

The image shows a modern interior space. A large, dark green rectangular box is centered in the upper half of the frame, containing the text 'SPACE TYPES - DESIGN BRIEFS' in white, all-caps, serif font. The background is a photograph of a room with a vibrant orange wall. On the left, there is a square window with a dark frame and a light-colored sill. Below the window, a horizontal strip of recessed lighting illuminates a wall of large, rectangular, light-colored stone tiles. To the right of this tiled area, a dark, possibly black, fireplace or built-in cabinet is visible. The floor is made of light-colored, square tiles. The ceiling is a plain, light color.

SPACE TYPES -  
DESIGN BRIEFS

## TOILETS, LOCKERS AND SHOWER DESIGN BRIEF

The NYC Department of Design and Construction (DDC) manages the construction and renovation of NYC's municipal buildings, many of which contain public restrooms as well as toilets, lockers and shower facilities for their employees. These guidelines are intended for municipal buildings such as offices, libraries, institutions and light industrial buildings. Although many considerations may apply, these guidelines were not developed for spaces subject to vandalism, requiring high security, or for commercial spas and sports centers.

### LIGHTING QUALITY STRATEGIES

Toilet rooms, locker rooms and showers have specific considerations because of their function and spatial characteristics. Please review and use the guidelines below, in concert with the basic design and quality issues discussed earlier in the Design Strategies section of this manual.

### SPECIFIC LIGHTING QUALITY AND QUANTITY STRATEGIES

ISSUE	IMPORTANCE
Relationship between light source and visual task and viewer	Very Important
Glare Control – Direct and Reflected Glare	Important
Three-dimensional modeling of objects	Important
Uniformity – No Shadows	Somewhat Important
Luminances of Room Surfaces	Somewhat Important

From *The IESNA Lighting Handbook, 9<sup>th</sup> Edition*.

courtesy: NYC Department of Design and Construction



*Lighting is primarily needed at the perimeter walls of restrooms -- over mirrors, sinks and toilets.*

#### Relationship Between Light Source And Visual Task And Viewer

The relationship of the light source to the objects in the space (toilets, lockers, mirrors) and the reflection of light from these surfaces to the viewer is very important in these space types, to avoid veiling reflections, shadows and glary lamp images. (See layout strategies)

#### Glare Control

The most common glare problems in toilet, locker and shower lighting are from direct reflections of light sources in mirrors, or from veiling reflections on glossy or shiny surfaces that mask visibility.

#### Three-dimensional Modeling

Lighting that promotes facial recognition and modeling is preferred in spaces where regarding mirrored images is a primary task. A combination of light from the front and sides accomplishes this.

#### Uniformity

A wide range of brightness contrast, up to a 20:1 ratio, may be acceptable in these types of spaces, as long as the lights are located appropriately in relation to the task and the viewer. Light-colored finishes reduce contrast and shadows.

#### Reflectances and Finishes

To reduce the contrast, promote inter-reflections, and utilize the light, walls and ceilings should be white or very light in color, with a minimum reflectance of 80%. Toilet partitions should be no darker than 50% reflective. Mirrored area should be kept to a minimum, and preferably not extend above 6'-6" AFF.

## Color

In order to limit the number of lamp types on a project, the lamps used in restrooms, locker rooms and showers should be the same as used elsewhere. Otherwise, high color rendering (CRI 80+) and color temperatures between 3000 and 3500 Kelvin are appropriate for these space functions.

## Daylighting

While daylight is not required in these spaces, it is desirable and reduces the need for safety lighting during daylight hours. If spaces are located along building perimeter, consider providing windows at the transom level with light shelves to reflect light deep into space. Obscuring glass that provides privacy for the occupants also controls solar heat gain.

### LIGHT LEVELS RECOMMENDED AVERAGE MAINTAINED ILLUMINANCE, IN FOOTCANDLES (FC)

FUNCTION	HORIZONTAL FC	VERTICAL FC	NOTES
Toilets and washrooms	5-10	3	
Locker rooms	10	3	
Shower rooms	5-10	3	1

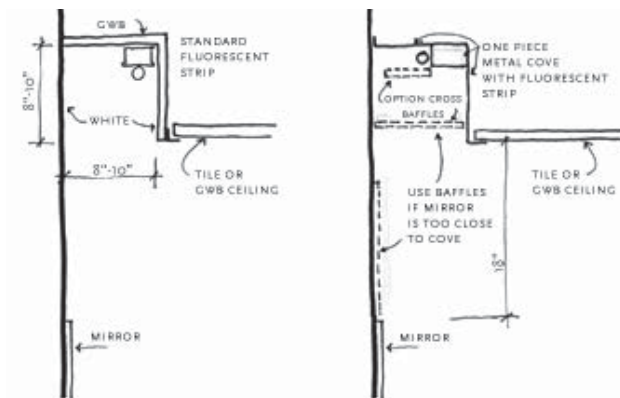
From the IESNA Lighting Handbook, 9th Edition.

1 No value for showers given by the IESNA.

## DESIGN AND LAYOUT STRATEGIES

### PUBLIC AND EMPLOYEE RESTROOMS

**Over toilets:** Lights placed on the wall or in the ceiling behind the toilet provide light from the best angle for cleaning and for assessing the cleanliness of the plumbing fixtures. For larger ADA stalls or single toilet rooms, a secondary ceiling or mirror light may be required.



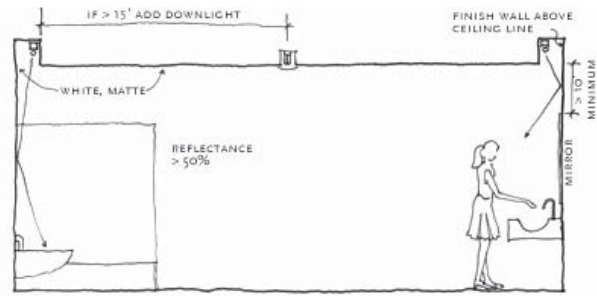
For lighting sinks and mirrors, the light should come from above and the side for best facial modeling. Continuous fixtures near the junction of the wall and ceiling provide acceptable distribution.

A standard solution for both toilet and mirrors in restrooms is the use of a continuous slot at the corner of the wall and ceiling, recessed 8" to 10" above the ceiling line. This can be constructed out of building materials with an industrial fluorescent strip at the top (above, left). Slot luminaires are also available (above, right) that mount to the upper wall on one edge, and create a continuous angle on the opposite edge to support suspended ceiling tiles. This solution is effective only if the wall is white or very light in color, and acts as a reflective surface to disburse the light. These walls should be eggshell or semi-gloss in finish, and not specular (shiny). Consequently, the use of mirrors should be limited, and the top of the mirror should stop at least 18" below the lower ceiling line. If a mirror extends closer to the lighting slot, baffles or louvers will be required to shield the reflections of the lamps in the mirror. The addition of baffles combined with the reduction of diffuse wall reflection will degrade the effectiveness and the efficiency of the slot, requiring more energy to achieve the desired effect.

Additional lensed or baffled downlights may be required for areas that are more than 15' away from either mirror or toilet lights (right).

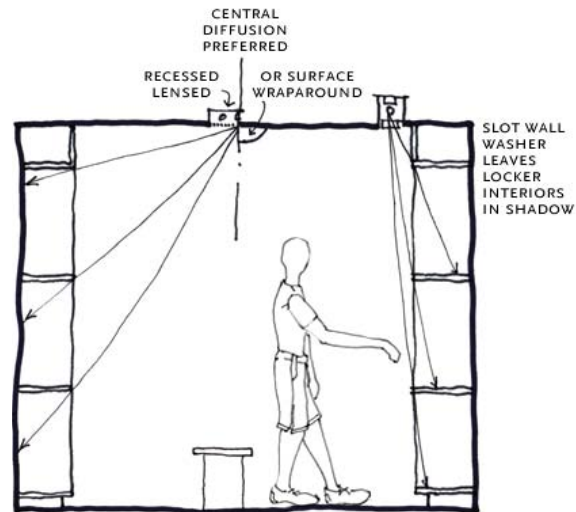
## LOCKER ROOMS

In locker rooms, the lockers generally replace the wall as the dominant vertical surface, so it is extremely important that the interior and exterior finishes of the lockers be light in color (70% or higher reflectance) and eggshell or semi-gloss in finish.



The most difficult task in a locker room is seeing into shadowy lockers. Visibility is further blocked by partially opened locker doors and the user.

The most effective lighting is diffuse light that is distributed to the vertical surfaces. Luminaires with high-transmission wrap-around lenses or radical-louvered lights running parallel to the aisles effectively light into the lockers. (See Luminaire Schedule). Open-celled luminaires or downlights distribute most of their light directly down on the horizontal surfaces and may create harsh shadows in the lockers.

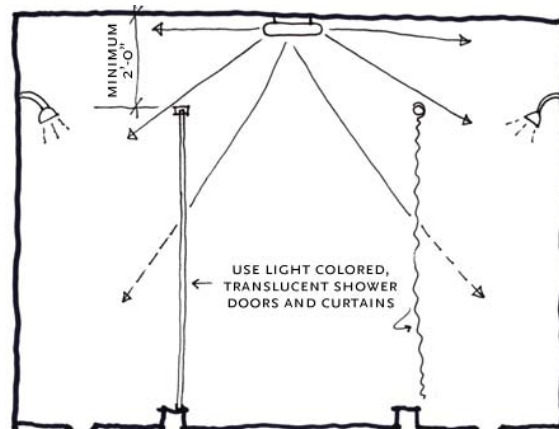


As in restrooms, the use of specular surfaces and mirrors should be limited because those finishes do not reflect light in the diffuse distribution desired. Indirect lighting is a more attractive way to provide diffuse light on vertical surfaces, and is often used in commercial facilities such as spas, health clubs or hotel fitness centers. It should be noted, however, that almost twice as much energy is consumed by bouncing the light off the ceiling before reaching the lockers. A continuous wall slot at the face of the lockers (above) will graze off the fronts, but not adequately light inside of the locker.

If a sleeping or rest area is associated with the locker room, care should be taken to supply a separate, local switch for lights in that area, and red-colored night lights. An architectural valance or curtain should shield luminaires or bright surfaces in the adjacent locker room from the view of resting occupants.

## SHOWER ROOMS

Small shower rooms may be lighted with fixtures inside the stall, specifically rated for showers and spas. More commonly, however, showers are lighted from damp-location rated (DL) lighting fixtures located in the adjacent circulation areas (right). These fixtures should be fitted with a diffuser that distributes the light widely as well as protects the bare lamps from splashes. Light fixtures surface-mounted to the ceiling are effective at distributing the light over shower doors or curtains, but recessed lensed lighting fixtures are also acceptable. Light-colored or translucent curtains or shower doors are essential for transmitting the light into the stalls.



## ENERGY CONSERVING DESIGN STRATEGIES

- Light colored finishes
- Optimal location of luminaires to task and occupant
- Lighting controls.

### ENERGY CODES: WATTS / SQUARE FOOT BUDGETS

FUNCTION	NYS ENERGY CODE		ASHRAE/IESNA STD.90.1		NOTES
	2002	+/- 2006	1999/2001	2004	
Toilets and washrooms	0.8	0.9	1.0	0.9	1,2
Locker rooms	0.8	0.9	0.8	0.6	1,2
Shower rooms	0.8	0.9	1.0	0.9	1,2,3

1. Multiply this value by the square footage of the dedicated workshop spaces. Sum the results of all the individual spaces in the building to determine the total building interior power allowance using the space-by-space method. The design of an individual space is not required to meet the watt/sf limits, as long as the total building connected load does not exceed the total interior power allowance. 2. From NYS Energy Code category of “Corridor, restroom and support area” 3. No values are given for showers in Std. 90.1. Same values as toilets and washrooms assumed by authors, due to partitions.

### LIGHTING CONTROLS

Due to a sense of vulnerability in toilets, locker rooms and showers, the light controls should be carefully designed to maintain a sense of security. Automatic on-off occupancy sensors are a good solution, but should never turn off all the lights. Except in daylighted spaces, at least 20% of the lights in toilets, locker rooms and showers should be zoned separately to remain on throughout the hours of building occupancy. A time or sweep-off control system can turn off these “orientation” lights at the end of the occupied period. The orientation lights should be strategically located, so in case a “false-off” is caused by the occupancy sensor, occupants will not be frightened by complete darkness during the short time before their motion reactivates the lights. Ultrasonic-type occupancy sensors are the most effective in these spaces blocked by toilet partitions, shower doors and high lockers, since they don’t require line-of-sight to operate. Sensors should be located frequently to compensate for the vertical obstructions. Occupancy sensors designed for a linear or “corridor” distribution may be a good choice for the aisles of elongated locker rooms.

### OTHER CONSIDERATIONS

#### DAMP LABEL, WET LABEL

Damp-Labeled (DL) luminaires are not required for restrooms and locker rooms, but it is good practice to specify DL fixtures for these spaces, especially if they are adjacent to a shower, sauna, steam room, pool or similar environment. Damp-Label must be specified in shower rooms. Use Wet-Labeled (WL) lighting fixtures in environments with high humidity or strong chemicals. Use luminaires specifically rated for saunas, steam rooms and inside shower/tub stalls as required.

#### DIRT DEPRECIATION

These spaces types are classified as “very clean”, but the higher humidity may result in a greater percentage of airborne particulates deposited on the lamps and diffusing lenses. Cleaning of light fixtures and lamps is recommended every two years.

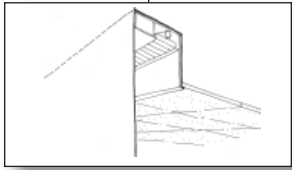
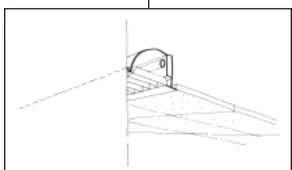
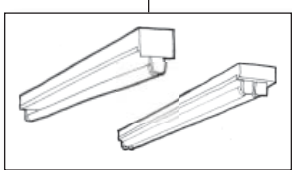
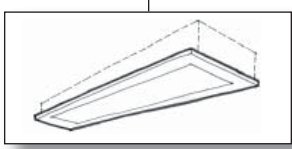
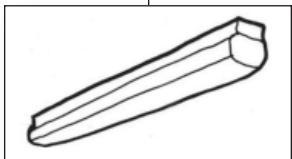
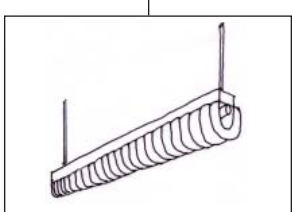
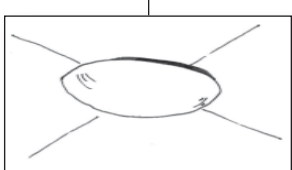
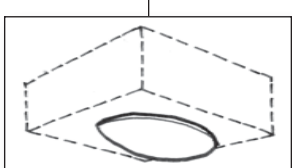
#### EMERGENCY LIGHTING

Since occupants may be wet or partially clothed when a loss of power occurs, a greater degree of emergency lighting coverage than required by code is recommended for showers and locker rooms. Closer spacing of emergency luminaires will provide a more uniform distribution. Also, the view of exits and paths of egress should not be blocked by vertical obstructions.

#### ELECTRICAL CODE ISSUES

- Use ground fault circuit interrupter (GFCI) or arc fault circuit interrupter (AFCI) circuit breakers for receptacles where required.
- Use luminaires rated for correct application, like wet location, spas or saunas.

## SAMPLE LUMINAIRE SCHEDULE FOR TOILETS, LOCKERS & SHOWERS

	<p><b>RECESSED TOILET WALL SLOT WITH BAFFLE</b></p> <p><b>Location:</b> Toilet room ceiling near mirror  <b>Lamps:</b> (1) 28-32W, High Performance T8, 830 – 835 color  <b>Description:</b> Recessed fluorescent 10" in depth by 4' lengths as needed to complete wall length, regressed cross baffles. Tandem wire and use two-lamp ballasts where possible. 52% minimum fixture efficiency.</p>
	<p><b>RECESSED TOILET WALL SLOT REFLECTOR</b></p> <p><b>Location:</b> Toilet room ceiling perimeter or mirror  <b>Lamps:</b> (1) 28-32W, High Performance T8, 830 – 835 color  <b>Description:</b> Recessed fluorescent 10" in depth by 4' lengths as needed to complete wall length, semi-specular wall washing reflector. Available with or without cross baffles. Damp location rated. Tandem wire and use two-lamp ballasts where possible. Minimum 62% fixture efficiency.</p>
	<p><b>TOILET FLUORESCENT STRIP</b></p> <p><b>Location:</b> Toilet room ceiling  <b>Lamps:</b> (1) or (2), 28-32W, High Performance T8, 830 – 835 color  <b>Description:</b> Surface-mounted 4' white baked enamel fluorescent strip. Minimum 85% fixture efficiency.</p>
	<p><b>RECESSED LENSED FIXTURE</b></p> <p><b>Location:</b> Shower aisles or locker rooms  <b>Lamps:</b> (2), 28-32W, High Performance T8, 830 – 835 color  <b>Description:</b> White upper reflector and prismatic lens. Damp location rated. Electronic instant-start, multi-lamp ballasts. Minimum 65% fixture efficiency.</p>
	<p><b>WRAP-AROUND FLUORESCENT</b></p> <p><b>Location:</b> shower aisles or locker rooms  <b>Lamps:</b> (1) or (2) 28-32W High Performance T8, 830-835 color  <b>Description:</b> Surface-mounted fluorescent luminaire with acrylic wrap-around diffuser or lens. Damp location rated. Electronic instant-start multi-lamp ballasts. Minimum 60% fixture efficiency.</p>
	<p><b>RADIAL LOUVER FLUORESCENT STRIP</b></p> <p><b>Location:</b> Locker room  <b>Lamps:</b> (1) 28-32W, High Performance T8, 830 – 835 color  <b>Description:</b> Surface or stem-mounted fluorescent luminaire in lengths of 8'-0" or 12'-0". White baked enamel finish. Minimum 90% downlight. Minimum 62% fixture efficiency. Cross baffles 1-3/4" deep x 2" on center. White painted cross baffles. Total 2-lamps per 8' long fixture. Two-lamp electronic instant-start ballast, nominal 55 input watts. Also available in 12' lengths and continuous rows.</p>
	<p><b>BUTTON LIGHTS</b></p> <p><b>Location:</b> Shower aisles or locker room  <b>Lamps:</b> (2) 13W CFL, 830 – 835 color  <b>Description:</b> Surface-mounted bowl with white opal glass or acrylic diffuser. Damp location rated. Two-lamp electronic ballast. Minimum 51% fixture efficiency.</p>
	<p><b>SHOWER RATED LIGHT</b></p> <p><b>Location:</b> Shower ceiling  <b>Lamps:</b> (1) 32W CFL, 830 – 835 color  <b>Description:</b> Semi-recessed, wet location rated, compact fluorescent downlight with dropped lens. Integral 120v ballast. Mount a minimum of 8'-0" above the shower rim. Minimum 36% fixture efficiency.</p>

