iii. Compact fluorescent luminaires, having an integral electronic ballast, with a maximum relamping rated wattage of 42 watts.

2. Luminaires with line voltage lamp holders not containing permanently installed ballasts are always classified as incandescent luminaires. The wattage of such luminaires shall be determined as follows:

   a. The maximum relamping rated wattage of the luminaire; and

   b. For recessed luminaires with line-voltage medium screw base sockets, wattage shall not be less than 50 watts per socket.

      For example, if a recessed luminaire has a relamping rated wattage on a permanent, pre-printed, factory-installed label of 30 watts, it shall be counted as 50 watts; if a recessed luminaire has a relamping rated wattage of 90 watts, it shall be counted as 90 watts.

      Peel-down labels are never recognized for any type of incandescent luminaire.

3. Luminaires and luminaire housings designed to accommodate a variety of trims or modular components that allow the conversion between incandescent and any other lighting technology without changing the luminaire housing or wiring shall be classified as incandescent.

4. Screw-based adaptors shall not be used to convert an incandescent luminaire to any type of non-incandescent technology. Screw-based adaptors, including screw-base adaptors classified as permanent by the manufacturer, shall not be recognized for compliance with the Standards.

5. Luminaires and luminaire housings manufactured with incandescent screw base sockets shall be classified only as incandescent. Field modifications, including hard wiring of an LED module, shall not be recognized as converting an incandescent luminaire or luminaire housing to a non-incandescent technology for compliance with the Standards.

6. Luminaires with permanently installed or remotely installed ballasts will be either fluorescent or high intensity discharge. Wattage shall be determined as follows:

   a. Wattage shall be the operating input wattage of the rated lamp/ballast combination published in ballast manufacturer's catalogs based on independent testing lab reports as specified by UL 1598.

   b. Replacement of lamps in a luminaire manufactured or rated for use with linear fluorescent lamps, with linear lamps of a different technology such as linear LED lamps, shall not be recognized as converting the fluorescent luminaire to a different technology for compliance with the Standards.

7. The wattage of line-voltage lighting track and plug-in busway which allows the addition or relocation of luminaires without altering the wiring of the system shall be determined by one of the following methods:

lighting system for compliance with The Standards. LED modules having screw-bases including screw based pig-tails, screw-based sockets, or screw-based adaptors shall not be recognized as a LED lighting system for compliance with The Standards. The intent of this requirement is to not give credit for screw based LED lamps. An ANSI/IES RP-16-2010 integrated or non-integrated LED lamp is one with a screw base. The governing wattage of a luminaire with a screw based lamp is the rated luminaire wattage and not the LED lamp. If one wants to take credit for the lower wattage afforded by a LED lamp then the luminaire must have a **GU-24 socket** or be a hard wired LED luminaire (i.e. contain a LED light engine) that is rated according to IES LM-79-08.

d. Luminaires and luminaire housings equipped with screw-base sockets shall not be classified as a LED lighting system for compliance with The Standards.

e. Luminaires manufactured or rated for use with low-voltage incandescent lamps, into which have been installed LED modules or LED lamps, shall not be recognized as a LED lighting system for compliance with the Standards.

f. For LED lighting systems which allow the addition of luminaires or light engines without rewiring, the wattage of such luminaires shall be the maximum rated input wattage of the power supply, labeled in accordance with §130.0(c)1 or published in the power supply manufacturer's catalog.

10. The wattage of all other miscellaneous lighting equipment shall be the maximum rated wattage of the lighting equipment, or operating input wattage of the system, labeled in accordance with §130.0(c)1, or published in manufacturer's catalogs, based on independent testing lab reports as specified by UL 1574 or UL 1598. Lighting technologies listed in subsections 2 through 9 shall be determined in accordance with the applicable requirements in subsections 1 through 9.

D. Summary of installed luminaire wattage

The installed wattage of indoor lighting luminaires are calculated as follows for the various type of systems

- Line voltage screw based luminaires (not including track lighting)
  - The wattage of the luminaire (but not less than 50 Watts) regardless of the wattage of the lamp is the rating of the luminaire housing
- Luminaires containing a hardwired ballasts
  - The rated input wattage of the lamp/ballast
- Line voltage track lighting one of the following:
  - The larger of the rated wattage of luminaires installed on the track or 45 Watts per linear foot
  - The volt-amps of the circuit serving the track

  - The larger of the volt-amps of the integral current limiter serving the track or 12.5 Watts per linear foot of track
  - The volt amps of the dedicated overcurrent protection in track lighting supplementary overcurrent protection panel

- Low voltage luminaires with hardwired or remotely installed transformers
  - If the lamps cannot be replaced without rewiring the rated wattage of lamp/transformer combination
  - If the lamps can be replaced without rewiring (i.e. the lamps fit into a socket), the maximum rated input wattage of the transformer.
- Light emitting diode (LED) with "light engine" wattage is the greater of:
  - the maximum rated input wattage of the system when tested in accordance with IES LM-79-08, or
  - the labeled wattage of the luminaire
- Screw-in LED or CFL lamps or screw-in assemblies are not recognized for their lower wattages, the rating for luminaires with screw-in lamps or assemblies is the labeled rating of the luminaire itself.

E. The 2013 Title 24, Part 6 Nonresidential Appendix NA8 provides an alternate option for determining how many watts of power is used per luminaire. NA8 provides tables that contain a limited list of lamp and ballast combinations. These tables in NA8 provide an alternate voluntary option to the provision in §130(c) for determining luminaire power for any lamp and ballast combination specifically listed in NA8. Appendix NA8 is not intended to list all possible lamp and ballast combinations, and shall not to be used to determine luminaire power for any lighting system not specifically listed in NA8.

When using NA8 to determine luminaire power, luminaire classification shall still be determined in accordance with §130.0(c).

Lamp ballast combinations included in Appendix NA8 are:

- Fluorescent U-Tubes
- Fluorescent Linear Lamps T5
- Fluorescent Rapid Start T-8
- Fluorescent Eight foot T-8 High Output (HO) with Rapid Start Ballasts
- High Intensity Discharge (Metal Halide and High Pressure Sodium)
- 12 Volt Tungsten Halogen Lamps Including MR16, Bi-pin, AR70, AR111, PAR36

EXCEPTIONS: There are two exceptions to the requirements for these controls to be readily accessible and located in the same room:

a. In malls, auditoriums, retail and wholesale sales floors, industrial facilities, convention centers, and arenas, the lighting control shall be located so that a person using the lighting control can see the lights or area controlled by that lighting control, or so that the lighting control for the area is annunciated.

Annunciated is defined in the Standards as a type of visual signaling device that indicates the on, off, or other status of a load.

b. Public restrooms having two or more stalls may use a manual switch that is not accessible to unauthorized personnel. However, all other lighting controls in accordance with §130.1 are still required.

C. Interaction of Manual ON and OFF Switches with Other Lighting Controls

1. In addition to the manual area lighting controls, other lighting controls may be installed provided they do not override the functionality of controls installed in accordance with §130.1(a)1 (functionally controlled with a manual switch), §130.1(a)2 (readily accessible), or §130.1(a)4 (separately controlled lighting systems).

D. Separately Controlled Lighting System

In addition to the requirements in §130.1(a)1, 2, and 3:

1. General lighting shall be separately controlled from all other lighting systems in an area.
2. Floor and wall display, window display, case display, ornamental, and special effects lighting shall each be separately controlled on circuits that are 20 amps or less.
3. When track lighting is used, general, display, ornamental, and special effects lighting shall each be separately controlled.

1.4.2 Multi-Level Lighting Controls.

§130.1(b)

A. The multi-level lighting control requirements allow a room to be occupied with all of the lights turned on, part of the lights turned on, and none of the lights turned on, whether the room is occupied or not. The number of required lighting control steps varies, depending on the type of lighting technology in each installed luminaire, in accordance with Table 5-1. The uniformity requirements in Table 5-1 require that multi-level control occur per luminaire so one cannot meet this requirement by controlling alternate luminaires or alternate rows of luminaires.

B. This requirement applies to enclosed spaces larger than 100 square feet and with a connected lighting load greater than 0.5 W/ square foot. In addition, these spaces also must comply with the following:

1. Lighting shall have the required number of control steps and meet the uniformity requirements in accordance with TABLE 5-1; and

- Are permanently anchored to the floor, provided that neither commercial industrial stacks nor industrial storage stacks are permanent full height interior partitions.

g. Column 3 of Table 5-6 shall be used to determine the additional allowed power for wall display lighting as follows:

   i. Use the same Primary Function Area Category row in column 1 that was used to determine the general lighting power density allotments for the area;

   ii. Find the corresponding Wall Display Power (W/linear ft) in column 3;

   iii. Determine the length of qualifying display walls in a single room or area:

   iv. Multiply the Wall Display Power times the length of qualifying display walls, to calculate Wall Display lighting power allowance.

h. A mounting height multiplier is available in Table 5-7 for wall display luminaires mounted 12 feet or higher, where mounting height is the distance from the finished floor to the bottom of the luminaire.

   i. The mounting height multiplier is NOT available for the general lighting power density allotment.

   ii. The mounting height multiplier in Table 5-7 shall be used inversely to reduce the input wattage of luminaires (adjusted input wattage).

   iii. Wall display lighting with varying mounting heights shall be separately determined.

   In a single room, or single area having wall display lighting, using § 130.0(c) to determine luminaire classification and input wattage, do the following:

   - Separately add together the input wattage of all wall display luminaires mounted lower than 12 feet. These luminaires do not qualify for a height multiplier.

   - Separately add together the input wattage of all wall display luminaires mounted between 12 feet to lower than 16 feet. Multiply the total input wattage of these luminaires times 0.85. This will be your adjusted input wattage for these luminaires

   - Separately add together the input wattage of all wall display luminaires mounted higher than 16 feet. Multiply the total input wattage of these luminaires times 0.70. This will be your adjusted input wattage for these luminaires

i. Use the same Primary Function Area Category row in column 1 that was used to determine the general lighting power density allotments for the area;

ii. Find the corresponding Allowed Combined Floor Display Power and Task Lighting Power (W/ft2) in column 4;

iii. Determine the square feet of the qualifying area.

iv. Multiply the Allowed Combined Floor Display Power and Task Lighting Power Floor Display/Task Lighting Power allowance.

l. A mounting height multiplier is available in Table 5-7 for floor display and task luminaires mounted 12 feet or higher, where mounting height is the distance from the finished floor to the bottom of the luminaire.

iv. The mounting height multiplier is NOT available for the general lighting power density allotment.

v. The mounting height multiplier in Table 5-7 shall be used inversely to reduce the input wattage of luminaires (adjusted input wattage),

vi. Floor display lighting and task lighting luminaires with varying mounting heights shall be separately determined.

In a single room having floor display lighting and/or task lighting luminaires, using § 130.0(c) to determine luminaire classification and input wattage, do the following:

- Separately add together the input wattage of all floor display lighting and task lighting luminaires mounted lower than 12 feet. These luminaires do not qualify for a height multiplier.

- Separately add together the input wattage of all floor display lighting and task lighting luminaires mounted between 12 feet to lower than 16 feet. Multiply the total input wattage of these luminaires times 0.85. This will be your adjusted input wattage for these luminaires.

- Separately add together the input wattage of all floor display lighting and task lighting luminaires mounted higher than 16 feet. Multiply the total input wattage of these luminaires times 0.70. This will be your adjusted input wattage for these luminaires

m. The additional allowed power for all floor display lighting and task lighting luminaires lighting shall be the smaller of the calculated Floor Display/Task Lighting Power allowance, or the sum total of the adjusted input wattage of all luminaires used for floor display and task lighting systems in that room or area, using the smaller of the following:

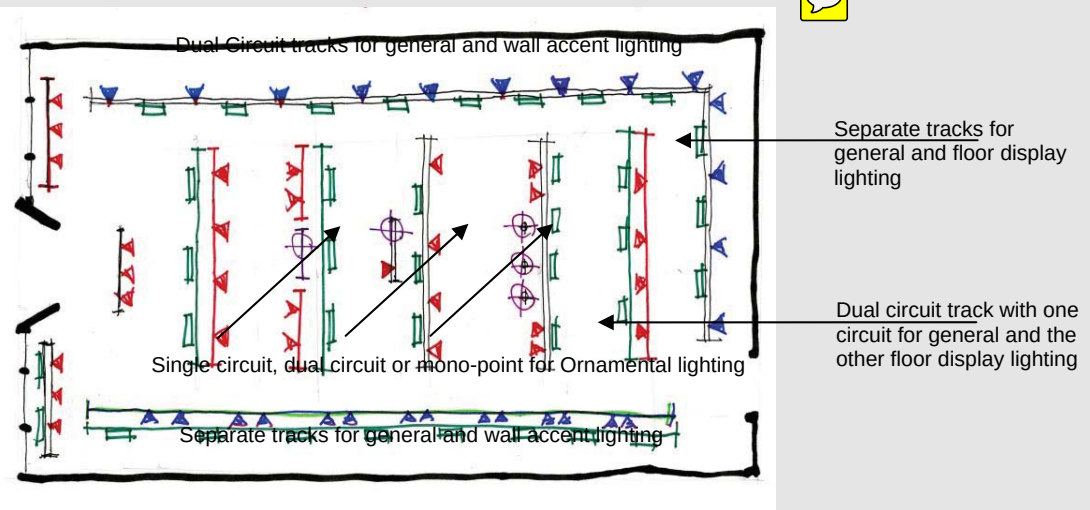
TABLE 5- 7: (table 140.6-D in the Standards)
Tailored Method Lighting Power Allowances

1	2	3	4	5
Primary Function Area	**General Illumination Level (Lux)**	**Wall Display Power (W/ft)**	**Allowed Combined Floor Display Power and Task Lighting Power (W/ft²)**	**Allowed Ornamental/ Special Effect Lighting**
Auditorium Area	300	2.25	0.3	0.5
Civic Meeting Place	300	3.15	0.2	0.5
Convention, Conference, Multipurpose, and Meeting Center Areas	300	2.50	0.4	0.5
Dining Areas	200	1.50	0.6	0.5
Exhibit, Museum Areas	150	15.0	1.2	0.5
Financial Transaction Area	300	3.15	0.2	0.5
Grocery Store Area	500	8.00	0.9	0.5
Hotel Function Area	400	2.25	0.2	0.5
Lobby Area:				
Hotel lobby	200	3.15	0.2	0.5
Main entry lobby	200	0	0.2	0
Lounge Area	200	7.00	0	0.5
Malls and Atria	300	3.50	0.5	0.5
Religious Worship Area	300	1.50	0.5	0.5
Retail Merchandise Sales, and Showroom Areas	400	14.00	1.0	0.5
Theater Area:				
Motion picture	200	3.00	0	0.5
Performance	200	6.00	0	0.5
Transportation Function Area	300	3.15	0.3	0.5
Waiting Area	300	3.15	0.2	0.5

TABLE 5- 8: (Table 140.6-E in the Standards)
Adjustments for Mounting Height Above Floor

Height in feet above finished floor and bottom of luminaire(s)	Floor Display or Wall Display – Multiply by
< 12'	1.00
12' to 16'	1.15
> 16’	1.30

Owners of a retail store want to use track lights for all the sales floor lighting. The shops selling floor is 50 ft x 100 ft with 10 ft high ceilings. There are 125 ft of sales wall and decorative pendants for ornamental effect lighting also mounted on track. All the merchandise is on open sell racks, tables or on wall shelves and hangers. There will be no casework or high-end valuable merchandise lighting required in the design. **Part one:** using tailored compliance, what is the maximum allowed lighting power? **Part two:** based on the design description, what other compliance requirements are unique to this approach?



Answer – Part 1

The allowed maximum wattage is **13,750W** or LPD is 2.75W/ft² which is determined as follows:

From Standards Table140.6-D, Column 2, the general illumination for retail is 400 lux. From Standards Table 5-9, the LPD for 400 lux in a space with the RCR determined as <2.0 is 0.9W/ft². Therefore, the allowed general lighting power is 0.9W/ft² X 5,000 ft² = 4500W along with the allowed floor display lighting from Table 140.6-D column 4 which is 1.0W/ft² X 5,000 ft² = 5000W and the allowed wall display lighting from the same table column 3 which is 14W/ft X 125 ft = 1750W. Plus an ornamental lighting adder from column 5 of 0.5 W/ft² X 5,000 ft² = 2500W [4500 + 5000 +1750 + 2500 =13,750]

Answer – Part 2

Dual circuit track, multiple independently circuited tracks or combination of both will be required for an all track design to conform to Title 24-2013 Tailored lighting compliance.

Retail stores or other spaces using Tailored Compliance that use track lighting exclusively for the layered lighting approach as defined in the Tailored Method must provide a system for separately switching and controlling the layered lighting components (general, floor display, wall display and ornamental lighting). One solution is the use of dual circuit track with one circuit dedicated to general lighting and the other to wall display or floor display, based on where the track is located and on its assigned function. If/when ornamental lighting is also powered by track; it must also be separately circuited using dual circuit track or a separate dedicated track.

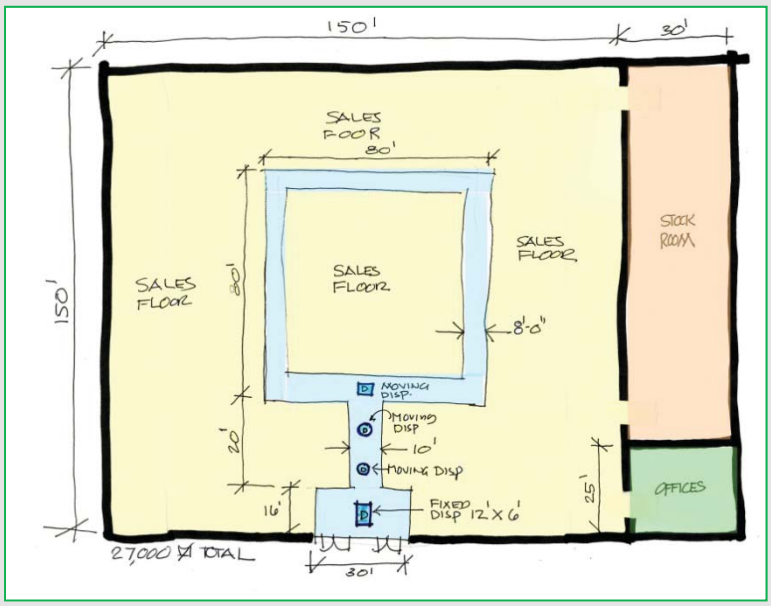
Another solution is to use multiple, single circuit tracks, as needed, with each track circuited for its specific task (general, display or ornamental lighting).

Note: each lighting task; general, display and/or ornamental lighting must be separately circuited and controlled. Therefore, in an application that has an area with general lighting, wall and floor display and ornamental lighting all occurring multiple adjacent dual circuit tracks or a combination of tracks and other power connections (such as mono-points) may be needed.

Example 1-31 Tailored compliance LPD for retail space

Question

How are the task spaces and allowed LPD's determined for a 27,000 square foot retail store with sales areas, stockrooms and offices using Tailored Compliance?



Answer

Determine square footage allowances by space type, as well as allowed maximum watts, for each area as follows:

1) Identify spaces allowed Tailored Method compliance and those requiring Area Method. Only the sales area can use Tailored Compliance (per table 140.6-D of the standards) stock rooms and offices are not in the tailored tables and therefore must comply under the area method (Table 5-4).

2). Square footage of offices and stockrooms are determined by multiplying the length and width of each space (25 X 30 = **750 ft²** for offices) (30 X 125 = **3750 ft²** for stockrooms). The allowed maximum watts for offices and stockrooms are then determined by multiplying the allowed LPD of the space (Table 140.6-C of the Standards) by the area of the space.

3) Sales floor uses the total area as was used for offices and stock rooms. However the gross sales area also includes major circulation paths that are required by code (evacuation egress). Therefore these egress areas must be deducted from the total sales floor footprint to determine allowed sales area when using Tailored Compliance. Note: the same is also true for a sales area complying under the area method. Allowed sales floor square footage is therefore **19,980 ft²** (150 X 150 = 22500 minus 2520 total egress area shown in pale blue on plan).

To determine maximum allowed watts for the sales floor it is also necessary to identify the lineal foot of qualifying walls eligible for wall display. Total maximum watts for the sales floor is then determined by using the allowed LPD for general lighting based on the RCR of the space and the LPD (columns 2, 3 & 4 from Table 5-6 and Table 5-9 of the standards) for allowed floor display, wall display and ornamental effect lighting.

1.10 Compliance and Enforcement

1.10.1 Indoor Lighting Compliance Documents

At the time a building permit application is submitted to the enforcement agency, the applicant also submits plans and energy compliance documentation.

Energy compliance documentation, including instructions for filling out the documentation, is located in Appendix A of this manual (2013 Nonresidential Compliance Manual).

This section describes the recommended forms and procedures for documenting compliance with the lighting requirements of the Standards. It does not describe the details of the requirements. The following discussion is addressed to the designer preparing construction and compliance documents, and to the enforcement agency plan checkers who are examining those documents for compliance with the Standards.

The use of each form is briefly described below, and complete instructions for each form are presented in the following subsections. These forms may be included in the lighting equipment schedules on the plans, provided the information is in a similar format as the suggested form.

- LTG-1C: Certificate of Compliance:

This form is required for every job, and all four pages are required to appear on the plans.

- LTG-2C: Lighting Controls Credit Worksheet:

This form is only required when calculating control credit watts. See Standards Table 146-C for lighting control credits.

- LTG-3C: Interior Lighting Power Allowance Worksheet:

This form is required when calculating the Lighting Power Allowance using the Complete Building, Area Category, or Tailored Method for compliance. For conditioned and unconditioned spaces the allowed watts need to be separately indicated in the appropriate sections on the form.

- LTG-4C: Tailored Method Worksheet:

This form should only be required when calculating the Lighting Power Allowance using the Tailored Method.

- LTG-5C: Line Voltage Track Lighting Worksheet:

This form is only used when line voltage track lighting is used.

LTG-1C: Certificate of Compliance

The LTG-1C Certificate of Compliance form has four pages. Each page must appear on the plans (usually near the front of the electrical drawings). A copy of these forms should also be submitted to the enforcement agency along with the rest of the compliance submittal at the time of building permit application. With enforcement agency approval, the applicant may use alternative formats