insulation is attached to a cover or other part that will be removed when conduit is being attached to the luminaire.

Glass fiber thermal insulation provided as an integral part of the luminaire shall have a minimum density of 9.6 kg/m^3 (0.6 lb/ft^3)

6 .5.19 CONTINUOUS ROW MOUNTING

General Coverage Luminaries are not to be evaluated for continuous row mounting.

6 .5.20 RACEWAYS

General Coverage Luminaries are not to be evaluated or provided with raceway for conductors of other circuits

6.6 Electrical

6 .6.1 **GENERAL COVERAGE LUMINAIRE DETAILS – ELECTRICAL**

Current Carrying Parts shall be copper, copper alloy, nickel alloy, or stainless steel.

6 .6.2 WIRING DEVICES

A wiring device shall be rated for the temperatures, locations, voltage, and current encountered during normal operation.

A luminaire incorporating a wiring device rated for ac use shall be marked with the frequency or for ac use only, in accordance with: **items 1.4 or 3.7 of table in section 6.20.**

A wiring device shall be prevented from any turning that can apply tension to conductor connections, result in damage to the conductor, or otherwise adversely affect the assembly. Friction alone between the mating parts of the assembly shall not be acceptable as a means to prevent turning.

Parts of wiring devices that are removable from outside the enclosure without the use of ordinary tools shall not result in access to live parts within the enclosure.

An attachment plug assembled to a flexible cord for connection to a branch circuit shall not be used with General Coverage Luminaries unless evaluated by Intertek and specifically described in this Report Section 4.

6.0 Critical Features

6 .6.3 LAMPHOLDERS

A lamp holder of a luminaire shall be suitable for the application. A lamp-supported lamp holder shall be provided with stranded conductors. A husk or sleeve made of treated cellulosic fiber, provided to electrically insulate the terminals and screwshell of a lamp holder, shall be at least 0.8 mm (0.032 in) thick and shall be positively retained.If the husk or sleeve is not positively retained and the wire terminals of the lampholder are accessible with the husk or sleeve removed, they shall be additionally enclosed in accordance with Clause 6.5.3. The screwshell of a lamp holder directly supplied by the branch circuit shall be connected to the neutral grounded conductor.

6 .6.4 SWITCHES

A switch shall have a minimum ampere rating equal to the total load current it controls multiplied by the load factor shown in Table 4

Table 4
Switch rating load factor

Type of load	Special use switches				General use switches
	L-rated (ac only)	T-rated (ac/dc)	Ampere rated (ac only)	Ampere rated (ac/dc)	Ampere rated (ac only)
Tungsten filament	1	1	3	3	1
Inductive	1	1	2	2	1
Receptacle	1	1	3	3	1

A single-pole switch shall not be connected in the neutral grounded conductor. When a single-pole photo control switch is used on a line-to-line supply, the luminaire shall be marked with a caution to disconnect the power before servicing, in accordance with: **items 3.6 and 3.19 of table in section 6.20.**

A luminaire provided with a receptacle for a photo control shall be:

a) shipped with the control or shorting plug; or
b) marked to require the installation of the control or plug, in accordance with: **in item 1.20 of table in section 6.20.**

6 .6.5 RECEPTACLES

A convenience receptacle in a luminaire shall be a grounding type and marked for maximum load in accordance with: **items 3.3 or 3.4 of table in section 6.20.**
A luminaire may be provided with a maximum of one duplex or two single convenience receptacles.

6.0 Critical Features
6 .6.6 FUSES & FUSEHOLDERS A replaceable fuse shall be of the type that requires mounting in a fuse holder. The fuse identification and ampere rating shall be marked on or adjacent to the fuse holder with **item 3.5 of table in section 6.20**. A fuse holder shall disconnect all ungrounded conductors of the supply circuit simultaneously during fuse replacement. In the United States, the fuse holder is not required to disconnect all ungrounded conductors during fuse replacement. A fuse shall not be connected in the neutral grounded conductor.
6 .6.7 BALLASTS A General Coverage Luminaire incorporating a ballast shall not have an open circuit voltage of more than 1000 V. A ballast required to operate lamps of the type and wattage for which the luminaire was designed shall be provided with the luminaire and shall be wired in accordance with the diagram or instructions on or with the ballast. When a ballast is intended to be connected to the line with an auto-transformer or an auto-transformer type ballast, Intertek will need to evaluate and specifically describe in the Report Section 4.
6 .6.7.1 LUMINAIRES WITH REMOTE BALLASTS OR TRANSFORMERS Reserved for future use. To be evaluated by Intertek
6 .6.8 CAPACITORS Reserved for future use. To be evaluated by Intertek

6.0 Critical Features

6 .6.9 CONDUCTORS AND CORDS

Current-carrying conductors shall be copper, copper alloy, or nickel alloy.

Conductors shall be minimum No. 18 AWG, except as specified, and shall be rated for the voltage, current, temperature, and condition of service to which they will be subjected

For cETL products, the conductors must be in accordance with Table 5 (CAN).
For ETLus products, the conductors must be in accordance with Tables 6 (USA) and 7 (USA).
For cETLus products, the conductors must be in accordance with Tables 5 (CAN), 6 (USA) and 7 (USA).

A conductor or cord that can be flexed because of an adjustable, movable, or flexible part of a luminaire shall be of the stranded type and shall be secured so it will not be cut or abraded under conditions of intended use, including relamping, servicing, and inspection of supply connections.
In a luminaire construction that allows the conductor or cord to be pushed back into the luminaire, the temperature rating of the conductor or cord shall be suitable for the operating temperature of any component it can contact.

An insulated conductor, including each insulated conductor of a cord, that is rated for 90 °C, 105 °C, or 125 °C shall be considered as rated for 150 °C if each conductor is individually provided with supplemental insulation consisting of snugly fitting woven glass fiber sleeving having at least a 0.25 mm (0.010 in) wall thickness or at least two layers of glass fiber tape that provide a total thickness of at least 0.25 mm (0.010 in).

An insulated wire connector having a voltage rating less than that required for the application may be used if the splice, including the connector, is additionally covered with insulation rated for the voltage difference between the required voltage and the rated voltage of the connector.

Conductors of a size smaller than 24 AWG (0.21 mm2) may be used under the following conditions:

(a) The conductors are in Class 2 power limited circuits only;
(b) The current carrying capacity of the conductor is not exceeded and is sufficient to carry the continuous normal load current without any temperature related issues; and
(c) The construction complies with Item (1) or (2), as follows:

(1) The conductors shall have an insulation rating not less than the voltage on the conductor and be stranded if accessible during use or maintenance, or inaccessible but subject to movement during maintenance, or

(2) The luminaire shall be provided with a barrier to prevent contact with wiring that is not connected to a Class 2 circuit. The width of an opening between a barrier and adjacent parts shall not exceed the diameter of the Class 2 circuit wire. This dimension shall be measured between the barrier and the enclosure walls, components, or the like that serve as part of the compartment for the Class 2 wiring.

Table – 5 (CAN)
CEC conditions of use and conductor temperature ratings for flexible cords and equipment wires.

6.0 Critical Features

Table 5 (CAN)

CEC conditions of use and conductor temperature ratings for flexible cords and equipment wires

Location	Usage	Description	Type	Rating, Volts	Temp. (°C)	Notes
Dry	Not Hard Usage	Equipment Wire	GTF	600	125	1
Dry or Damp	Not Hard Usage	Flexible Cord Equipment wire	HPN	300	90	
			SPT-1	300	60	2
			SPT-1	300	105	
			SPT-2	300	60	
			SPT-2	300	105	
			SPT-3	300	60	
			SPT-3	300	105	
			SV	300	60	
			SVO	300	60	
			SVT	300	60	
			SVT	300	105	
			CL751	300	75	
			CL901	600	90	1
			CL1051	300	105	
			CL1251	600	125	1
			CL1251-R3	600	150	1
			CL1502	600	150	1
			REW (0.015)	300	105	
			REW (0.030)	600	105	
			SEW-1	300	200	3
			SEWF-1	300	150	3
			SEW-2	600	200	3
			SEWF-2	600	150	3
			TEW	600	105	1 & 2
			TEWN	600	105	1 & 2
			TR-32	600	105	1
			TRB-32	600	105	1
			TR-64	600	105	1
			TRB-64	600	105	1
	For Hard Usage	Flexible Cord	HSJO	300	90	2
			SJ	300	60	
			SJO	300	60	2
			SJT	300	60	
			SJT	300	105	
	For Extra Hard Usage	Flexible Cord	S	600	60	
			SO	600	60	2
			ST	600	60	
			ST	600	105	
Dry or Damp or Wet	Not for Hard Usage	Flexible Cord	CXWT	300	60	
			CXWT	600	60	
			PXWT	300	60	
	For Hard Usage	Flexible Cord	SJO2	300	60	2
			SJTW	300	60	
			SJTW	300	105	
	For Extra Hard Usage	Flexible Cord	SAW	600	60	2
			STW	600	60	
			STW	600	105	

NOTES
(1) A voltage of 1 000 V is permitted when the current is limited by a transformer, reactor, or resistor.
(2) Temperature rating is limited to 60 °C when exposed to oil.
(3) A temperature rating of 250 °C is permitted when the conductor is nickel or nickel-plated copper.

6.0 Critical Features

Table 6
NEC temperature and voltage ratings of flexible cords and equipment wire

Location	Usage	Description	Type	Rating, Volts	Temp. (ºC)	Notes
Dry		Equipment wire	FEPW	600	75	
			PFAH	600	250	
			RH	600	75	
			RHH	600	90	
			T	600	60	
			TFE	600	250	
			THHN	600	90	
			THHW	600	90	
			Z	600	90	2
			ZW	600	90	2
Dry	Not hard usage	Flexible cord	C	300	60	
			PD	300	60	
Dry or damp		Equipment wire	FFH-1	300	75	
			FFH-2	600	75	
			KF-2	600	200	
			KFF-1	300	200	
			KFF-2	600	200	
			HF	600	150	
			HF-1	300	200	
			HFF	600	150	
			PAF	600	200	
			PAFF	600	150	
			PF	600	200	
			PFF	600	150	
			PGF	600	200	
			PGFF	600	150	
			PTF	600	250	
			PTFF	600	150	
			RFH-1	300	75	
			RFH-2	600	75	
			RFHH-2	600	90	2
			RHH	600	90	2
			RHH-3	600	90	2
			SF-1	300	200	
			SF-2	600	200	
			SFF-1	300	150	
			SFF-2	600	150	
			TF	600	60	
			TFF	600	60	
			TFN	600	90	
			THHN	600	90	2
			XHHW	600	90	2
			XF	300	150	
			XFF	300	150	
			Z	600	90	2
			ZF	600	150	
			ZFF	600	150	
			ZHF	600	200	
			ZW	600	90	2
Dry or damp	Not hard usage	Flexible cord	HPW	300	90	2
	Extra-hard usage		S	600	60	
			S	600	75	1
			SE	600	60	
			SE	600	75	1

6.0 Critical Features

Table 6
NEC temperature and voltage ratings of flexible cords and equipment wire (continued)

Location	Usage	Description	Type	Rating, Volts	Temp. (°C)	Notes
	Hard usage		SJ	300	75	1
			SJE	300	75	1
			SJO	300	60	
			SJO	300	75	1
			SJOO	300	60	
			SJOO	300	75	1
			SJT	300	60	
			SJT	300	75	1
			SJT	300	90	1,2
			SJT	300	105	1,2
			SJTO	300	60	
			SJTOO	300	60	
	Not hard usage		SP-1	300	60	
			SP-2	300	60	
			SPE-1	300	60	
			SPE-1	300	75	1
			SPE-1	300	90	1,2
			SPE-1	300	105	1,2
			SPE-2	300	60	
			SPE-2	300	75	1
			SPE-2	300	90	1,2
			SPE-2	300	105	1,2
	Extra-hard usage		SO	600	60	
			SO	600	75	1
			SO	600	90	1,2
			SOO	600	60	
			SOO	600	75	1
			SOO	600	90	1,2
	Not hard usage		SPT-1	300	60	
			SPT-1	300	75	1
			SPT-1	300	90	1,2
			SPT-1	300	105	1,2
			SPT-2	300	60	
			SPT-2	300	90	1,2
			SPT-2	300	105	1,2
			SPT-3	300	60	
			SPT-3	300	75	1
			SPT-3	300	90	1,2
			SPT-3	300	105	1,2
	Extra-hard usage		ST	600	60	
			ST	600	75	1
			ST	600	90	1,2
			ST	600	105	1,2
			STO	600	60	
			STOO	600	60	
	Not hard usage		SV	300	60	
			SVE	300	60	
			SVO	300	60	
			SVO	300	90	1,2
			SVOO	300	60	
			SVOO	300	90	1,2
			SVT	300	60	
			SVT	300	75	1
			SVT	300	90	1,2
			SVT	300	105	1,2
			SVTO	300	60	
			SVTOO	300	60	

6.0 Critical Features

Table 6
NEC temperature and voltage ratings of flexible cords and equipment wire (continued)

Location	Usage	Description	Type	Rating, Volts	Temp. (ºC)	Notes
Dry, damp, or wet		Wire	RHW	600	75	
			RUW	600	60	
			THW	600	75	
			THWN	600	75	
			TW	600	60	
			XHHW	600	75	
			ZW	600	75	
Dry, damp, or wet	Same as specified for cord type under dry or damp	Flexible cord	Any if marked as specified in Note 3	As marked on cord	As marked on cord	2,3

NOTES:
(1) The insulation temperature rating is marked on the surface of the flexible cord.
(2) See Clause 6.9.7 for increasing the insulation temperature rating using sleeving.
(3) Flexible cord that is suitable for use in a wet location is surface marked with a "W" or "Water Resistant".

Table 7
Appliance wiring material insulation type, voltage, and temperature ratings for United States

Types of insulation	Minimum thickness of insulation							
	300 volts				600 volts			
	Without braid		With added impregnated braid cover		Without braid		With added impregnated braid or nylon cover [min 0.1 mm (0.004 in)]	
	mm	in	mm	in	mm	in	mm	in
Thermoplastic	0.33	0.013	0.33	0.013	0.69	0.027	0.38	0.015
Thermoset	0.33	0.013	0.33	0.013	0.69	0.027	0.69	0.027
Rubber	0.69	0.027	0.33	0.013	1.02	0.040	0.69	0.027
Neoprene	0.69	0.027	0.33	0.013	1.07	0.042	0.69	0.027
Silicon rubber	-	-	0.33	0.013	-	-	0.69	0.027
Fluoro-plastic*	0.30		-	-	0.46	0.018	-	-

*Polytetrafluoroethylene or fluorinated ethylene propylene.
NOTE The temperature marking of appliance-wiring material or miscellaneous wire consists of:
(1) colored threads;
(2) durable, continuous (unbroken), straight, longitudinal stripes printed in indelible ink on the surface of the insulation; or
(3) durable and legible indelible ink printing (or legible indent printing) of words, stating the temperature in degrees Celsius on (or in) the surface of the insulation.

6.0 Critical Features

6 .6.10 UNENCLOSED CONDUCTOR IN CLASS 2 CIRCUITS

These conductors are permitted in surface-mounted luminaires, and on the room side of recessed luminaires and when the luminaire is constructed as follows:

If these conductors will be concealed within a building cavity after recessed luminaire installation (e.g., into a wall or a ceiling), they are permitted only in: recessed luminaires when the conductors are:
1) Power-limited cable types CL2, CL3, CL2P, CL3P, CL2R, CL3R, CMP, or PLTC regardless of length;
2) Appliance wiring material no longer than 100 mm (4 in);
3) Appliance wiring material with a VW-1 flame rating regardless of length; or
4) Appliance wiring material enclosed in either glass fiber sleeving or VW-1 rated thermoplastic sleeving regardless of length, where the sleeving is at least 0.25 mm (0.010 in) thick.

Recessed luminaires employing unenclosed appliance wiring material, as permitted by Clauses (b)(2) – (b)(4) above, shall be marked for use in non-fire-rated installations only, in accordance with **item 1.26 of table in section 6.20**.

6 .6.11 IDENTIFICATION AND POLARITY

A conductor terminal intended for the connection of the neutral conductor of the branch circuit shall be substantially white in color or be marked neutral adjacent to the terminal in accordance with: **item 1.5 of table in section 6.20.**

The insulation on a conductor intended for connection to the neutral conductor of the branch circuit shall be identified by one of the following means:

a) be colored white or grey;
b) be of any color except green, with a continuous white tracer throughout its length;
c) be identified at the point where connected to the branch circuit by white paint, tape, ink, or permanent tag; or
d) be provided with one or more raised longitudinal ridges, if a parallel conductor flexible cord.

The identified terminal of a wiring device shall be connected to the neutral conductor of the branch circuit.

Note: Include drawing of the lamp-holder screw shell for neutral conductor terminal in the report

6.0 Critical Features

6 .6.12 SPACINGS

In primary circuits, minimum spacing are maintained through air and over surfaces of insulating material between uninsulated current-carrying parts of different potential and between uninsulated current-carrying parts and dead-metal parts in accordance with table below.

Minimum spacings – clearance through air and creepage distances for uninsulated live parts

Voltage range, V rms	Voltage range, V peak	Minimum spacing clearance through air		Minimum spacing creepage Distance	
		mm	in	mm	in
0 – 50	0 – 71	1.6	0.063	1.6	0.063
51 – 150	72 – 212	3.2	0.125	6.4	0.250
151 – 300	213 – 423	6.4	0.250	9.5	0.375
301 – 600	424 – 846	9.5	0.375	9.5	0.375
601 – 2000	847 – 2828	9.5	0.375	12.7	0.500

The minimum expansion spacing perpendicular to the capacitor terminal shall be:
a) 11 mm (0.44 in) for a maximum of 300 V; or
b) 13 mm (0.50 in) for a voltage more than 300 V.

The spacings between field wiring terminals of different potential and between the terminals and a grounded non-current-carrying part shall be not less than 3.2 mm (0.125 in) through air and 6.4 mm (0.250 in) over surface or as indicated in Table above, whichever is greater.

As an alternative to those spacings requiredabove, for locations other than for wiring terminals or spacings to a dead-metal conductive enclosure, spacings are permitted to be in accordance with UL 840 and CSA C22.2 No. 0.2. Overvoltage Category II applies to circuits directly connected to the branch circuit. Printed wiring boards are presumed to have a minimum CTI of 100 unless known to be greater.

6 .6.13 ELECTRICAL INSULATION

Any supplemental electrical insulation, if used, is to be evaluated by Intertek and specifically described in this Report Section 4.

6 .6.14 ACCESSIBILITY OF LIVE PARTS

All live parts shall be enclosed and inaccessible to the user during user maintenance and normal operation unless described below.

6.0 Critical Features

6 .6.14.2 ACCESSIBILITY OF UNINSULATED PARTS

Uninsulated current-carrying parts specified below may be accessible during user maintenance and normal operation. Contact with all other uninsulated current-carrying parts shall be prevented by an enclosure or barrier.

The live parts of a lamp holder or starter holder that make the electrical connection to the lamp or starter may be accessible.

The lampholder leads of a wall mounted luminaire that are accessible from below or behind the lampholder with the luminaire fully assembled in accordance with the manufacturer's instructions shall comply with the lampholder lead pull test.

6 .6.14.3 ACCESSIBILITY OF INSULATED PARTS

Insulated current-carrying parts specified below may be accessible during user maintenance and normal operation. Contact with all other insulated current-carrying parts shall be prevented by an enclosure or barrier.

The following conductors specified in Table 5 (CAN) or 6 (USA) shall be permitted to be used without additional mechanical protection:
a) Flexible cord with insulation thickness equal to or greater than Type SPT-2;
b) Flexible cord with insulation thickness equal to or greater than Type SPT-1, routed through the chain of a chain pendant luminaire; or
c) Other conductors of minimum insulation thickness 0.80 mm (0.032 in), routed through the chain of a chain pendant luminaire.
Flexible cords, equipment wire, and 600 V rated appliance wiring material specified in Tables 5 (CAN), 6 (USA), and 7 (USA) may be accessible if:

a) Visible for the entire accessible length;
b) Routed, where practicable, to a structural part of the luminaire;
c) Secured at least every 75 mm (3 in) if stranded wire or every 100 mm (4 in) if solid wire, where practicable, to a structural part of the luminaire, or threaded through chain links of the luminaire; and
d) In compliance with Item (1) or (2), as follows:
1) accessible for no more than 100 mm (4 in) and not containing any splices; or
2) enclosed in a minimum 0.25 mm (0.010 in) thick glass fiber or thermoplastic sleeving and factory-made splices using insulated crimp-type connectors are enclosed in a minimum 0.25 mm (0.010 in) thick glass fiber or thermoplastic sleeving.

6 .6.14.4 PARTS ACCESSIBLE ONLY DURING USER MAINTENANCE

The following insulated current-carrying parts may be accessible to incidental contact only during user maintenance that requires an enclosure part to be removed or opened to accomplish the operation:

a) The terminals of electrical components, if insulated with material that is mechanically secured in place; and
b) Any wiring or factory-made splices employing machine-applied twist-on wire connectors or other types of insulated wire connectors that are acceptable, if not disturbed during user maintenance

6.0 Critical Features

6 .6.15 GROUNDING AND BONDING

Non-current-carrying metal parts and metalized polymeric parts shall not be accessible during user maintenance or component replacement without the use of tools and that can involve the risk of shock unless bonded to ground and shall comply with the bond impedance test as conducted by Intertek and specifically described in this Report Section 4. The following parts are not required to be bonded to ground:

a) The links of a metal chain used to support a pendant luminaire;
b) Accessible non-current-carrying metal parts of luminaire components (for example, lamp holders and switches) that are isolated from live parts; or
c) Decorative parts, metal guards, and metal shades that do not enclose live parts.

An individual grounding conductor of a chain-and-canopy suspended luminaire shall be interwoven through the chain from the luminaire to the canopy. Installation instructions shall be provided.

6 .6.15.2 PROVISION FOR GROUNDING

A luminaire that requires grounding shall be provided with a grounding means to provide connection to the branch circuit ground. The grounding means shall be in the same location as the power supply connection means and shall be a pigtail lead grounding conductor, a pressure terminal connector, a wire binding screw, or the equivalent. A grounding terminal shall not be located on a removable part, unless the removal of the part during user maintenance does not interrupt the bonding continuity.

For products bearing the cETLus or ETLus mark: A luminaire required to be grounded and designed for mounting over an outlet box, but not incorporating a means to terminate the branch circuit grounding conductor, shall be provided with a mounting crossbar that has a grounding termination means.

For products bearing the cETL mark only: a mounting crossbar shall not be required to have a grounding termination.

A grounding conductor shall not be smaller than the gauge of wire used for the luminaire supply conductors and in no case less than No. 18 AWG. A grounding conductor shall not be terminated by hardware that is likely to be removed during replacement of any luminaire components. The grounding conductor of a pendant luminaire may be terminated by hardware that is also used to secure a lamp holder or lamp holder bracket when that is the only available termination point. An insulated grounding conductor shall be identified by one of the following:

a) Green;
b) Green with a yellow stripe; or
c) Green with a yellow tracer.

A screw provided for luminaire grounding shall:

a) Not be used for any other purpose;
b) Be limited to conductors of size No. 10 AWG or smaller;
c) Comply with Table 8;
d) Have a cupped washer or similar provision, or the area around the screw shall be provided with two raised areas;
e) Have a green-colored head, or the area directly adjacent to the screw shall be marked in accordance with: **item 4.4 of table in section 6.20**.

(f) Be a machine or thread-forming screw.
(g) Be capable of withstanding 1.6 N•m (14 lb-in) of tightening torque. Compliance is determined by the ground-screw assembly strength test.

6.0 Critical Features

Table 8
Ground screw size

Screw size		Wire size (AWG)
M3.5	No. 6	18 – 14
M4	No. 8	18 – 12
M5	No. 10	18 - 10

A luminaire grounding conductor may be secured to a snap-fit lamp holder if the bonding between the lamp holder and the luminaire complies with the grounding continuity test.
A terminal plate intended for use with a wire binding screw shall be of metal and shall provide a minimum of two full threads engagement with the screw.
A pressure- or screw-type terminal block shall be suitable for the conductors involved, and grounding termination shall be marked with a grounding symbol or abbreviation in accordance with: **item 4.4 of table in section 6.20.**

6 .6.15.3 BONDING

A bonding means shall consist of one of the following:

a) A pigtail lead bonding conductor of at least No. 18 AWG;
b) A terminal;
c) A welded, soldered, or brazed joint;
d) A screw, rivet, or welded stud;
e) A pressure terminal connector;
f) An assembly of bolt, nut, and lockwasher or starwasher, or other compressive fastener that with the bonding circuit impedance test if evaluated by Intertek; or
g) An equivalent conductive path that complies with the bonding circuit impedance test if evaluated by Intertek and specifically described in this Report Section 4.

The bonding of a conductive part that is coated with vitreous enamel, paint, or similar coatings can require treatment of the part, such as masking, removal of the coating at points of connection, or the use of fastening means that penetrate the surface coating. If special treatment is required or if grounding continuity is not obvious, acceptability shall be determined by the bond impedance test if evaluated by Intertek.

A luminaire part shall be provided with a No. 18 AWG or larger stranded bonding conductor if the part:

a) Is required to be bonded to ground; and
b) Is likely to be removed from the remainder of the luminaire during user maintenance and supports a live part.

In the United States, a luminaire part shall be provided with a No. 18 AWG or larger stranded bonding conductor if the part:

a) Is required to be bonded to ground.
b) Is likely to be removed from the remainder of the luminaire during user maintenance and supports a live part, other than a ballast with an integral enclosure.

6.0 Critical Features

A bonding conductor shall be secured by one of the following methods:

a) A machine screw and nut;
b) A screw that threads into metal, with at least two full threads engaging;
c) Rivets; or
d) Equivalent means as determined by investigation and specifically described in Section 4.

The bonding conductor shall not be smaller than the gauge of wire used for the luminaire supply conductors and in no case less than No. 18 AWG.

A chain shall not be considered an effective bonding means.

6 .6.16.1 SUPPLY CONNECTIONS

A luminaire shall be provided with a means of connection to a single branch circuit and shall have one or more of the following:

a) Conductors, when mounted on or over an outlet box;
b) Provision for connection of conduit;
c) A pressure or screw terminal block; or
d) A length of a flexible cord;
e) Provision for connection of cable
f) Provision for a proprietary wiring system, and be marked in accordance with **item 1.12 of table in section 6.20**., or installation instructions in accordance with **item 1.33 of table in section 6.20.**

The supply connection and grounding connection shall be accessible for inspection after installation.

A luminaire intended to be mounted on or over an outlet box shall be provided with supply conductors long enough to extend 150 mm (6 in) into the outlet box.

A post or pole mounted luminaire shall be provided with supply conductors extending 150 mm (6 in) beyond the field wiring compartment

6 .6.16.2 CONDUIT CONNECTIONS

A luminaire provided with a means of conduit connection shall be shipped with provision to close all but one of the conduit openings. Closure plugs may be packaged separately with the luminaire. The dimensions for the unthreaded opening and the minimum unobstructed diameter of the flat surface surrounding the back of an opening for conduit shall comply with the values shown in Table 9.

Table 9
Dimensions for conduit openings

Nominal trade size of conduit	Unthreaded opening diameter		Minimum diameter of flat surface	
	mm	in	mm	in
1/2	22.2	0.875	28.09	1.11
3/4	28.2	1.109	34.04	1.34
1	34.9	1.375	42.85	1.69
1-1/4	44.0	1.734	55.07	2.17
	Tolerance			
	+0.81	+0.032		
	-0.38	-0.015		

6.0 Critical Features

The unthreaded part of a hole and the back edge of an opening not threaded all the way through shall be smooth and well rounded for protection of the conductors. The unthreaded throat diameter shall have a minimum internal diameter as shown in Table 10.

Table 10
Throat diameters for conduit openings

Nominal trade size of conduit	Minimum throat diameter mm	Minimum throat diameter in	Maximum throat diameter mm	Maximum throat diameter in
1/2	13.4	0.528	15.8	0.622
3/4	17.7	0.697	20.8	0.819
1	22.4	0.882	26.7	1.051
1-1/4	29.7	1.169	35.1	1.382

A threaded opening shall have one of the following configurations:

a) when tapped all the way through, the opening shall have at least 3.5 threads but no more than 5 threads; or
b) when not tapped all the way through, the opening shall have at least 5 threads.

The minimum unobstructed diameter surrounding the back of an opening threaded all the way through shall comply with the minimum diameter of flat surfaces as shown in Table 9, to accommodate the conduit bushing.

6 .6.16 WIRING COMPARTMENT AND JUNCTION BOX VOLUME FOR BRANCH CIRCUIT CONDUCTORS
Reserved for future use. To be evaluated by Intertek

6 .6.18 SEPARATION OF CIRCUITS

6 .6.18.1 FACTORY INSTALLED WIRING

Factory-installed power limited wiring and branch circuit wiring that come in random contact within the luminaire shall have insulation rated for the maximum voltage that exists in any of the circuits.

6 .6.18.2 FIELD INSTALLED WIRING

Reserved for future use. To be evaluated by Intertek

6 .6.19 WIRE SPLICES AND CONNECTIONS (MEX)
Reserved for future use.

6 .6.20 INTERCONNECTED UNITS
Reserved for future use. To be evaluated by Intertek

6.7 Incandescent Luminaires

6 .7.1 INCANDESCENT GENERAL COVERAGE LUMINAIRES

A luminaire shall be marked, in a location visible during relamping, with a caution, the maximum lamp wattage, and the lamp type, in accordance with: **items 3.1 and 3.18 of table in section 6.20.**

More than one lamp wattage and lamp type, as applicable, may be included in the lamp replacement marking if sufficient testing is initially conducted by Intertek to confirm that the temperature requirements are met. Such conditions will be specifically described in Section 4.

An incandescent luminaire intended for connection to other than a nominal 120 V circuit shall be marked with the input line voltage with **item 1.4 of table in section 6.20.**

6.0 Critical Features

6 .7.2 TEMPERATURE TEST-EXEMPT LUMINAIRES

6 .7.2.1 THE MAXIMUM NUMBER OF LAMPHOLDERS AND WATTAGE OF LAMPS SHALL BE IN ACCORDANCE WITH TABLES 11 AND 12.

Table 11
Maximum number of lampholders permitted in a lamp compartment

Lumainare type	Lampholder type	Lamp compartment			
		Exposed	Ventilated	Partially enclosed	Enclosed
Pendant ceiling-mounted	Candelabra	No limit	No limit	3	3
	Intermediate Medium	No limit	3	3	3
Surface ceiling-mounted	Candelabra	Note (1)	N/A	2	1
	Intermediate Medium	Note (1)	N/A	2	1
Surface ceiling-mounted, bullet shade	Candelabra	N/A	N/A	Note (2)	N/A
	Intermediate Medium	N/A	N/A	Note (2)	N/A
Surface wall-mounted	Candelabra	No limit	No limit	3	3
	Intermediate Medium	No limit	3	3	3
Pole-mounted and post mounted	Candelabra	No limit	No limit	3	3
	Intermediate Medium	No limit	3	3	3

NOTES
(1) If the lamp is in a vertical, base-up position, one lampholder or a single row of multiple lampholders is permitted, spaced 150 mm (6 in) center-to-center.

If the lamp is in a horizontal position, two lampholders maximum are permitted.

(2) Multiple lampholders are permitted, each with a bullet shade. N/A Not applicable.

Table 12
Maximum lamp wattagepermitted in a lamp compartment

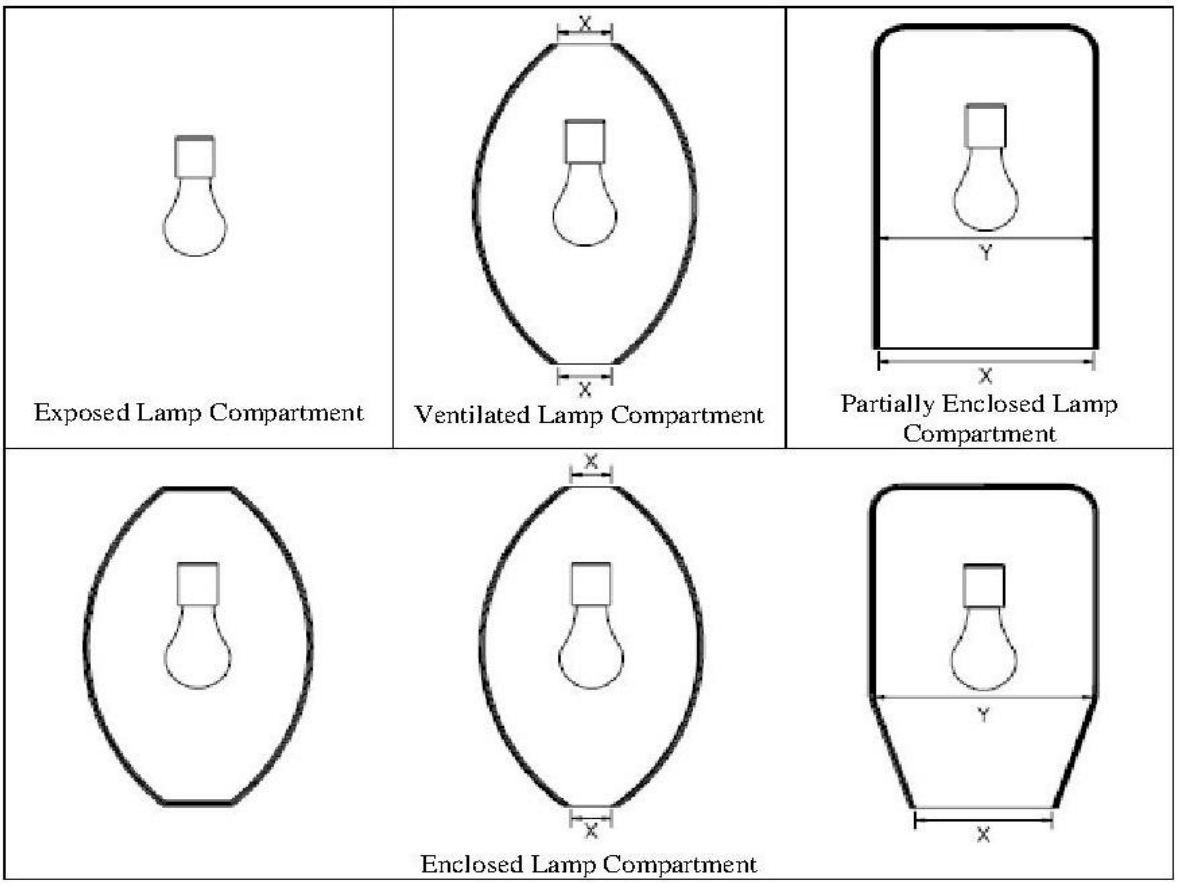
Lumainare type	Lampholder type	Lamp compartment			
		Exposed	Ventilated	Partially enclosed	Enclosed
Pendant ceiling-mounted	Candelabra	60 W per lamp	60 W per lamp	60 W per lamp	60 W per lamp
	Intermediate	40 W per lamp	40 W per lamp	40 W per lamp	40 W per lamp
	Medium	300 W per lamp	450 W per compartment	450 W per compartment	450 W per compartment
Surface ceiling-mounted	Candelabra	40 W per lamp	N/A	40 W per lamp	40 W per lamp
	Intermediate	40 W per lamp	N/A	40 W per lamp	40 W per lamp
	Medium	60 W per lamp	N/A	60 W per lamp	60 W per lamp
Surface ceiling-mounted, bullet shade	Candelabra	N/A	N/A	60 W per lamp	N/A
	Intermediate	N/A	N/A	Note (1)	N/A
	Medium	N/A	N/A	Note (1)	N/A
Surface wall-mounted	Candelabra	60 W per lamp	60 W per lamp	60 W per lamp	60 W per lamp
	Intermediate	40 W per lamp	40 W per lamp	40 W per lamp	40 W per lamp
	Medium	300 W per lamp	450 W per compartment	450 W per compartment	450 W per compartment
Pole-mounted and post mounted	Candelabra	60 W per lamp	60 W per lamp	60 W per lamp	60 W per lamp
	Intermediate	40 W per lamp	40 W per lamp	40 W per lamp	40 W per lamp
	Medium	300 W per lamp	450 W per compartment	450 W per compartment	450 W per compartment

NOTE Maximum 150 W reflector type, or 100 W for any other type.
N/A Not applicable.

The lamp compartment of a pendant ceiling-mounted, surface wall-mounted, pole-mounted, or post-mounted luminaire shall be defined by one of the lamp compartment definitions shown in Figure 3.

6.0 Critical Features

Figure 3
Temperature-test-exempt lamp compartment definitions



Legend:

X is an open area.

Y is the maximum horizontal inside cross-sectional area of the lamp compartment.

EXPOSED LAMP COMPARTMENT has no enclosure or barrier to restrict the flow of air or heat radiation.

VENTILATED LAMP COMPARTMENT has an open area, X, above and below the lamp. Each area, X, is at least 19.3
cm^2(3 in^2) for each lamp in the compartment.

PARTIALLY ENCLOSED LAMP COMPARTMENT has an open area, X, above or below the lamp that is at least equal to the maximum horizontal cross-sectional area of the compartment, Y.

ENCLOSED LAMP COMPARTMENT has no ventilation openings or has open area, X, that is less than 19.3 cm^2 (3 in^2) for each lamp in the lamp compartment or that is less than the maximum cross-sectional area of the compartment, Y.

6.0 Critical Features

6 .7.2.2 CONDUCTORS INTEGRAL TO THE LUMINAIRE

A conductor spaced:

a) 50 mm (2 in) or less from a lamp or lamp holder shall have a minimum insulation rating of 150 °C, unless otherwise specified in below, in which case the lowest conductor insulation rating specified may be used; or
b) More than 50 mm (2 in) from a lamp or lamp holder shall have a minimum insulation rating of 60 °C.

A conductor shall have an minimum insulation temperature rating of 75 °C when there is a solid metal barrier between the conductor and the lamp or lamp holder and the barrier is spaced a minimum of:

a) 38 mm (1.5 in) from the lamp or lamp holder; or
b) 25 mm (1 in) from the lamp or lamp holder, and the conductor is secured to prevent contact with the barrier.

The dimensions described in Figure 5 and Figure 7 shall be measured using the following screwbase lamps:

a) medium base, 60 W A19;
b) intermediate base, 25 W T8; or
c) candelabra base, G16-1/2.

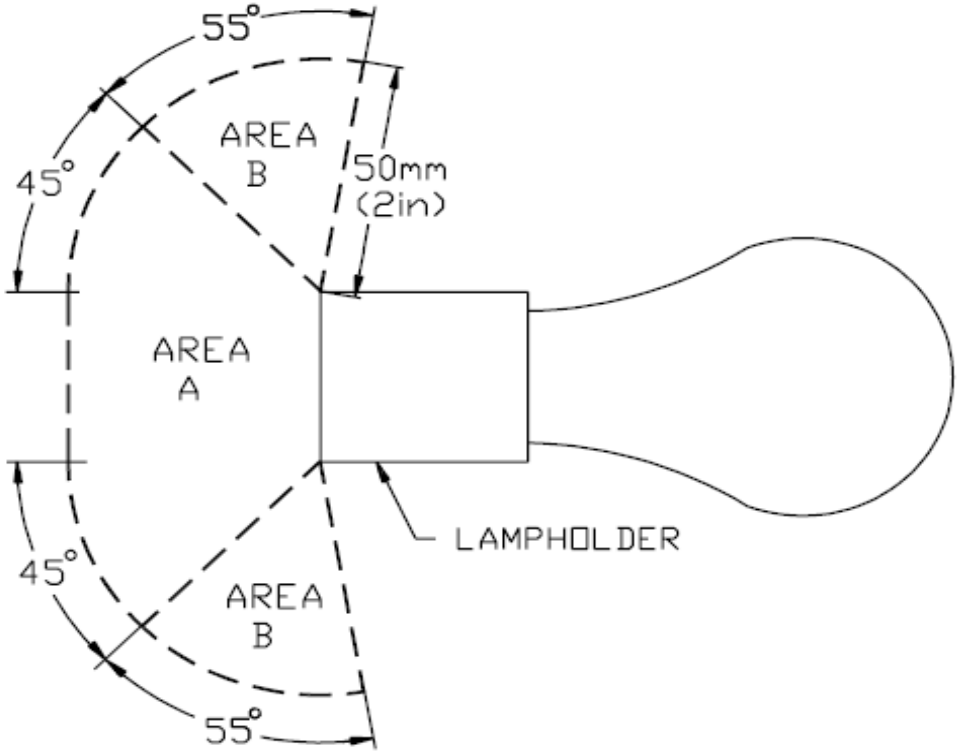
A conductor located in areas A or B as shown in Figure 4 shall be rated as shown in Table 13.

Table 13
Minimum temperature rating of conductor in °C

Lamp compartment	Position of lamp base	Areas in Figure 4			
		Area A		Area B	
		Total lamp compartment, W		Total lamp compartment, W	
		60 W or less	61 to 450 W	60 W or less	61 to 450 W
Exposed	Base down vertical ±44 degrees	60	60	60	60
	Any other base position	75	75	75	75
Ventilated	Base down vertical ±44 degrees	60	75	75	75
	Any other base position	90	105	90	105
Partially enclosed	Base down vertical ±29 degrees	75	75	75	90
	Base horizontal +61 degrees, –15 degrees	75	90	90	105
	Any other position	105	105	105	150
Enclosed	Base down vertical ±44 degrees	75	90	75	90
	Any other base position	105	150	150	150

6.0 Critical Features

FIGURE - 4
Area for minimum temperature rating of conductors



6.0 Critical Features

6 .7.2.3 BRANCH CIRCUIT CONDUCTOR INSULATION TEMPERATURE RATINGS

A luminaire shall be marked with a minimum branch circuit temperature rating equal to or greater than the lowest insulation temperature rating permitted below for any type luminaire.

A luminaire construction that permits a branch circuit conductor, assumed to be 150 mm (6 in) long, measured from the center of the outlet box face or luminaire conduit connection point, to come within 50 mm (2 in) of a lamp or lamp holder shall be marked for branch circuit conductors with a minimum insulation temperature rating of 150 °C in accordance with: **item 1.1 of table in section 6.20.**

and not for use in dwellings in accordance with: **item 2.5 of table in section 6.20.**
unless otherwise specified below.

A luminaire that provides a solid metal barrier between any lamp or lamp holder and any branch circuit conductor, assumed to be 150 mm (6 in) long, measured from the center of the outlet box face or conduit connection point, shall be marked for branch circuit conductors with a minimum insulation temperature rating of 75 °C in accordance with: **item 1.1 of table in section 6.20.**

Also provided that the barrier is spaced a minimum of:

a) 38 mm (1.5 in) from the lamp or lamp holder; or
b) 25 mm (1 in) from the lamp or lamp holder, and the conductor is routed to prevent contact with the barrier.

A luminaire that permits a branch circuit conductor to be located in areas A or B as shown in Figure 4 shall be marked in accordance with: **item 1.1 of table in section 6.20.**
with the appropriate insulation temperature rating as specified in Table 13.

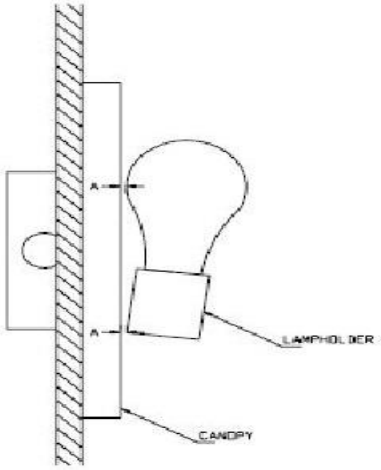
The dimensions described in shall be measured using the following screwbase lamps:

a) Medium base, 60 W A19;
b) Intermediate base, 25 W T8; or
c) Candelabra base, G16-1/2.

A wall-mounted luminaire shall have the outside surface of the canopy located at least 3.2 mm (0.125 in) from the lamp envelope and lamp holder (see dimension A of Figure 5) and shall be marked to indicate the branch circuit temperature rating in accordance with Table 14 and be in accordance with marking requirements below: **item 1.1 of table in section 6.20.**

6.0 Critical Features

Figure 5
Minimum lamp spacings for wall-mounted luminaries



Note: Dimension A is minimum 3.2 mm (0.125 in)

Table 14
Minimum temperature ratings of branch circuit conductors for wall-mounted luminaires

Lamp compartment	Maximum lamp compartment wattage	Allowed branch circuit temperature, ºC
Exposed	150	60
Ventilated	100	60
	200	75
	300	90
Partially enclosed	75	75
	100	90
Enclosed	60	75
	75	90

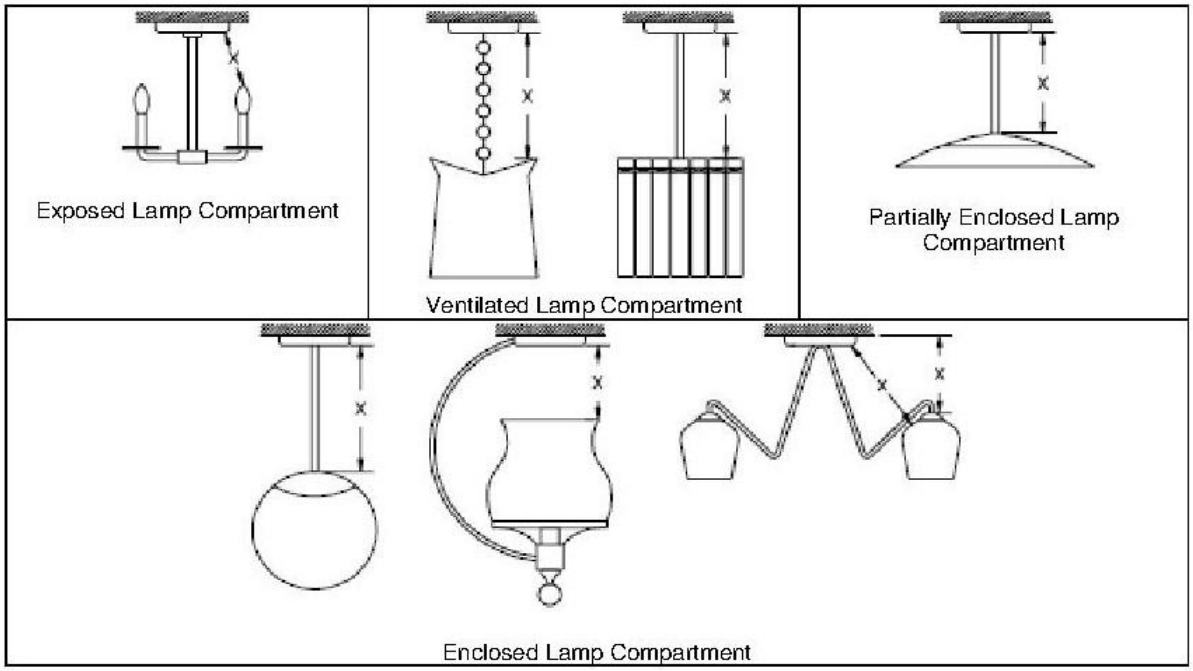
A wall-mounted luminaire shall have the outside surface of the canopy located at least 3.2 mm (0.125 in) from the lamp envelope and lampholder (see dimension A of Figure 5) and shall be marked to indicate the branch circuit temperature rating in accordance with Table 14

6.0 Critical Features

6 .7.2.4 PENDANT CEILING-MOUNTED LUMINAIRES

A free air space (see dimension X of Figure 6) of at least 100 mm (4 in) shall exist between a lamp or lamp compartment of a pendant luminaire and the ceiling or canopy it is mounted to when the luminaire is installed as intended. A pendant luminaire with a free air space less than 100 mm (4 in) shall comply with the requirements for a surface ceiling-mounted luminaire mentioned below to be considered test exempt

Figure 6
Temperature-test-exempt pendant luminaires

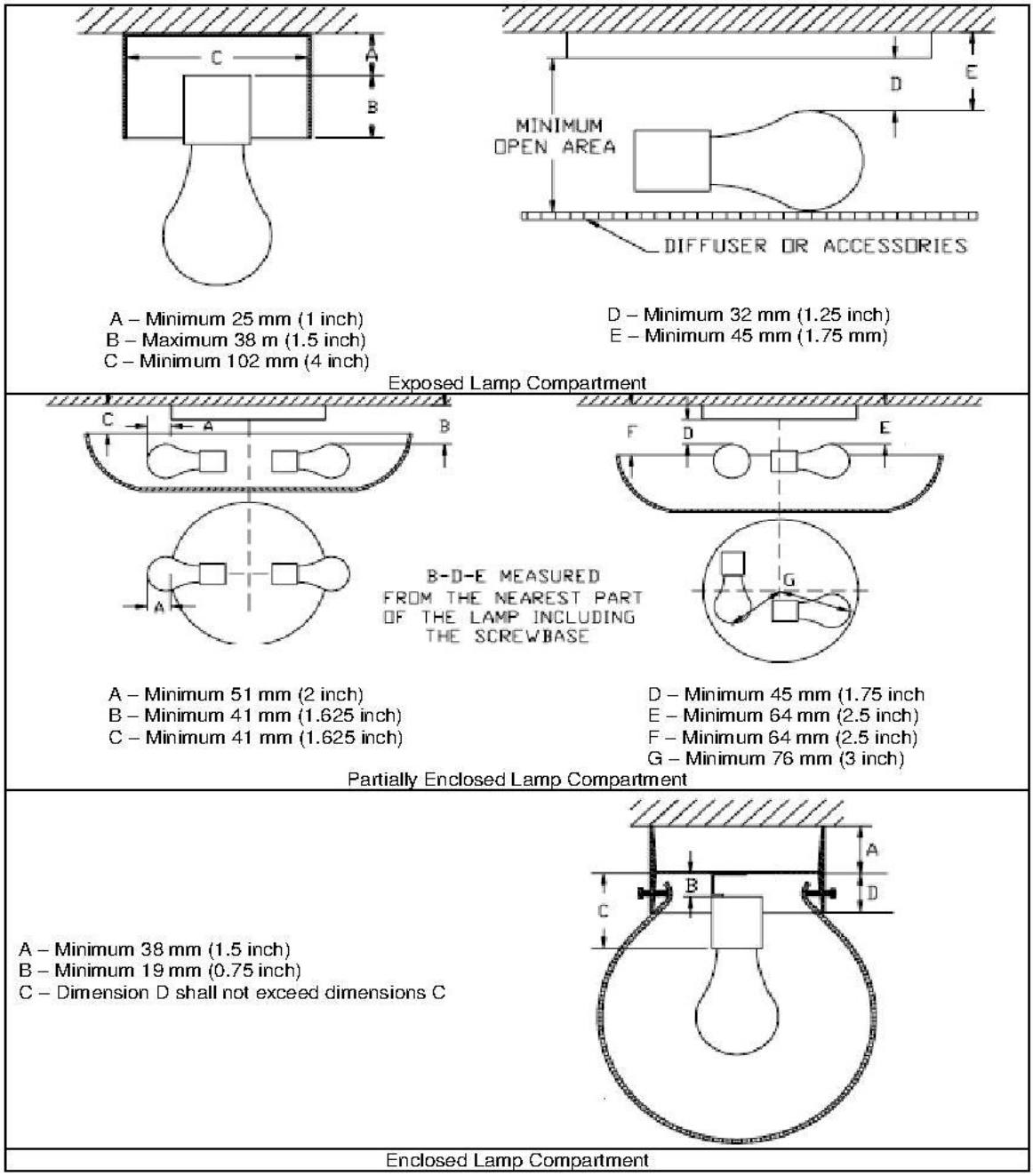


6.0 Critical Features

6 .7.2.5 SURFACE CEILING-MOUNTED LUMINAIRES

The general design and dimensions of a surface ceiling-mounted luminaire shall be as shown in Figure 7

Figure 7
Temperature-test-exempt surface ceiling-mounted luminaires



6.0 Critical Features

The luminaries shown in Figure 7 shall be marked either caution, maximum 40 W for intermediate and candelabra base lamps, or caution, maximum 60 W for medium base lamps, in accordance with: **items 3.1 and 3.18 of table in section 6.20.**

An exposed lamp compartment luminaire as shown in Figure 7 shall have no provision such as threaded canopies, clips, or thumbscrews to attach husks, diffusers, globes, shades, or other parts that can entrap heat.

A partially enclosed lamp compartment as shown in Figure 7 shall be exposed at the top, with no glassware or other material partially or completely enclosing the area above the lamps.

A luminaire shown in Figure 7 shall be provided with thermal insulation that completely closes off the opening to the outlet box at the ceiling line. The thermal insulation shall meet the requirements of thermal insulation stated previously.

A conductor integral to a surface ceiling-mounted luminaire shall be rated at least 150 °C.

The dimensions described in Figures 5 and 7 shall be measured using the following screwbase lamps:

a) Medium base, 60 W A19;
b) Intermediate base, 25 W T8; or
c) Candelabra base, G16-1/2.

6 .7.2.6 SURFACE CEILING-MOUNTED LUMINAIRES – BULLET SHADE

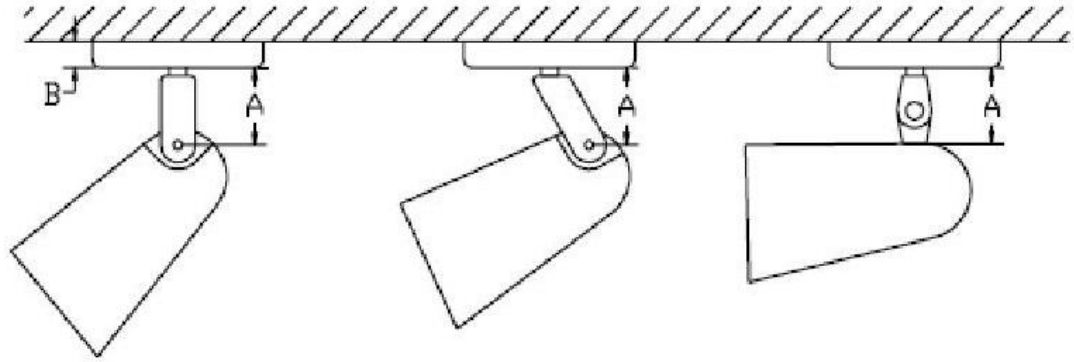
A luminaire shown in Figure 8 is considered to include a partially enclosed lamp compartment and shall be marked caution, maximum 150 W when used with a reflector-type lamp, or caution, maximum 100 W for other lamp types, in accordance with: **items 3.1 and 3.18 of table in section 6.20.**

A luminaire shown in Figure 8 shall be provided with a mechanical means to prevent it from being aimed at or directed above the horizontal towards the ceiling or canopy, and the back of the shade shall have no open holes.

A luminaire shown in Figure 8 shall be provided with thermal insulation that completely closes off the opening to the outlet box at the ceiling line. The thermal insulation shall meet the requirements of thermal insulation stated previously.

6.0 Critical Features

Figure 8
Temperature-test-exempt bullet shade luminaires



Notes:
A – Minimum 25 mm (1 inch) from bottom of canopy to point where swivel joint enters shade.
B – Minimum 19 mm (0.75 inch)

6 .7.2.7 SURFACE WALL-MOUNTED LUMINAIRES

A luminaire that appears to be made so that it can be mounted either to a ceiling or wall and that does not comply with the requirements of 6.7.2.5 or 6.7.2.6 shall be marked for wall mounting only, in accordance with: **item 2.10 of table in section 6.20.**

A luminaire construction that permanently spaces the lamp or lamp holder 50 mm (2 in) or more from the back plane of the luminaire canopy or from the edge of the outlet box on which it is mounted may have a minimum branch circuit conductor insulation temperature rating of 60 °C when the luminaire is marked to push the conductors into the outlet box, in accordance with: **item 1.25 of table in section 6.20.**

6.8 Fluorescent Luminaires

6 .8.1 FLUORESCENT GENERAL COVERAGE LUMINAIRES - these requirements are in addition to the requirements above.

6 .8.2 BALLASTS

A fluorescent luminaire shall use a thermally protected ballast

6 .8.3 SUPPLY CORDS AND CONDUCTORS

When the supply cord of a luminaire permits the cord to be pushed back into the enclosure, resulting in spacing between the cord and the ballast of less than 76 mm (3 in), the supply cord shall be rated for at least 90 °C or for the temperature of any component it can contact, whichever is greater. Conductors shall have a minimum temperature rating in accordance with Table 15

6.0 Critical Features

Table 15
Minimum temperature rating of conductors

Position of conductors relative to ballasts	Temperature ºC
Permanently spaced a minimum of 76 mm (3 in) from any ballast	60
Less than 76 mm (3 in) from, but not in contact with, any ballast except at the point of entry to the ballast	80
In contact with any ballast or spaced less than 76 mm (3 in) and provided with an outer braid	75
In contact with any ballast or spaced less than 76 mm (3 in)	90

6 .8.4 LAMPHOLDERS

Lampholders shall be of a type and voltage rating suitable for the lamp and ballast intended to be used. Lampholders of the bipin, miniature, medium, or mogul size shall have a voltage rating greater than the output voltage or voltage to ground, if marked on the ballast. The voltage rating of lampholders intended for use with a simple reactance ballast shall be greater than the supply voltage. Circuit-interrupting-type lampholders required by the ballast marking shall be connected in accordance with the ballast wiring diagram. Lampholders of the single pin, slimline type shall have the circuit-interrupting mechanism in the stationary lamp holder. Lampholders of the circuit-interrupting type shall be connected in the line side of the ballast and have a voltage rating greater than the supply voltage. The lampholders connected to the high voltage ballast conductors shall be rated:

a) 600 V minimum; or
b) 250 V and provided with a supplementary insulation consisting of 0.4 mm (0.016 in) thick material of fiber or phenolic composition; or
c) 250 V and provided with a 2 mm (0.078 in) permanent air space between the back of the lampholder and the metal of the luminaire

6 .8.5 TEMPERATURE-TEST-EXEMPT LUMINAIRES

In the United States, luminaries employing single-ended fluorescent lamps and thermally protected ballasts shall be temperature test exempt.
Luminaires employing more than one ballast spaced more than 25 mm (1 in) end to end or 100 mm (4 in) side to side and luminaires provided with a thermally protected ballast located more than 75 mm (3 in) from a knockout or other power supply entry and the luminaire is marked for 90 °C supply conductors are temperature test exempt.

6 .8.6 MARKING

Instead of the current rating in amperes, a luminaire employing:

a) A high-power-factor, reactor-type ballast or ballasts for bipin lamps (preheat or rapid start types) may be marked in accordance with: **item 1.27 of table in section 6.20.**

b) A low-power-factor, reactor-type ballast or ballasts for bipin lamps may be marked in accordance with: **item 1.28 of table in section 6.20.**

c) single-pin lamps (instant start type) and high-power-factor ballast or ballasts may be marked in accordance with: **item 1.29 of table in section 6.20 using the multiplying factors shown in Table 16.**

6.0 Critical Features

Table 16
Multiplying factors for ballasts

Maximum ballast output current in milliamperes	Minimum acceptable multiplying factor
120 or less	0.6
121 – 200	0.8
210 – 300	1.2
301 – 460	1.5

A luminaire intended for use with an adapter plate and shipped without the adapter shall be marked to indicate the plate, in accordance with: **items 4.1 and 4.2 of table in section 6.20.**

A luminaire designed for use with a remote ballast shall be marked to indicate that the intended ballast is thermally protected, in accordance with: item 1.30of table in section 6.20.

A luminaire designed for use with single-ended, compact fluorescent lamps and having non-thermally protected ballasts shall be marked to indicate the lamps intended, in accordance with: **item 3.21 of table in section 6.20.**

6 .8.7 EMERGENCY BATTERY PACKS

Listed Class P Emergency drivers and ballasts when provided must be evaluated by Intertek and identified in section 4 of this report and and the unit is marked with **item 1.43 of table in section 6.20.**

6 .8.8 INSTANT-START BALLASTS

A luminaire with instant-start ballast(s), incorporating bi-pin lampholders shall:
(a) be constructed with a ballast(s) identified as Type CC, or
(b) be constructed with lampholders intended for use with instant-start electronic ballasts in accordance with Clause 4.1. Lampholders marked with a circle “I” comply with these requirements.

6.0 Critical Features

6 .8.9 BRANCH DISCONNECTS - For products bearing the cETLus or cETL mark:
Each fluorescent luminaire utilizing double-ended lamps provided with ballasts intended for installation on branch circuits with voltages exceeding 150 volts to ground, including multi-voltage ballasts such as 120-277 V, shall be provided with one or more installed disconnect means that:
(a) complies with one of the following:
(i) mating connector with a current-interrupting rating and voltage rating suitable for the ballast(s) employed in the luminaire
(ii) multi-pole switch that opens all circuit conductors simultaneously and is rated suitably
(iii) a wiring harness that is considered suitable for this application;
(iv) a cord set or power supply cord; or
(v) a ballast provided with an integral disconnect means
(b) simultaneously opens all circuit conductors between the branch circuit conductors and one or more ballast(s); and
(c) are marked according to their specific locations, with the marking located and worded according to (i) or (ii), as follows:
(i) when the disconnect means is installed inside the luminaire, the marking shall be located adjacent to such means and shall be worded in accordance with **item 3.4 of table in section 6.20.**
(ii) when the disconnect means is installed outside the luminaire and not accessible from the room side, the marking shall be located adjacent to the ballast and shall be worded in accordance with **item 3.26 of table in section 6.20.**

6.9 Reserved for future use

6.10 LED luminaires – supplementary requirements

6 .10.1. LED GENERAL COVERAGE LUMINAIRES

6 .10.2. LAMPHOLDERS - A lampholder MUST have an electrical rating suitable for the LED lamp load to be used.

6 .10.3. PRINTED WIRING BOARDS - Must be part of a LED models as noted in 6.10.6.2 below.

6 .10.4 EMERGENCY BATTERY PACKS
Listed Class P Emergency drivers when provided must be evaluated by Intertek and identified in section 4 of this report and and the unit is marked with **item 1.42 of table in section 6.20.**

6 .10.5 MARKING - Luminaire must be marked with the following:
a) Marked with the input rating in volts, frequency in hertz, and total amperes or watts, in accordance with **item 1.3 of table in section 6.20**.
b) Marked with max wattage of self-ballasted LED lamp permitted with **item 3.3 of table in section 6.20**.
c) **item 4.6 of table in section 6.20.**

6 .10.6 TEMPERATURE TEST-EXEMPT LUMINAIRES LED LUMINAIRES WITH SEPARATE DRIVER AND ARRAYS

6 .10.6.1 LED Drivers - LED drivers must be NRTL Listed as a Class P driver to ANSI/UL 8750 and CAN/CSA C22.2 No. 250.13

6 .10.6.2 - LED Modules - LED Modules must be NRTL certified as follows:
a) Zhaga Book 7 certified modules with Tc 60°C maximum and NRTL certified to ANSI/UL 8750 and CAN/CSA 250.13; or
b) NRTL certified as functional safety compliant ANSI/UL 8750 and CSA 250.13

6 .10.6.3 SUPPLY CORDS AND CONDUCTORS
When the supply cord of a luminaire permits the cord to be pushed back into the enclosure, resulting in spacing between the cord and the driver of less than 76 mm (3 in), the supply cord shall be rated for at least 90 °C or for the temperature of any component it can contact, whichever is greater. Conductors shall have a minimum temperature rating in accordance with Table 15

6 .10.7 TEMPERATURE TEST-EXEMPT LUMINAIRES WITH SELF BALLASTED LAMPS

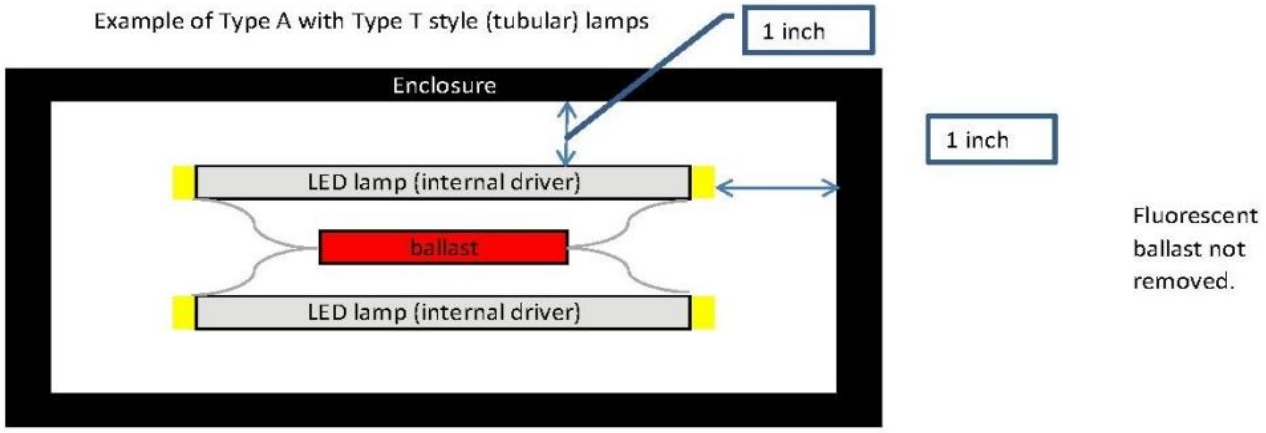
6 .10.7.1 In addition to the following section, the product must comply with clause 6.7 requirements for type A style (incandescent) lamp replacements and clause 6.8 requirements for type T (tubular fluorescent) style lamp replacements.

6.0 Critical Features

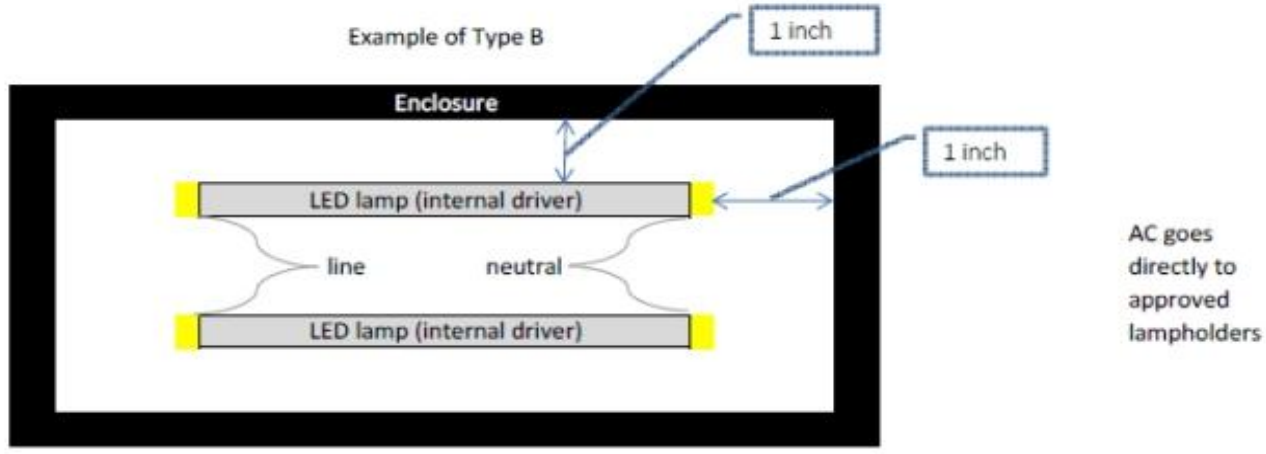
6 .10.7.2 A Luminaire is permitted to utilize LISTED LED lamps that are Edison base (E12, E26) or GU-24 type A lamps or Linear fluorescent replacement T lamps. In addition Type B LED linear fluorescent replacement retrofit kits (as defined below) are also allowed to be used.

Linear Fluorescent Replacements Lamps are defined as follows:

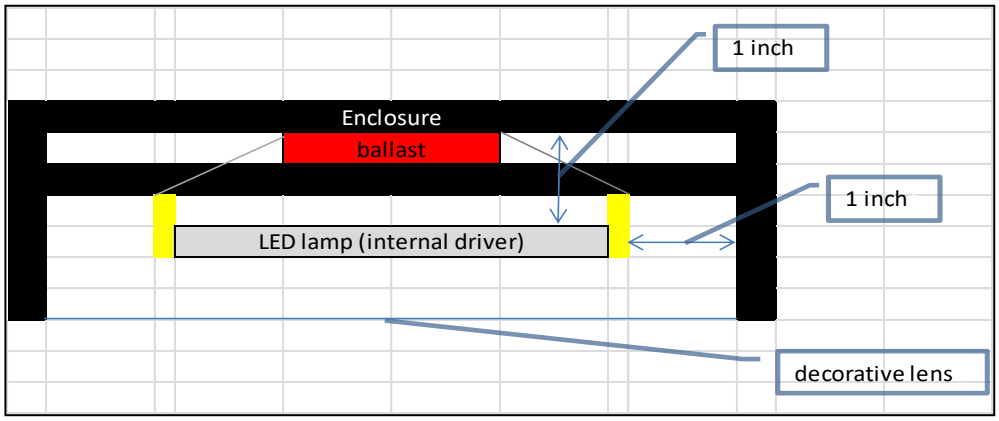
Type A – A device intended for general-use is intended for direct substitution of a fluorescent lamp and operating from ballast that would be provided for the fluorescent lamp without additional modifications of the fluorescent lamp circuit (this includes Listed Self Ballasted Lamps)



Type B – A device for special-use intended for operation in luminaires that are either factory wired especially for the devices or as a component for retrofit luminaire conversions involving modification of an existing luminaire, and the LED driver components are integral part of the device.



6 .10.7.3 Type A lamps are LISTED products. Type B and C are considered retrofit kits. Only Type A lamps and Type B retrofit kits are allowed under this general coverage program. Type C is not allowed. The retrofit kits must be Classified and installed per the instructions provided with the kit. The certification of the Type B retrofit kit shall not have any criteria for testing in the end product luminaire

6.0 Critical Features
6 .10.7.4 When installed on the luminare, any LED tubular lamp must be spaced minimum of 1 inch from any enclosure surface (the one in gap can include the ballast compartment that is generally on troffer fluorescent luminaires). A metallized polymeric reflector must be spaced a minimum of 3 inches (76.2 mm) from any lampholder, lamp contact, lampholder lead, wiring, or other electrical component (unless the reflector is provided as part of the retrofit kit). 
6 .10.7.5 Lampholders that are not provided as part of the kit are to be of the Tombstone type and are to be non-shunted type.
6 .10.8 RETROFIT KITS
6 .10.8.1 Classified retrofit kits may be use when installed per their intructions in the type of fixture that it was intended to be retrofited into.
6 .10.8.2 The following markings from the retrofit kits are to be included on the luminaires: LED Lamp Replacement Marking – Identification of the replacement LED lamp type/model to be used along with manufacturer and ordering information. S24-L1 format For a linear tubular LED lamp conversion, there shall be text or a diagram showing how the supply connections were made to the lampholders so the correct connections will be made to the lamp when the lamp is installed or replaced. S24-L5 format

6.0 Critical Features

6.11 Surface Mounted Luminaires

6 .11.1 SURFACE-MOUNTED GENERAL COVERAGE LUMINAIRES

6 .11.2 MOUNTING MEANS

A luminaire intended to be directly mounted to an outlet box shall be provided with two No. 8-32 machine screws if the luminaire surface containing the mounting screw holes is more than 3.2 mm (0.125 in) from the mounting surface. The length of each screw shall be at least 13 mm (0.5 in) plus the distance from the mounting surface to the luminaire surface that contains the screw holes.

A crossbar intended as the sole support for mounting a luminaire to an outlet box shall be at least 1.35 mm (0.053 in) thick if made of steel or at least 1.9 mm (0.075 in) thick if made of metal other than steel.

The thickness of a crossbar may be reduced to 1.0 mm (0.040 in) for steel and 1.4 mm (0.055 in) for metal other than steel if reinforced by forming flanges along the edges. The thickness of a crossbar may be less than 1.0 mm (0.040 in) for steel and 1.4 mm (0.055 in) for metal other than steel if the crossbar complies with the loading test. See Table of Type Tests if evaluated initially by Intertek.

A luminaire, including lamps, shall be provided with means of support independent of the outlet box and shall be marked with: **items 1.21 and 1.33 of table in section 6.20.**

and provided with installation instructions, if it is:

a) A ceiling surface type and weighs more than 22.7 kg (50 lb); or
b) A surface wall-mounted type and weighs more than 11.4 kg (25 lb) {or a surface wall-mounted type and weighs more than 22.7 kg (50 lb) For US only}.

A luminaire that is supported by a lamp holder screwshell shall not have:

a) A mass that exceeds 2.7 kg (6 lb); or
b) A dimension that exceeds 400 mm (15.75 in).

Any part supported by the external threads on the body of a lamp holder shall comply with the loading test. See Table of Type Tests if evaluated initially by Intertek.

6.0 Critical Features

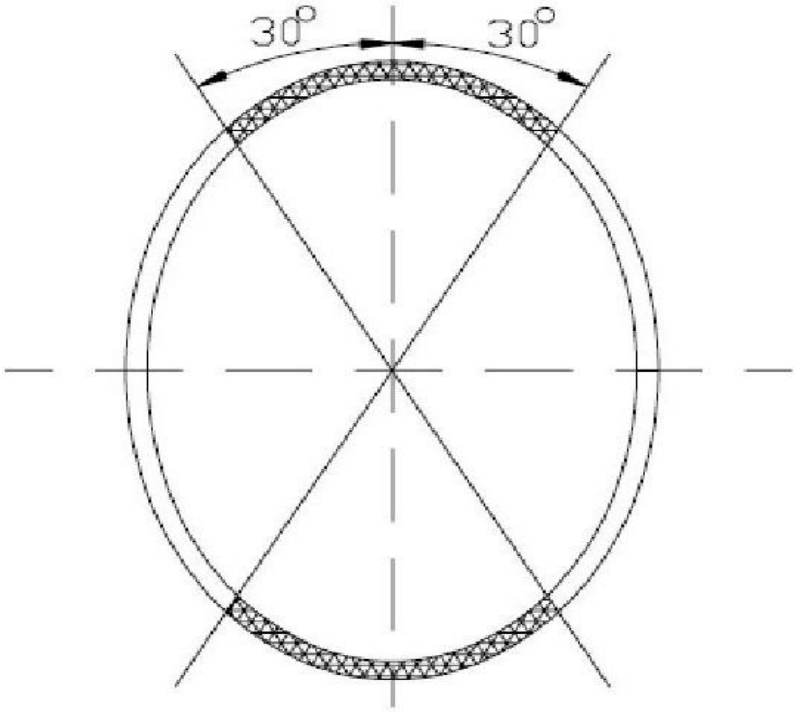
A luminaire intended to be mounted to an outlet box shall not be provided with a table, shelf, tray surface, basket, hook, eye, or other feature that allows the addition of weight. A luminaire provided with means to support it independently of the outlet box may be provided with a table, shelf, tray surface, basket, hook, eye, or other feature that allows the addition of weight. A luminaire supported by chain or cable shall use stranded wire from the point that the wire exits the luminaire enclosure to the point where it connects to the branch circuit supply conductors. The weight of the luminaire shall be supported by the chain or cable, not the conductors.

A flexible cord providing the sole support of a luminaire or luminaire part shall not be subjected to kinks or sharp bends, and shall be at least:

a) A not-for-hard-usage jacketed type if supporting a mass of 2.3 kg (5 lb) or less; or
b) A hard-usage jacketed type if supporting a mass of 4.5 kg (10 lb) or less.

A joint in a circular chain link shall be welded. A joint in a chain link of another shape shall not be located within 30 degrees of the vertical, as shown in Figure 9, unless welded.

Figure 9
Chain links



6.0 Critical Features

6 .11.3 reserved for future use

6 .11.4 OPEN HOLES AND OPENINGS

Open holes located 13 mm (0.5 in) or less from the surface on which the enclosure of a surface-mounted, outlet-box connected luminaire is intended to be mounted shall be considered to be one or more of the following:

a) Luminaire mounting holes;
b) Component mounting holes;
c) Pendant device mounting holes; or
d) Access holes.

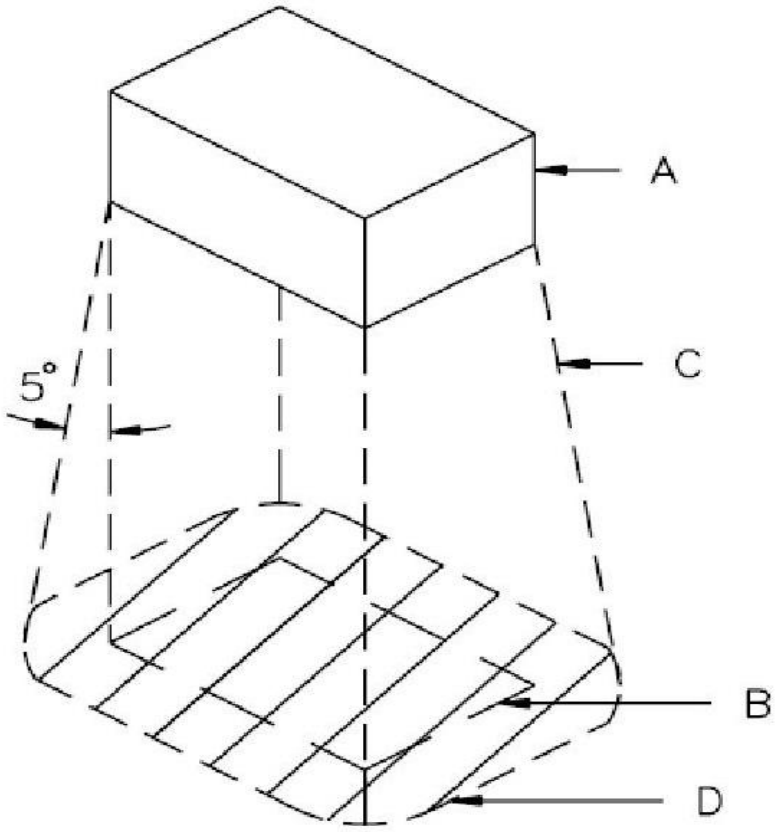
Open holes other than those specified above shall be considered to be general purpose open holes and shall comply with the requirements below.

General purpose open holes, such as ventilating open holes, shall be located more than 13 mm (0.5 in) from the mounting surface of a luminaire and shall comply with the following:

a) The area of each open hole shall not exceed 10 cm^2 (1.5 in^2).
b) The total area of holes shall be not more than 15 percent of the total area of the surface in which the hole or holes are located.
c) The open holes shall not be located in the mounting surface, in a canopy, or directly below electrical parts, as shown in Figure 10, that are required to be enclosed, unless the parts are protected by a baffle and shall meet the requirements of baffle.

6.0 Critical Features

Figure 10
Location of baffle – directly below



Notes:

A – Electrical component to be shielded by the baffle
B – Projection of the component outline on a horizontal plane.
C – Incline, 5 degree line, indicting minimum perimeter of the baffle.
D – Minimum area of the baffle.

6.0 Critical Features

Luminaire mounting holes may be any shape. A maximum of four open holes shall be permitted within the area directly below the outlet box opening in accordance with Figure 10. The maximum area of each hole shall be 2.6 cm^2 (0.41 in^2). Two additional holes shall be permitted for each 610 mm (24 in) of luminaire length in excess of 1270 mm (50 in).

Component mounting holes may be provided in the back enclosure, facing the luminaire mounting surface, provided that they comply with the following:

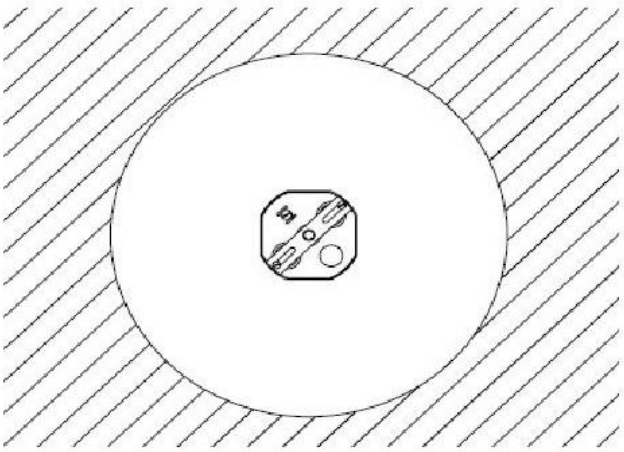
a) The maximum diameter of any open holes is 7.9 mm (0.313 in).
b) The maximum area of each unclosed portion of a slot used to accommodate components mounted in place or of an unused slot intended for accommodation of alternate components is 0.32 cm^2 (0.05 in^2).
c) The maximum total area of all unused open holes for alternate component mounting is 5.16 cm^2 (0.80 in^2).

Component mounting holes that are not closed off shall not be located within the area directly below the outlet box opening shown in Figure 10, unless baffled in accordance with baffle requirements.

A luminaire with a canopy that covers 1160 cm^2 (180 in^2) or more of the mounting surface shall be provided with a back enclosure. The back enclosure shall comply with the enclosure requirements. An open hole in the back enclosure shall:

a) If circular, have a maximum area of 1160 cm^2 (180 in^2) and have a maximum diameter of 380 mm (15 in), as shown in Figure 11; or
b) If not circular, have a maximum area of 1160 cm^2 (180 in^2) and a maximum linear length, usually diagonal, of 660 mm (26 in), as shown in Figure 12

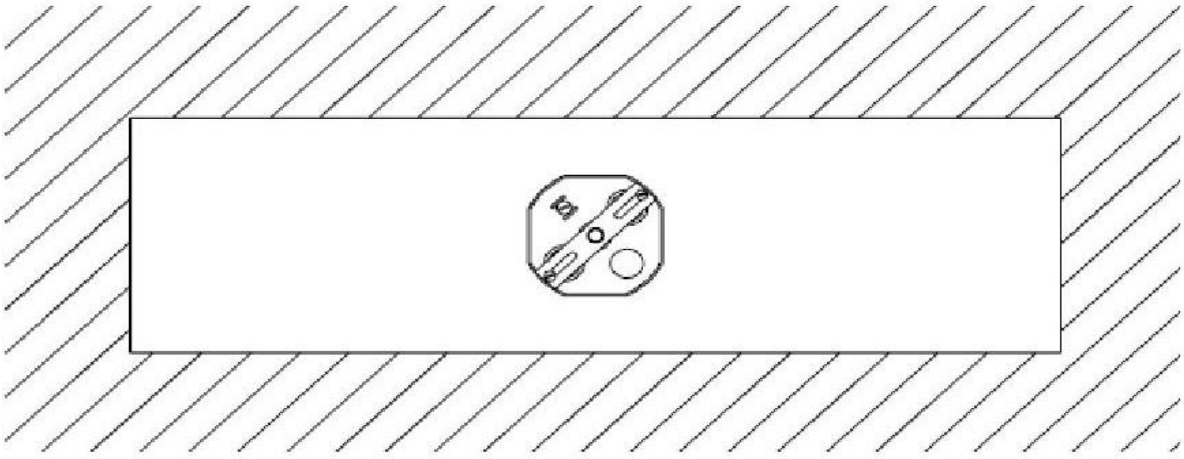
Figure 11
Back enclosure – circular open hole



Note: The circular open area is a maximum of 1160 cm^2 (180 in^2) and a maximum of 380 mm (15 in) diameter.

6.0 Critical Features

Figure 12
Back enclosure – non-circular open hole



Note: The non-circular open area is a maximum of 1160 cm^2 (180 in^2) and a maximum linear length, usually diagonal, of 660 mm (26 in).

A luminaire with a canopy that covers less than 1160 cm^2 (180 in^2) of the mounting surface and has the dimensions specified in above, Item (a) or (b), is not required to be provided with a back enclosure. An open hole in a luminaire enclosure need not comply with the requirements of Clause above or, provided that the open hole is closed off by a noncombustible mounting surface. The luminaire shall be marked for mounting on a noncombustible surface, in accordance with: **item 2.6 of table in section 6.20.**
This marking is not required when the opening is covered by a glass fiber pad that complies with the glass fiber requirement of thermal insulation.

An open hole or pair of holes may be provided for each stem or chain of a pendant device if each hole is closed by a suspension device. Knockouts may be provided in addition to, or in lieu of, the open hole or holes. An opening for a pull switch in a sheet metal drop canopy secured by set screws shall be located within 90 mm (3.5 in) of the center of the canopy. An opening for a pull switch in a sheet metal drop canopy secured by set screws that is reinforced by a minimum 3.2 mm (0.125 in) thick metal bar shall be located within 90 mm (3.5 in) of the means attaching the reinforcing bar to the canopy.

6.0 Critical Features

6 .11.5 ACCESSIBILITY OF SUPPLY CONNECTIONS

A luminaire shall allow for the inspection of branch circuit connections after installation. A luminaire weighing 4.54 kg (10 lb) or less, excluding diffusers, light-directing parts, and decorative parts, may be removed to provide access to branch circuit connections, without additional access openings. An access opening or separate means of luminaire support shall be provided if branch circuit connections or internal wiring can be subjected to a force of more than 4.5 kg (10 lb) during installation or field inspection. Chain, cable, hinges, or equivalent means of luminaire support shall be capable of withstanding the loading test.

Access openings or openings through a supporting strap, cross-bar, or plate may be of any shape and shall be:

a) A single opening that allows passage of a rod having a diameter of 44.5 mm (1.75 in); or
b) Two openings, each at least 10 cm^2 (1.5 in^2) in area, that allow passage of a rod having a diameter of 16 mm (0.625 in).

6 .11.6 ELECTRICAL CONSTRUCTION

The cord of a cord-connected luminaire that is required to be grounded shall contain an equipment grounding conductor. A conductor or flexible cord that is routed through the chain of a chain pendant luminaire shall have a minimum 0.80 mm (0.032 in) nominal insulation, and if a cord, it shall be at least Type SPT-1. A grounding conductor may be uninsulated.
A fluorescent pendant luminaire designed for a chain, hook, or similar means of suspension may be provided with a flexible power cord. Flexible cord provided with an attachment plug cap shall be at least of hard-usage type.

A flexible cord shall be provided with a strain-relief device that complies with the strain-relief test. The flexible cord on a chain or cable suspended luminaire shall not be required to be provided with strain relief. A luminaire that can be adjusted, after installation, to change the angle of light shall be provided with one of the following:

a) A cord bushing and a length of flexible cord of hard-usage type or heavier for connection to branch circuit conductors; or
b) A junction box cord grip bushing without a length of flexible cord.

A fluorescent or LED pendant luminaire designed for a chain, cable, hook, or similar means of suspension and intended to be mounted directly below an outlet is permitted to be provided with a flexible power cord of at least of hard-usage type.

A luminaire that can be adjusted, after installation, to change the angle of light, and where the supply connection point is on the adjustable portion, is permitted to be provided with one of the following:
a) a cord bushing and a length of flexible cord of hard-usage type or heavier for connection to branch circuit conductors;
b) a length of flexible cord of hard-usage type or heavier with a grounding type attachment plug or cord connector; or
c) a junction box cord grip bushing without a length of flexible cord.

A luminaire shall be shipped with the cord mounted in place and connected. In the United States, a luminaire may have a power supply cord that is not mounted in place and connected but shall be provided with installation instructions. In a pendant luminaire, a bonding conductor may be terminated by hardware that is also used to secure a lamp holder or lamp holder bracket if that is the only available termination point and if that part of the lamp holder is the only conductive part on the luminaire that is likely to become live.

6.0 Critical Features

A luminaire that requires branch circuit conductors rated greater than 60 °C and that may be installed in a dwelling shall include a caution and an installation warning marking on thluminaire and the carton, in accordance with: **items 1.32 and 3.18 of table in section 6.20**. Item 1.32 may be omitted if the carton is marked with: **items 1.31 and 3.18 of table in section 6.20**. When the branch circuit is mared for more than 90°C , it is marked in accordance with: **item 2.5 of table in section 6.20.**

A luminaire that has a flexible power cord and attachment plug and that is not provided with a hook, loop, or chain shall be marked for chain and hook suspension only is marked: **item 1.22 of table in section 6.20.**

A surface-mounted luminaire that is permitted to have a flexible cord may be provided with a detachable cord set and inlet when:
a) The cord set is packaged with or identified for use with the luminaire;
b) The cord set is at least of the hard-usage type;
c) The inlet is factory-wired, located on the luminaire's outer surface and accessible to an end-user from the room side;
d) Both the cord set and inlet are suitable for the electrical and environmental ratings of the luminaire;
e) Both the cord set and inlet are polarized or keyed to prevent electrical polarity reversal or unintentional mis-wiring during installation, use or maintenance;
f) The inlet is suitable for connection and disconnection under load. Alternatively, for non-IEC and non-NEMA configurations, the inlet need not be suitable for connection and disconnection under load provided the marking in **item 4.9 of table in section 6.20** is located adjacent to the inlet; and
g) For inlets with a grounding contact (pin), the grounding contact engages before the supply contacts during cord insertion, and the supply contacts disconnect before the grounding contact during cord disconnection.

6.12 Recessed Luminaires

6 .12.1 RECESSED GENERAL COVERAGE LUMINAIRES
The housing is constructed from metal. Polymeric material must be additionally evaluated.

6 .12.2 ENCLOSURES
The surfaces of an enclosure that are not visible from the room side shall have no open holes, except as specified in Clauses 6.11.3.8 and 6.11.4.3. Open holes in the surface of an enclosure of live parts that are visible from the room side shall comply with the requirements of Clause 6.10.4.

6.0 Critical Features

6 .12.3 JUNCTION BOXES

A junction box that complies with the component requirements of Clause 6.4.1 and is attached to a luminaire may have openings that do not comply with Clauses 6.11.2.

The wiring compartment (junction box) where the branch circuit connections to the luminaire are made shall be integral to the luminaire or securely fastened to its enclosure or frame. A wiring compartment attached by flexible conduit shall have additional means of securement.

The thickness of a junction box, excluding covers, shall be a minimum of 1.25 mm (0.050 in) if sheet steel, 2.3 mm (0.09 in) if nonferrous sheet metal, or 3.2 mm (0.125 in) if cast metal, with the following exceptions:
(a) the minimum thickness at or within 6.4 mm (0.25 in) of any right-angle bend in a drawn sheet steel box may be 0.9 mm (0.035 in).
(b) the average thickness of the sides and ends of a drawn steel box may be 1.24 mm (0.049 in), based on three measurements made on the side and end of the box, but a minimum of 9.5 mm (0.375 in) from a right-angle bend. The three measurements shall be made in a line perpendicular to the front of the box at the following points: a point 6.4 mm (0.25 in) from the front, a point 6.4 mm (0.25 in) from the right-angle bend at the back, and a point equidistant between the two.
(c) the wall of a malleable iron box or a die-cast or permanent-mold-cast aluminum, brass, or bronze box shall be in accordance with Table 2.
(d) a wall thickness of minimum 2.4 mm (0.094 in) shall be accepted for clearance of a cover screw in the area directly beneath the cover mounting lug if that area is no larger than 32.36 mm2 (0.050 in^2) and has no straight-line dimension more than 12.7 mm (0.5 in).
(e) if a luminaire is marked for use with cable only as specified in Clause 6.11.3.3, the junction box may be in accordance with the thickness requirement for openings for conduit connection specified in Table 1.
(f) if the luminaire complies with the junction box rigidity test of Clause 6.16.31, the junction box shall not be less than the thickness requirement for openings for conduit connection specified in Table 1.

An open hole in a box, such as a mounting-screw hole, shall have no dimension larger than 6.7 mm (0.265 in), except that a pryout hole or slot may be provided in a knockout for 1 in or smaller trade size conduit, provided that the area of the hole or slot is no more than 26 mm2 (0.040 in^2). All holes for entrances of conduit or armoured cable are to be closed except if threaded or provided with a threaded connector. The thickness of a sheet steel plug or plate used to close an open hole in a metal junction box shall be as specified in Table 17.

6.0 Critical Features

Table 17
Closure plug or plate thickness

Diameter of open hole in metal outlet box,		Minimum thickness of a sheet steel plug or plate,		Minimum thickness of a sheet aluminum plug or plate,	
mm	inch	mm	inch	mm	inch
Less than or equal to 32	1	0.7	0.028	2	0.079
More than 32	1.26	1.3	0.051	2	0.079

The thickness of a junction box cover shall be no less than:
(a) for sheet metal, the thickness requirements for enclosures specified in Table 1; or
(b) for cast metal, the thickness requirements of Table 2.

6 .12.4 RECESSED HOUSING

A recessed housing shall close off the opening in the surface in which it is mounted and have a minimum thickness of 0.66 mm (0.026 in) if ferrous metal or 0.71 mm (0.028 in) if nonferrous metal.

Where a luminaire recessed housing also serves as an enclosure, a top surface that is less than 30 degrees from the horizontal and any outer wall that contains any of the parts specified in Clause 6.5.3.2 shall have:

(a) a maximum of two pryout slots, each having a maximum area of 26 mm2 (0.04 in^2); and

(b) ballast mounting slots, each having a maximum unused area of 26 mm2 (0.04 in^2).

The recessed housing of a Type Non-IC luminaire that does not serve as an enclosure may have open holes in the shape of a slot or louvre that shall be a maximum 9.5 mm (0.375 in) wide and 10 cm2 (1.5 in2) in area. Any other open hole shall not allow passage of a rod having a diameter of 25 mm (1 in) and not exceed 10 cm2 (1.5 in2) in area. The total area of all open holes shall be maximum 15 percent of the area of the opening in the mounting surface closed off by the recessed housing.

The recessed housing of a Type IC luminaire that does not serve as an enclosure may have open holes in the shape of a slot or louvre that shall be a maximum 4.8 mm (0.188 in) wide and 10 cm2 (1.5 in^2) in area. Any other open hole shall not allow passage of a rod having a diameter of 6.4 mm (0.25 in) and shall not exceed 10 cm2 (1.5 in^2) in area. The total area of all open holes shall be a maximum of 15 percent of the area of the opening in the mounting surface closed off by the recessed housing.

A luminaire with openings in the housing that exceed those specified in Clause 6.11.4.3, 6.11.4.4, or 6.11.4.5 shall be marked for use in non-fire-rated installations only, in accordance with **Item 1.26 of table in section 6.20.**

6.0 Critical Features

6 .12.5 THERMAL PROTECTORS

When used, a Recognized thermal protector must be evaluated by Intertek and identified in section 4 of this report.

A recessed luminaire shall be provided with a thermal protector and comply with clause 6.4.1. The thermal protector may be of the self-heating thermal protector (SHTP) type. If a self-heating thermal connector is connected to a grounded supply, it shall be connected in the ungrounded supply conductor.

The thermal protector in a luminaire with a ballast or transformer shall be rated for inductive loads and the voltage and current involved.

A thermal protector in a luminaire with medium-base lampholders that can accommodate lamps of higher wattage than that marked on the lamp replacement shall have a minimum rating of 300 W Tungsten multiplied by the number of medium-base lampholders.

The thermal protector in a luminaire with other than medium-base lampholders that can accommodate lamps of higher wattage than that marked on the lamp replacement shall have a minimum tungsten lamp wattage rating equal to twice the maximum wattage specified in the lamp replacement marking multiplied by the number of lampholders that it controls.

6 .12.6 ELECTRICAL CONSTRUCTION

The branch circuit connections shall be accessible for visual inspection from the room side of the luminaire, unless:
(a) the luminaire is marked to restrict its use to installations where there is ready access to the ceiling side of the luminaire, in accordance with Item 2.7 of table in section 6.20; or
(b) access to branch circuit connections is provided in accordance with Clause 6.11.6.1.2.

The branch circuit connections are considered accessible from the room side of the luminaire if:
(a) the center of the wiring compartment cover is visible through the access opening; and
(b) all parts that are required to be removed to gain access are easily removed and replaced from the room side of the luminaire; and
(c) the luminaire construction is such that
(1) the diameter of the access opening is not less than 150 mm (6 in); or
(2) it complies with the splice inspection test of Clause 16.32; or
(3) the diameter of the access opening is less than 150 mm (6 in), as determined by the following equation, where X and Y are in accordance in Figure 11.6.1.1: $D \geq 75 + X + Y$

A tap conductor supplied with a luminaire shall:
(a) be enclosed in a raceway extending at least 450 mm (18 in) but not more than 2 m (6.5 ft) from the luminaire;
(b) extend at least 150 mm (6 in) from the raceway; and
(c) be at least 18 AWG if enclosed in a factory-installed raceway, or at least 14 AWG when supplied with a raceway and connectors for field installation.

(USA) In the United States, tap conductors furnished with the luminaire shall be building or fixture wire with an insulation thickness as specified in Table 18 (USA). The tap conductors shall extend at least 610 mm (24 in) but not more than 2 m (6.5 ft) beyond the recessed enclosure. luminaire furnished with tap conductors without flexible metal conduit shall be furnished with a connection fitting for either:
(a) 1/2 in or larger trade size conduit; or
(b) 3/8 in trade size conduit, provided the maximum number of conductors and the type of fitting are in accordance with the wire size and type shown in Table 18 (USA).

6.0 Critical Features

Table 18

Wire insulation thickness and maximum number of conductors in 3/8 in flexible metal conduit

Size		Maximum 0.8 mm (0.03 in) insulation with outer jacket[a]		0.5 – 0.8 mm (0.02 – 0.03 inin) insulation with outer jacket[b]		0.4 mm (0.015 in) insulation with outer jacket[d]		0.14 – 0.4 mm (0.006 – 0.015 in) insulation with outer jacket[d]	
AWG	mm^2	Inside[e]	Outside[f]	Inside[e]	Outside[f]	Inside[e]	Outside[f]	Inside[e]	Outside[f]
18	0.82	2	3	3	5	5	8	5	8
16	1.3	1	2	3	4	4	6	4	6
14	2.1	1	2	2	3	3	4	3	4
12	3.3	-	-	1	2	2	3	2	3
10	5.3	-	-	1	1	1	1	1	2

NOTE In addition, installation of one uninsulated grounding conductor of the same AWG size is optional.

[a] Examples: RH, RHH, FFH-2, RFH-2, SF-2, SFF-2.
[b] Examples: T, TW, XHHW, ZW, RUH, RUW, PFA, PFAH, TFE, TF, TFF, PF, PGF, PFF, PGFF.
[c] Examples: THHN, THWN, Z, RFH-1, FFH-1, TFN, TFFN, SF-1.
[d] Examples: KF-1, KF-2, KFF-1, KFF-2, SFF-1, HF, HFF, ZF, ZFF.
[e] Fitting is able to be located inside conduit.
[f] Fitting shall be outside conduit.

6 .12.7 TESTS - None

6 .12.8 MARKINGS

The temperature rating for the supply wire is to be marked with 90 °C per **Item 1.1 of table in section 6.20.**

A recessed luminaire that requires access from above the ceiling or from behind the wall to inspect splices shall be marked in accordance with **Item 2.7 or 2.8 of table in section 6.20.**

A luminaire intended to be shipped separately from the trim shall be marked for trim identification, in accordance with **Item 1.9 of table in section 6.20.**

A recessed luminaire with a thermal protector that is acceptable for connection to a branch circuit supply rated in excess of 20 A may be marked 30 A or 40 A, to indicate the maximum branch circuit rating, in accordance with **Item 1.2 of table in section 6.20.**

A recessed luminaire shall be marked with a caution, the maximum lamp wattage, and the type, in accordance with **Items 3.18 and 3.1 of table in section 6.20.**

6.13 Reserved for future use

6.14 Damp Location Luminaires

6 .14.1 GENERAL

Damp location luminaires will use moisture-resistant insulation materials such as vulcanized fiber, phenolic, urea or ceramic. Untreated fiber shall not be used. Lampholders will be listed for such use with screwshells of copper, copper alloy of at least 80% copper, nickel alloy or stainless steel.

6 .14.2 MARKING

The damp location luminaire will be marked verbatim with: **item 2.2 of table in section 6.20.**

The luminaire will not be provided with any markings, instructions, illustrations, on the carton or with the luminaire, that imply that it is suitable for use in wet locations.

Marking material has to be UL 969 approved.

6.0 Critical Features

6.15 TYPE TESTS

Certain luminaire constructions require type tests, that is, tests conducted during the initial evaluation as well as periodically throughout the production cycle. Each luminaire design shall be subjected to the applicable type tests a minimum of once over three months during production. If these tests are conducted by the manufacturer, the Intertek Field Rep shall witness the testing at least once a quarter unless noted in section 11.

6.16 Reserved for future use

6.17 Reserved for future use

6.18 Reserved for future use

6.19 Reserved for future use

6.20 Markings

6 .20.1
General

a) lettering on a pressure-sensitive label;
b) paint stenciled lettering;
c) ink-stamped machine lettering;
d) ink-hand-stamped lettering;
e) indelibly printed lettering;
f) die-stamped lettering;
g) embossed lettering;
h) molded or cast lettering; and
i) etched lettering in metal.

A Marking shall be of the minimum size (S_) and in the location (L_) shown in the “Format” and “Location” See Tables below for the size and location number explanations. Verbatim Markings are included as attached illustrations. Characters of embossed or cast letter, either in or out, shall be minimum 0.25 mm (0.010 in.) in depth. When permanent – type of label is required, paint stenciled, ink-stamped and indelibly printed lettering shall not be used unless subjected to special evaluation and described in the Special

6.0 Critical Features

The following markings may apply to the luminaire:

Item	Installation Instructions (marking) - for ETLus	Installation Instructions (marking) - additional for cETLus or when cETL only	Text	Format	Clause Reference
1.1	MIN ___°C SUPPLY CONDUCTORS	LES FILS D'ALIMENTATION ___ °C MIN	Verbatim	S16-L3 and S32-L4	6.6.15.1.5 6.6.15.1.5 (CAN) 6.7.2.3.2 6.7.2.3.3 6.7.2.3.4 6.7.2.3.5 6.8.5.2 6.10.6.9 (USA) 6.10.6.9 (CAN) 6.10.6.10 (CAN)
1.2	CONNECT TO BRANCH CIRCUIT RATED ___ AMPS MAX	POUR CONNEXION À UNE DÉRIVATION DE ___ AMPÈRES MAX		S16-L3	11.8.1.8 11.8.1.9
1.3	___ VOLTS ___ AMPS ___ WATTS ___ HERTZ or ___ V ___ A ___ W ___ HZ	___ VOLTS ___ AMPÈRES ___ WATTS ___ HERTZ ou ___ V ___ A ___ W ___ HZ		S16-L3	6.20.2.3
1.4	___ VOLTS ___ HERTZ or ___ V ___ HZ	___ VOLTS ___ HERTZ ou ___ V ___ HZ		S16-L3	6.6.2.2 6.7.1.4
1.5	N or NEUTRAL or W or WHITE	[Aucune traduction ne s'applique]		S16-L3	6.6.10.1
1.8	ASSEMBLE PART [Catalogue Number] ONLY WITH PART [Catalogue Number]	ASSEMBLER LA PIÈCE [référence au catalogue] SEULEMENT AVEC LA PIÈCE [référence au catalogue]		S24-L4	6.5.2.3 6.20.2.4
1.12	PROPRIETARY WIRING SYSTEM [Name, Part Number, Cautionary Marking]	RÉSEAU DE CÂBLAGE BREVETÉ [nom, numéro de la pièce, mise en garde]		S16-L2	6.6.15.1.1
1.20	INSTALL PHOTOCONTROL OR SHORTING PLUG	INSTALLER UNE CELLULE PHOTOÉLECTRIQUE OU UNE PRISE COURT-CIRCUITANTE		S16-L2	6.6.4.1.5
1.21	THIS LUMINAIRE MUST BE MOUNTED OR SUPPORTED INDEPENDENTLY OF AN OUTLET BOX	CE LUMINAIRE NE DOIT PAS ÊTRE MONTÉ SUR UNE BOÎTE DE SORTIE NI SUPPORTÉ PAR UNE TELLE BOÎTE (Note: French is not required for		S16-L2	6.10.2.5 6.10.2.5 (USA)
1.22	FOR CHAIN OR HOOK SUSPENSION ONLY	SUSPENDRE SEULEMENT À L'AIDE DE CHAÎNES OU DE CROCHETS		S16-L2	6.10.8.4
1.25	PUSH CONDUCTORS INTO JUNCTION BOX	ENFONCER LES FILS DANS LA BOÎTE DE JONCTION		S16-L2	6.7.2.7.2
1.26	FOR USE IN NON-FIRE-RATED INSTALLATIONS ONLY	UTILISER SEULEMENT DANS DES INSTALLATIONS OÙ LE DEGRÉ DE RÉSISTANCE AU FEU N'EST PAS ÉTABLI		S16-L2	11.4.7 11.8.5.2
1.27	FOR LINE VOLTS-AMPERES MULTIPLY TOTAL LAMP WATTAGE BY 1.5	POUR LA TENSION VECTORIELLE (VA) DU SECTEUR, MULTIPLIER LA PUISSANCE TOTALEEN WATTS DES AMPOULES PAR 1,5		S16-L3	6.8.6.1
1.28	FOR LINE VOLTS-AMPERES MULTIPLY TOTAL LAMP WATTAGE BY 2.5	POUR LA TENSION VECTORIELLE (VA) DU SECTEUR, MULTIPLIER LA PUISSANCE TOTALE EN WATTS DES AMPOULES PAR 2,5		S16-L3	6.8.6.1
1.29	FOR LINE VOLTS-AMPERES MULTIPLY TOTAL LENGTH OF ALL LAMPS IN INCHES BY ___	POUR LA TENSION VECTORIELLE (VA) DU SECTEUR, MULTIPLIER LA LONGUEUR TOTALE DES AMPOULES EN po PAR ___		S16-L3	6.8.6.1
1.30	USE THERMALLY PROTECTED BALLAST FOR TYPE ___ LAMPS	UTILISER UN BALLAST PROTÉGÉ THERMIQUEMENT POUR LES LAMPES DE TYPE ___		S16-L2	6.8.6.3
1.31	THIS PRODUCT MUST BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE INSTALLATION CODE BY A PERSON FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF THE PRODUCT AND THE HAZARDS INVOLVED	CE PRODUIT DOIT ÊTRE INSTALLÉ SELON LE CODE D'INSTALLATION PERTINENT, PAR UNE PERSONNE QUI CONNAÎT BIEN LE PRODUIT ET SON FONCTIONNEMENT AINSI QUE LES RISQUES INHÉRENTS		S24-L4	6.10.8.1 6.20.5.1

6.0 Critical Features

Item	Installation Instructions (marking) - for ETLus	Installation Instructions (marking) - additional for cETLus or when cETL only	Text	Format	Clause Reference
1.32	CONSULT A QUALIFIED ELECTRICIAN TO ENSURE CORRECT BRANCH CIRCUIT CONDUCTOR	CONSULTER UN ÉLECTRICIEN QUALIFIÉ POUR VOUS ASSURER QUE LES CONDUCTEURS DE LA DÉRIVATION SONT ADÉQUATS (Note: French is not required for this marking for Canada)		S24-L4	6.10.8.1 6.10.8.1 (CAN)
1.33	INSTALLATION OR ASSEMBLY INSTRUCTIONS	[Aucune traduction ne s'applique] (Note: French is not required for this marking for Canada for Clauses 6.10.2.5 or 6.10.6.7)		S16-L5	6.5.1.2 6.5.2.2 6.5.15.2.4 6.5.15.2.5 6.6.14.1.3 6.6.14.2.13 6.6.15.1.1 6.6.15.1.3 6.10.2.5 6.10.2.5 (USA) 6.10.2.6 6.10.6.7 (USA)
1.43	THIS LUMINAIRE IS PROVIDED WITH A FACTORYINSTALLED EMERGENCY LIGHTING BATTERY PACK	CE LUMINAIRE EST ÉQUIPÉ EN USINE D'UNE BATTERIE DES LUMIÈRES D'URGENCE		S16-L2	6.8.7
1.46	VOLTAGE AND CURRENT RATING OF LUMINAIRE	INTENSITÉ ET TENSION ASSIGNÉES DU LUMINAIRE		S24-L5	6.20.8, 8.7.2, 10.4.2
2.1	DRY LOCATIONS ONLY	POUR EMPLACEMENTS SECS SEULEMENT	Verbatim	S16-L2	6.13.1.2
2.2	SUITABLE FOR DAMP LOCATIONS	CONVIENT AUX EMPLACEMENTS HUMIDES	Verbatim	S16-L2	6.13.1.2 6.13.3.1.1
2.5	NOT FOR USE IN DWELLINGS	NE PAS UTILISER DANS LES LOGEMENTS	Verbatim	S16-L3	6.6.7.1.1 6.6.15.1.4 6.7.2.3.2 6.10.6.9 (USA) 6.10.6.9 (CAN) 6.10.6.10 (CAN)
2.6	NONCOMBUSTIBLE SURFACE ONLY	POUR SURFACES INCOMBUSTIBLES SEULEMENT	Verbatim	S16-L3	6.10.4.9, 6.10.8.3, 6.20.43
2.7	ACCESS ABOVE CEILING REQUIRED	ACCÈS REQUIS AU-DESSUS DU PLAFOND	Verbatim	S16-L2	11.6.1.1 11.8.1.4
2.8	ACCESS BEHIND WALL REQUIRED	ACCÈS REQUIS DERRIÈRE LE MUR	Verbatim	S16-L2	11.8.1.4
2.10	WALL MOUNT ONLY	INSTALLATION MURALE SEULEMENT	Verbatim	S16-L2	6.7.2.7.1
2.13	MOUNTING ORIENTATION – (Such as this end up)	SENS DE MONTAGE [par exemple, cette extrémité vers le haut]		S16-L2	6.20.4.1
2.16	SUITABLE FOR CONTINUOUS ROW MOUNTING	PEUT ÊTRE MONTÉ EN RANGÉE CONTINUE		S16-L2	6.5.19.1
3.1	MAX ___ WATTS TYPE ___ or MAX ___ W TYPE ___	MAX ___ WATTS TYPE ___ ou MAX ___ W TYPE ___	Verbatim	S32-L1 for "MAX" and S16-L1 for remainder of marking text	6.7.1.2 6.7.2.5.2 6.7.2.6.1 6.7.3.1.2
3.3	MAX ___ WATTS or MAX ___ W	MAX ___ WATTS ou MAX ___ W		S16-L1	6.6.5.1
3.4	MAX ___ AMPS or MAX ___ A	MAX ___ AMPS ou MAX ___ A		S16-L1	6.6.5.1
3.5	FUSE [identification] ___ AMPS	FUSIBLE [identification] ___ AMPÈRES		S24-L6	6.6.6.2
3.7	AC ONLY	C.A. SEULEMENT		S16-L3	6.6.2.2

6.0 Critical Features

Item	Installation Instructions (marking) - for ETLus	Installation Instructions (marking) - additional for cETLus or when cETL only	Text	Format	Clause Reference
3.18	CAUTION – RISK OF FIRE	ATTENTION – RISQUE D'INCENDIE (Note: French is not required if marked for clauses 6.7.1.2 or 6.7.2.6.1)	Verbatim	S24-L1	6.7.1.2 6.7.1.2 (CAN) 6.7.2.5.2 6.7.2.5.2 (CAN) 6.7.2.6.1 6.7.2.6.1 (CAN) 6.10.8.1
3.19	CAUTION – RISK OF SHOCK	ATTENTION – RISQUE DE CHOC (Note: French is not required for Canada for this marking.)	Verbatim	S24-L1	6.6.4.1.4 6.6.4.1.4 (CAN)
3.25	BALLAST DISCONNECT	DÉBRANCHMENT DU BALLAST	Verbatim	S24-L6	6.8.9.1
3.26	UNPLUG POWER SUPPLY CORD LOCATED AT _____ or UNPLUG CONNECTOR LOCATED AT_____	DÉBRANCHER LE CORDON D'ALIMENTATION SITUÉ _____ ou DÉBRANCHER LE CONNECTEUR SITUÉ _____		S24-L6	6.8.9.1
4.1	MANUFACTURER'S IDENTIFICATION	IDENTIFICATION DU FABRICANT		S16-L2	6.8.6.2 6.20.2.1 6.20.2.4
4.2	CATALOGUE NUMBER OR CAT. NO. OR SIMILAR PRODUCT IDENTIFICATION	RÉFÉRENCE AU CATALOGUE OU RÉF. CAT. OU IDENTIFICATION SIMILAIRE DU PRODUIT		S16-L2	6.8.6.2 6.20.2.2
4.3	DATE MARKING OR CODED FORM CONSISTING OF, AT LEAST, MONTH AND YEAR	MARQUAGE DE LA DATE OU MARQUAGE CHIFFRÉ INCLUANT AU MOINS LE MOIS ET L'ANNÉE		S16-L2	6.20.2.1
4.4	G or GR or GRD or GND or GRND or GROUND or ⏚	G ou GR ou GRD ou GRND ou GROUND ou ⏚		S16-L3	6.6.14.2.9 6.6.14.2.12
4.5	TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT	POUR EVITER LES CHOCS ELECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA FENTE LA PLUS LARGE		S16-L5	6.6.10.4
4.6	USE CLASS P DRIVERS ONLY	UTILISATION CLASSE P PILOTES SEULEMENT		S24-L6	6.9.2.4
4.9	CAUTION – RISK OF SHOCK – DO NOT MAKE OR BREAK CONNECTION UNDER LOAD	ATTENTION – RISQUE DE CHOC – N'OUVREZ ET NE FERMEZ PAS LA CONNEXION SOUS CHARGE		S24-L1	11.6.9

6 .20.2 IDENTIFICATION AND RATINGS

A luminaire shall be marked with the following:

a) Manufacturer's identification
b) Date code of at least the month and year of manufacture
c) Factory identification, if more than one location,
d) Other markings, as required.

A luminaire shall be marked with catalogue number, model number, series number, or other similar designation. A luminaire that employs a ballast or transformer shall be marked with the input rating in volts, hertz, and total amperes or watts, unless the required marking is shown on the ballast or transformer, and is visible during installation and inspection of wire connections.

Where parts of a luminaire, except for lenses, diffusers, and decorative parts, are shipped in more than one package, each package shall be marked with the following:

a) The manufacturer's identification
b) Part numbers, group numbers, descriptive designation, or other identification.

See section 6.22 for marking lay out.

6.0 Critical Features

Format minimum size designation for marking height and typeface

Size Designation	Letter Height		Font Size (points)	Font typeface, upper case
	(mm)	(in)		
S16	1.6	0.062	6	Not specified
S24	2.4	0.094	10	Univers bold, Arial bold, Helvetica bold, Zurich BT bold
S32	3.2	0.125	12	Not specified
S48	4.8	0.188	19	Univers bold, Arial bold, Helvetica bold, Zurich BT Bold

Format Location Designation for Marking

Location Designation	Description	Label exposed to a dry/damp environment	Label exposed to a wet environment
L1	Visible during relamping, after installation	Type P	Type P
L2	Visible during installation	Type N	Type P
L3	Visible during installation and inspection of wire connections, located near the supply connections	Type N	Type P
L4	On the smallest unit package or carton	Type T	Type T
L5	On an instruction sheet or tag	Type T	Type T
L6	Visible during component replacement	Type P	Type P

Note:
Type P – Permanent label or nameplate
A label that is intended to remain in the applied position for the lifetime of the luminaire under conditions of intended use.
Uses: Information required for user maintenance over the expected life of the product.
Material: Metal, plastic, or other suitable material with an adhesive suitable for the temperature involved and comply with Clause 20.1.7.
Type N – Non-permanent label or nameplate
A label that is intended to remain in place only for the purpose of installation.
Uses: Certification mark, manufacturer's identification, product identification.
Material: Paper with an adhesive suitable for the temperature involved.
Type T – Temporary label or instruction sheet
A label, instruction sheet, or tag that is not required after installation.
Uses: Installation instructions, and information not required after installation.
Material: Printed matter with or without adhesive and/or attachment, intended to be included with or attached to the product.

6 .20.3 INSTALLATION, OPERATING AND SAFETY INSTRUCTIONS

Instructions for installation and use of this product are provided by the manufacturer.

Wiring instructions that specify the proper method of connecting the grounding means and maintaining polarity shall be included with the luminaire in a manner that will require the installer to handle the instructions during installation, or the luminaire carton shall be marked to require installation by a person familiar with the construction and operation of the product and the hazards involved, in accordance with:

THIS PRODUCT MUST BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE INSTALLATION CODE BY A PERSON FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF THE PRODUCT AND THE HAZARDS INVOLVED / CE PRODUIT DOIT ÊTRE INSTALLÉ SELON LE CODE D' INSTALLATION PERTINENT, PAR UNE PERSONNE QUI CONNAÎT BIEN LE PRODUIT ET SON FONCTIONNEMENT AINSI QUE LES RISQUES INHÉRENTS (S24-L4)

6.0 Critical Features

The instructions may be separately provided on a publicly accessible website if the luminaire is marked “See (specific URL inserted here) for installation, operation, and maintenance instructions”.

In lieu of providing an instruction sheet or tag (designation L5), installation, and assembly instructions **item 1.33 of table in section 6.20**. may be provided on a publicly accessible web site if the equipment is marked in accordance with **item 1.44.1 of table in section 6.20.**

6.21 MARKING ILLUSTRATIONS AND WIRING INSTRUCTIONS

NOTE - For products bearing the cETL or cETLus mark, must have all required markings Bi-Lingual in French and English.
Representative required markings and instruction labels are to be included in this Section 7 during the initial evaluation by Intertek. (other than markings that are called out above)

6.22 Multiple Listee Similarity-

-MULTIPLE LISTEE 1 Note:
For MULTIPLE LISTEE 1 MODELS

For Multiple listee model suffix variables refer to basic listee model variables definition in Section 2.0 Model Similarity column.

7.0 Illustrations

No Illustrations are used in this report.

8.0 Test Summary				
Evaluation Period	23-Sep-2024 to 28-Oct-2024		Project No.	240923091GZU
No testing was performed during this evaluation. The Manufacturer Lighting Compliance Representatives (MLCR) were trained and are evaluated for the requirements of the program annually.				
	Name	Location	Evaluation Date	Re-Evaluation Due
The following MLCR were evaluated:	Lianpei Chen	7th Floor, Building 6, No. 288 East Coast North Road, Haizhou Village, Guzhen Town, ZHONGSHAN CITY Guangdong Province 528442, China	28-Oct-2024	27-Oct-2025

8.1 Signatures			
A representative sample of the product covered by this report has been evaluated and found to comply with the applicable requirements of the standards indicated in Section 1.0.			
Completed by:	William Chen	Reviewed by:	Xavier Xie
Title:	Engineer	Title:	Sr. Supervisor
Signature:	*Signature on file*	Signature:	*Signature on file*

9.0 Correlation Page For Multiple Listings

The following products, which are identical to those identified in this report except for model number and Listee name, are authorized to bear the ETL label under provisions of the Intertek Multiple Listing Program.

BASIC LISTEE	Zhongshan Dengku Lighting Co., Ltd
Address	7th Floor, Building 6, No. 288 East Coast North Road, Haizhou Village, Guzhen Town, ZHONGSHAN CITY Guangdong Province 528442
Country	China
Product	General Coverage Luminaires

MULTIPLE LISTEE 1	Shanghai Xianzeng Trading Company Limited
Address	11/F, No.65 Huang Jia Que Road, Huangpu District, Shanghai, 200001
Country	China
Brand Name	Vonluce
ASSOCIATED MANUFACTURER	Zhongshan Dengku Lighting Co., Ltd
Address	7th Floor, Building 6, No. 288 East Coast North Road, Haizhou Village, Guzhen Town, ZHONGSHAN CITY Guangdong Province 528442
Country	China

MULTIPLE LISTEE 1 MODELS	BASIC LISTEE MODELS
PDL followed by up to twenty characters CDL followed by up to twenty characters	PDK followed by up to twenty characters.
CLF followed by up to twenty characters TCL followed by up to twenty characters	CDK followed by up to twenty characters.
BVL followed by up to twenty characters WLS followed by up to twenty characters	WDK followed by up to twenty characters.

10.0 General Information

The Applicant and Manufacturer have agreed to produce, test and label ETL Listed products in accordance with the requirements of this Report. The Manufacturer has also agreed to notify Intertek and to request authorization prior to using alternate parts, components or materials.

COMPONENTS

Components used shall be those itemized in this Intertek report covering the product, including any amendments and/or revisions.

LISTING MARK

The ETL Listing mark applied to the products shall either be separable in form, such as labels purchased from Intertek, or on a product nameplate or other media only as specifically authorized by Intertek. Use of the mark is subject to the control of Intertek.

The mark must include the following four items:

1) applicable country identifiers "US" and/or "C" or "US", "C" and "EU"
2) the word "Listed" or "Classified" or "Recognized Component" (whichever is appropriate)
3) a control number issued by Intertek
4) a product descriptor that identifies the standards used for certification. Example:

For US standards, the words, “Conforms to” shall appear with the standard number along with the word, “ Standard” or “Std.” Example: “Conforms to ANSI/UL Std. XX.”

For Canadian standards, the words “Certified to CAN/CSA Standard CXX No. XX.” shall be used, or abbreviated, “Cert. to CAN/CSA Std. CXX No. XX.”

Can be used together when both standards are used.

If all standards on the ATM have the same standard title, the shared title or its abbreviation may be used in place of the examples above. Example: "Medical Electrical Equipment" or "MEE"; "Information Technology Equipment" or "ITE"; "Audio/Video Information And Communication Technology Equipment" or "A/V ICTE".

Note: A facsimile must be submitted to Intertek, Attn: Follow-up Services for approval prior to use. The facsimile need not have a control number. A control number will be issued **after signed Certification Agreements** have been received by the Follow-up Services office, approval of the facsimile of your proposed Listing Mark, satisfactory completion of the Listing Report, and scheduling of a factory assessment in your facility.

MANUFACTURING AND PRODUCTION TESTS

Manufacturing and Production Tests shall be performed as required in this Report.

FOLLOW-UP SERVICE

Periodic unannounced audits of the manufacturing facility (and any locations authorized to apply the mark) shall be scheduled by Intertek. An audit report shall be issued after each visit. Special attention will be given to the

1. Conformance of the manufactured product to the descriptions in this Report.
2. Conformance of the use of the ETL mark with the requirements of this Report and the Certification Agreement.
3. Manufacturing changes.
4. Performance of specified Manufacturing and Production Tests.

In the event that the Intertek representative identifies non-conformance(s) to any provision of this Report, the Applicant shall take one or more of the following actions:

1. Correct the non-conformance.
2. Remove the ETL Mark from non-conforming product.
3. Contact the issuing product safety evaluation center for instructions.

10.1 Evaluation of Unlisted Components

Because Unlisted Components are uncontrolled, and they do not fall under a third party follow up program, Intertek may require these components to be tested and/or evaluated at least once annually, more often for certain components, as part of the independent certification process. The Unlisted Components in Section 5.0 require testing and/or evaluation as indicated.

The Applicant will be notified, in writing, via the applicable contact methods, as defined in Section 1.0, when these components must be selected and sent to Component Evaluation Center (CEC) for re-evaluation.

Due to particular testing requirements, some components may be requested to be shipped to specific labs. Thus, specific shipment destination(s) for each sample will be provided in the written notification.

Managing CEC Location:
Intertek Testing Services Shenzhen Limited Guangzhou Branch
ETL Component Evaluation Center
Room 101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District
Guangzhou, Guangdong, China
Attn: Ms. Joey Kuang
Sample Disposition: Due to the destructive nature of the testing, all samples will be discarded at the conclusion of testing unless, the manufacturer specifically requests the return of the samples. The request for return must accompany the initial component shipment.

11.0 Manufacturing and Production Tests

The manufacturer agrees to conduct the following Manufacturing and Production Tests as specified:

Required Tests

Dielectric Voltage Withstand Test, Grounding Continuity Test, Polarity Test, Strain Relief Test, Ground Screw Torque Test, Glass Support Test, Conduit Knock Out and Twistout Test, Self-Threading Screw Torque Test, Loading/Mounting Test, Snap-In or Tab Mounted Parts or Parts Secured with Friction without Conduit Openings Test, Snap-In or Tab Mounted Parts or Parts Secured with Friction with Conduit Openings Test, Suspended Ceiling Luminaire - Security of Clips Test, Movable Joint Torsion and Pull Test, Enclosure Secured by Friction Test, Insulation Resistance Test

Test records should be retained for a period of at least 6 months, and should include test quantity, test dates, catalogue or model numbers, test results, and disposition of any non-complying products

11.1 Dielectric Voltage Withstand Test

Method

A dielectric voltage-withstand test shall be performed on 100 percent of production of luminaires that contain conductors that are:

a) not visible after assembly; or
b) enclosed for a distance more than 38 mm (1.50 in) within

1) a stem, arm, or tubing; or
2) conduit that is not listed or certified.

A fluorescent luminaire with the construction described above and provided with a removable cover for access to conductors shall not be required to be subjected to the factory dielectric voltage-withstand test.

Test Equipment

The test equipment shall incorporate a transformer with an essentially sinusoidal output, a means to indicate the applied test potential, and an audible and/or visual indicator of dielectric breakdown.
The test equipment shall incorporate a voltmeter in the output circuit to indicate directly the applied test potential if the rated output of the test equipment is less than 500VA.
If the rated output of the test equipment is 500VA or more, the applied test potential may be indicated by either:
1 - a voltmeter in the primary circuit;
2 - a selector switch marked to indicate the test potential; or
3 - a marking in a readily visible location to indicate the test potential for test equipment having a single test potential output.
In cases 2 and 3, the test equipment shall include a lamp or other visual means to indicate that the test potential is present at the test equipment output. All test equipment shall be maintained in current calibration.

Products Requiring Dielectric Voltage Withstand Test:

Product	Test Voltage	Test Time
All products covered by this Report.	1000V or 1200V	60 s 1 s

11.2 Grounding Continuity Test

Method

A grounding continuity test shall be performed on luminaries with:

a) non-current-carrying metal parts that can become energized and are accessible during user maintenance; or
b) snap-in lamp holders with integral grounding means.

The testing shall be performed as follows:

a) at least once per production run per design for temperature-test-exempt luminaries; and
b) at least once per quarter per design for all other luminaries.

The grounding continuity test apparatus shall be an ohmmeter or similar indicating instrument capable of measuring 0.1 ohms. The measured or calculated resistance between the point of connection of the grounding means and any non-current-carrying metal parts shall not exceed 0.1 Ω.

Grounding Continuity Test for Unassembled Luminaries

A grounding continuity test shall be performed on a representative design at least once per quarter. The grounding continuity test for a luminaire that is shipped with the enclosure unassembled, or with snap-in or tab-mounted parts, shall be conducted in the following manner:

a) The luminaire shall be completely assembled in accordance with the assembly instructions. The grounding continuity test shall be performed after the applicable parts pull test specified in Items b) and c). The grounding continuity test apparatus is as noted above. The resistance between the two test points shall not exceed 0.1 Ω.
b) If the assembled enclosure part is not provided with a knockout or conduit opening, the parts pull test shall be conducted. See Section above.
c) If the assembled enclosure part is provided with a knockout or conduit opening, the parts pull test shall be conducted. See Section above.

Products Requiring Grounding Continuity Test:

All products covered by this Report.

11.3 Polarity Test

Method

One sample of each luminaire design required to comply with the identification and polarity requirements in Section 6.10 shall be tested at least once per quarter to determine compliance with the polarity test, unless the polarity can be verified visually.

Continuity shall be verified between the point where the identified (neutral) branch circuit conductor is intended to be connected to the luminaire and the lamp holder screw shell, using an indicating device such as an ohmmeter or other continuity testing device.

Products Requiring Polarity Test:

All products covered by this Report that are provided with a cord and plug.

11.4 Strain Relief Test

Method

One sample of each luminaire design with a power supply cord shall be tested at least once per quarter to determine compliance with the strain-relief test consisting of applying a force of 35 pounds (156 N) for 1 minute to the cord in a direction perpendicular to the cord entrance opening. There can be no movement of the cord more than 1.6 mm (0.063 in.) and the conductors should not break or loosen the connections inside the luminaries.

One sample of each luminaire design with a lamp-supported lamp holder shall be tested at least once per quarter to determine compliance with the strain-relief test as stated above except the force is 20 pounds (89 N).

Products Requiring Strain Relief Test:

All products covered by this Report that are provided with a strain relief.

11.5 Ground Screw Torque Test

Method

One sample of each luminaire design with a screw for securing the branch circuit equipment grounding conductor shall be tested at least once per quarter to determine compliance with the ground-screw assembly strength test of Clause 16.39.

A 12 AWG (3.3 mm2) solid-copper, insulated conductor shall be stripped to a length of 2.5 cm (1inch) minimum. The wire shall be wrapped around the screw under the screw head so that it makes a minimum 180° turn. The conductor shall be seated to follow any wire guides or dimples provided to align the conductor with the mating surface. The ground screw shall be tightened with a calibrated torque screwdriver to 1.6 N·m (14 lb-in). When tested as described in this section, there shall not be damage to the head of the ground screw which would prevent the 1.6 N·m (14 lb-in) of tightening torque to be achieved or stripping of the ground screw assembly.

Products Requiring Ground Screw Torque Test:

All products covered by this Report. Unless luminaire is provided with leads on the lamp holder for permanent connection.

11.6 Glass Support Test

Method

One sample of each luminaire style that employs a glass diffuser supported by friction alone shall be tested at least once per quarter. The test is to consist of weighing the diffuser and then 4 times that weight of sand or equipment material poured into the diffuser and evenly disturbed. The diffuser is to be mounted as intended and it is required to stay in place for 1 minute.

Products Requiring Glass Support Test:

All products covered by this Report when provided with glass secured by friction.

11.7 Conduit Knock Out and Twistout Test

Method

A force of 44 N (10 lb) was applied to each knockout for 1 minute by means of a 6.4 mm (0.250 inch) diameter mandrel with a flat end to one sample of a knockout/twistout. The force was applied to the exterior surface of the knockout, in a direction perpendicular to the plane of the knockout, and at the point most likely to result in movement. The test apparatus was (per Clause 19.23). The knockout/twistout must remain in place. The clearance between the knockout and the opening cannot exceed 1.6 mm (0.063 in) when measured after the force had been removed.

Products Requiring Conduit Knock Out and Twistout Test:

All products provided with a conduit knockout or twistout. Must be conducted initially by Intertek and then witnessed quarterly by an Intertek representative.

11.8 Self-Threading Screw Torque Test

Method

One sample of each of the self threading or sheet metal screws employed for securement of electrical parts or enclosure components were installed as intended and tightened with a torque of 3.39 N m (30 lb in). The screws were then subjected to a force equal to four times the weight of the part secured, in a direction coincident with the axis of the screw.

Products Requiring Self-Threading Screw Torque Test:

Only on self-threading or sheet metal screws used for mounting or supporting a part that weighs more than 3.4 kg (7.5 lb) per screw. Must be conducted initially by Intertek and then witnessed quarterly by an Intertek representative.

11.9 Loading/Mounting Test

Method

One sample of the supporting device of the sample (see section "Products Requiring Loading/Mounting Test") was subjected to a load equal to four times the total mass that is normally supported under intended operating conditions for 60 minutes. The load was applied in the direction of actual loading conditions.

Products Requiring Loading/Mounting Test:

Unthreaded tubing joints, fasteners (such as ferrules secured to the end of steel support cable used to support all or part of the luminaire), cast metal fasteners (such as chains, hooks, threaded nipples, and hickeys used to support the luminaire or sections of the luminaire), Decorative parts secured by friction alone (no mechanical device) and luminaires with special hardware used for mounting the luminaire. Must be conducted initially by Intertek and then witnessed quarterly by an Intertek representative.

11.10 Snap-In or Tab Mounted Parts or Parts Secured with Friction without Conduit Openings Test

Method

One sample of the part under test was installed per the manufacturer's instructions and was subjected to an evenly distributed 44.5 N (10 lb) force which was applied for 1 minute in the direction most likely to dislodge the part being tested. Before and after the test, the sample was subjected to the grounding continuity test (Clause 17.2).

The resistance was measured with a ohmmeter or similar device. If the resistance measured was above 0.1 Ω, then the impedance test was performed by passing a 30A current from part to be grounded to the grounding terminal means for a period of 2 minutes and measuring the voltage drop and the resistance between them at the end of the time period.

The part must comply with bonding test, the part must remain attached and no deformation more than 3.2 mm (0.125 inch))

Products Requiring Snap-In or Tab Mounted Parts or Parts Secured with Friction without Conduit

Snap-in or tab-mounted part not provided with a knockout or conduit opening and not secured by at least one screw or rivet. Must be conducted initially by Intertek and then witnessed quarterly by an Intertek representative.

11.11 Snap-In or Tab Mounted Parts or Parts Secured with Friction with Conduit Openings Test

Method

One sample of the part under test was installed per the manufacturer's instructions A length of rigid conduit was connected to the opening in the part to be tested. The total length of exposed conduit was 305 mm (12 inch) The part was mounted to the luminaire as intended. A 133 N (30 lb) force was applied for 1 minute at the end of the conduit in a direction perpendicular to the plane of the part being tested. A 45 N (10 lb) force shall be applied for 1 minute at the end of the conduit in a direction parallel to the plane of the part being tested and in the direction most likely to dislodge the part. The test shall be repeated for each opening, using a new sample for each test. The bonding impedance test was then conducted per Clause 17.2

The resistance was measured with a ohmmeter or similar device. If the resistance measured was above 0.1 Ω, then the impedance test was performed by passing a 30A current from part to be grounded to the grounding terminal means for a period of 2 minutes and measuring the voltage drop and the resistance between them at the end of the time period.

The part must comply with bonding test, the part must remain attached.

Products Requiring Snap-In or Tab Mounted Parts or Parts Secured with Friction with Conduit

A snap-in or tab-mounted part of a luminaire provided with a knockout or conduit opening that was not additionally secured by at least one screw or rivet. Must be conducted initially by Intertek and then witnessed quarterly by an Intertek representative.

11.12 Suspended Ceiling Luminaire - Security of Clips Test

Method

One sample with integral suspended ceiling clips was mounted as intended to a representative ceiling grid. The ceiling grid was inverted so that the total weight of the luminaire was applied normal to the luminaire mounting plane for a period of 1 minute.

The fixture must remain attached to the ceiling grid.

Products Requiring Suspended Ceiling Luminaire - Security of Clips Test:

Luminaires secured with clips to connect to a ceiling grid. Must be conducted initially by Intertek and then witnessed quarterly by an Intertek representative.

11.13 Movable Joint Torsion and Pull Test

Method

One sample of the movable joint was subjected to a torsion of 2.26 ± 0.056 N•m (20 ± 0.5 lb•in) for a period of one minute. Following this, a straight pull applied by a mass of 16 kg (35.6 lb) or four times the maximum weight recommended by the manufacturer (whichever is greater) for a period of one minute.

No damage can occur to the movable joint.

Products Requiring Movable Joint Torsion and Pull Test:

Luminaires provided with movable joints (where wire is subject to movement). Must be conducted initially by Intertek and then witnessed quarterly by an Intertek rrepresentative.

11.14 Insulation Resistance Test

Method

One hundred percent of production of the products covered by this Report that the Dielectric Voltage Withstand Test was not conducted shall be subjected to a routine production line insulation resistance test.
The test shall be conducted on products that are fully assembled. Prior to applying the test potential, should be closed so that the input circuit is energized by the test potential.
The test potential shall be applied between input circuit and accessible parts, including enclosure, output terminals. The test potential may be gradually increased to the specified value but must be maintained at the specified value for the time as required. A voltage of 500 Vdc was applied for a minimum duration of 1 s. The measured resistance should not be less than 2 MΩ. For safety reasons, the test should be performed with the luminaire disconnected from the power supply

Test Equipment

The test equipment is a dc insulation tester capable of delivering the appropriate open circuit voltage (i.e., 500 V dc), or other suitable equipment.

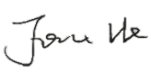
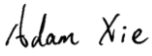
Products Requiring Insulation Resistance Test:

Product

All products covered by this Report that the Dielectric Voltage Withstand Test was not conducted.

12.0 Revision Summary

The following changes are in compliance with the declaration of Section 8.1:

Date/ Proj # Site ID	Project Handler/ Reviewer	Section	Item	Description of Change
22-Apr-2025	Jone He 	6.0	22	Added item 22 "Multiple Listee Similarity" for multiple listee 1.
250403227GZU	Adam Xie 	9.0	1	Added MULTIPLE LISTEE 1 "Shanghai Xianzeng Trading Company Limited".