



AGENDA ITEM NO.

COUNCIL MEETING 03-06-07

APPROVED BY

DEPARTMENT DIRECTOR

Randy R. Bruegman

CITY MANAGER

March 6, 2007

FROM: RANDY R. BRUEGMAN, Fire Chief
Fire Department

BY: KERRI L. DONIS, Deputy Fire Chief *(Signature)*
Fire Prevention Division

SUBJECT: CONSIDER ADOPTION OF BILL NO. B-13 - AMENDING THE FRESNO MUNICIPAL CODE, REQUIRING THE INSTALLATION OF PHOTO-LUMINESCENT EXIT PATH MARKING FOR BUILDINGS THREE (3) STORIES OR MORE

1. RESOLUTION - CONSIDER AND ADOPT FINDINGS REGARDING LOCAL CLIMATIC, GEOLOGICAL, OR TOPOGRAPHICAL CONDITIONS THAT SUPPORT AMENDING THE UNIFORM FIRE CODE AND UNIFORM BUILDING CODE TO REQUIRE THE INSTALLATION OF PHOTO-LUMINESCENT EXIT PATH MARKING FOR BUILDINGS WITH THREE (3) OR MORE STORIES.
2. BILL NO. B-13 (INTRO. 2/27/2007) (FOR ADOPTION) - AMENDING THE FRESNO MUNICIPAL CODE, REQUIRING THE INSTALLATION OF PHOTO LUMINESCENT EXIT PATH MARKING FOR BUILDINGS THREE (3) STORIES OR MORE

KEY RESULT AREA: 0209001000

Public Safety

RECOMMENDATION

Staff recommends the City Council adopt the amendment to the Fresno Municipal Code requiring the installation of photo-luminescent exit path marking and adopt the resolution that adopts the findings regarding local climatic, geological, or topographical conditions that support amending the uniform fire code and uniform building code to require the installation of photo-luminescent exit path marking for buildings with three (3) or more stories

EXECUTIVE SUMMARY

This standard is intended to provide minimum requirements for photo-luminescent exit path markings that will aid in the evacuation of buildings in the event of failure of both power and back-up power to illuminated exit signs and stairwell lighting.

Report to the City Council

Consider Adoption of Bill No. B-13 - Amending the Fresno Municipal Code, Requiring the Installation of Photo-Luminescent Exit Path Marking for Buildings Three (3) Stories or More

March 6, 2007

Page 2

Photo-luminescent material is charged by exposure to light and will emit luminance after the activating light source is unavailable. The markings covered by this standard are not designed to provide enough light to illuminate a dark exit path, but rather will provide luminescent signs and outlines of the egress path, stairs, handrails, and obstacles so that the occupants can discern these egress path elements in dark conditions. Additionally, photo-luminescent exit path markings will assist firefighting personnel in their effort to ascend and descend stairwells and hallways as they are called upon to provide lifesaving assistance to citizens.

The markings are generally required to be positioned at a low level in specific locations in case of smoke and to be readily seen, such as in a crowd situation. They are in addition to and not a substitute for any signage required under the Building Code.

Additionally, on January 10, 2007, the Fire Department met with the Chamber of Commerce regarding the importance of installing photo-luminescent exit path markings in buildings with significant life loss potential. The results of the meeting were very positive feedback from Chamber board members, who agreed with the importance of this life-safety equipment; however, they chose to take no position on the issue. Furthermore, information regarding photoluminescence was shared with a State representative (Dave Jones) from the Associated General Contractors of California; his response was favorable stating, "This seems absolutely necessary."

Finally, the Fresno Fire Chief's Foundation submitted for a \$155,000 Federal Emergency Management Agency (FEMA) grant to offset a portion of the cost to install exit path markings in the existing buildings included in this ordinance. Confirmation of grant awards will not be known until April 2007.

KEY OBJECTIVES

This proposal provides gains in all three Key Objectives of Customer Satisfaction, Employee Satisfaction, and Financial Management. Customer Satisfaction is achieved through reducing the potential life loss by installing low-level exit path lighting. Employee Satisfaction is achieved through providing a service for a fair price. Financial Management is achieved as the City does not incur any costs associated with the ordinance change.

BACKGROUND

Firefighting, rescue, and evacuation operations in multi-story buildings place high physiological stress demands on firefighters, as well as building occupants. Elevators are not normally used in such operations, due to the inherent susceptibility of elevator control units and circuitry being damaged during a fire. A reliable illuminated stairwell is critical to maintain visibility and to enable firefighters to climb and descend stairs in as efficient a manner as possible. Such systems also aid in the orderly exit of building occupants lessening the need for firefighters to assist in evacuation of able-bodied individuals; therefore, firefighters are able to concentrate on assisting the disabled and conducting firefighting activities more efficiently during times of extreme climatic stress.

Furthermore, the National Institute of Standards and Technology (NIST) conducted an investigation regarding the building and fire safety of the World Trade Center following the terrorist attack on September 11, 2001. Below are some of those findings related to exit path markings:

- One of the critical findings was the need for improved evacuation in the stairwells.

- Crowded stairwells, lack of instruction, and injured evacuees were the most reported obstacles to evacuation.
- The most commonly mentioned aid in assisting co-workers and emergency responders was photo-luminescent markings in stairwells.

LOCAL CLIMATIC, TOPOGRAPHICAL, OR GEOLOGICAL CONDITIONS MAKING THE MODIFICATIONS OR CHANGES TO THE UNIFORM FIRE CODE AND UNIFORM BUILDING CODE REASONABLY NECESSARY

The proposed ordinance amends sections of the California Building Code and California Fire Code. Pursuant to California Health & Safety Code § 17958.7, the City may modify or change the building and fire codes adopted by the State of California if it makes express findings that because of local climatic, topographical, or geological conditions, the changes are reasonably necessary. (Exhibit A)

The Fire Department submits that local climatic conditions make these changes reasonably necessary. As this Council knows, and as documented in the 2025 Fresno General Plan¹ and the Master Environmental Impact Report No. 10130² for the General Plan, during the summer months the city of Fresno experiences periods of what can only be described as extreme heat. Attached as Exhibit 1 is a chart setting forth the high temperatures in Fresno, San Francisco, and San Diego for each day from July 1, 2006 through July 31, 2006, as reported by the National Weather Service. During this approximately 31-day period, the average maximum temperature in Fresno was 103.4 degrees, the average maximum temperature in San Francisco was 68.8 degrees, and the average maximum temperature in San Diego was 81.2 degrees. Furthermore, during this 31-day period, the monthly average temperature in Fresno was 87.8 degrees, the monthly average temperature in San Francisco was 61.7 degrees, and the monthly average temperature in San Diego was 76.3 degrees. Finally, during this 31-day period Fresno experienced 20 days where the maximum temperature exceeded 100 degrees, while neither San Francisco nor San Diego experienced such temperatures at any time during the 31-day period. Though Health & Safety Code § 17958.7 does not require the local conditions to be unique to a particular jurisdiction, the temperature chart demonstrates that the temperatures experienced in Fresno are extreme as compared to temperatures experienced in other parts of California.

The Heat Stress Index published by the Federal Emergency Management Agency in its publication entitled "Emergency Incident Rehabilitation" sets forth the stress placed on the human body when exposed to various temperatures and humidity. This Heat Stress Index is attached as Exhibit 2 and incorporated by reference. A Note under the Heat Stress Chart provides that ten degrees should be added to the temperature when protective clothing is worn and an additional ten degrees should be added when the person is standing in direct sunlight.

¹ The 2025 Fresno General Plan at p.166 states, "Fire Hazards. Fresno's high summer temperatures, intense sunlight, and low rainfall potentiate fires by drying and pre-heating combustible material and by fostering spontaneous combustion of flammable material. Fresno's estimated maximum wind speed (used to design structures) is 70 mph, which could fan blazes to a high intensity."

² Master Environmental Impact Report No. 10130 at p. states, "The climate of the FMA [Fresno Metropolitan Area] is characterized by hot, dry summers ... Temperatures in the FMA range from a mean monthly maximum of 97.9 [degrees] F in July to a mean monthly minimum of 36.3 [degrees] F in December."

According to this chart, a person exposed to temperatures between 90 and 105 degrees is subject to heat cramps and heat exhaustion if exposure to these temperatures is prolonged and there is physical activity. A person exposed to temperatures of 105 to 130 degrees is likely to experience heat cramps and heat exhaustion. Furthermore, heat stroke is possible if exposure is prolonged and there is physical activity. A person exposed to temperatures above 130 degrees or greater faces a high risk of suffering from heat stroke.

Because of the extreme heat Fresno experiences during the summer months, Fresno firefighters responding to fires and other incidents requiring the evacuation of a building are regularly exposed to temperatures in excess of 105 degrees, when accounting for their protective gear, exposing them to the probability of heat cramps, heat exhaustion, and possibly heat stroke.

Reports and studies related to building evacuation have concluded that the use of photo-luminescent floor path indicators are effective in guiding occupants out of a building, with or without the use of electrical power.³ This is because photo-luminescent markings are not dependent upon electricity for illumination, and they are placed at floor level as this is where the most visibility is in the event of smoke.⁴ Traditional electrical exit lighting is located higher (above doorways), which is obscured when smoke fills a room or hallway. Attached as Exhibit "C" are color photographs of a traditional exit sign and markings required under the current code and of photo-luminescent floor path indicators that would be required by this ordinance.

Additionally, by making it easier for individuals to evacuate from buildings unassisted, fewer firefighters will have to enter buildings to assist with evacuation. Accordingly, fewer fighters will be exposed to health risks associated with exposure to sustained high temperatures. As such, this ordinance mandating installation of photo-luminescent markings in certain occupancies in excess of three or more stories is reasonably necessary in light of Fresno's extremely high temperatures during the summer months.

Finally, photo-luminescent exit path marking has been tested by the United Minerals Corporation for its potential shelf life. This testing institute has determined photoluminescence pigment to be visible for a minimum of 25 years.

FISCAL IMPACT

None.

RRB/KLD 022007

Attachments:

Ordinance Amendments

Resolution

Exhibit A: Findings Relating to Local Climatic, Geological, and Topographical Conditions...

Fire Department Standards

Exhibit B: July 2006 Maximum Temperatures Chart

Exhibit B-1: Heat Stress Index

Exhibit C: Photos of Photo-Luminescent Exit Path Markings

Exhibit D-1 and D-2: Local Multi-story Buildings Owners Letters of Support (2)

³ Amy, James D.; *The Path at Your Feet – The Shift in Emergency Lighting*; International Fire Protection Magazine.

⁴ Amy, James D.; *The Path at Your Feet – The Shift in Emergency Lighting*; International Fire Protection Magazine.

ORDINANCE OF THE COUNCIL OF THE CITY OF FRESNO
PROPOSED AND INITIATED BY _____
MOVED BY _____ SECONDED BY _____

BILL NO. _____

ORDINANCE BILL NO. _____

AN ORDINANCE OF THE CITY OF FRESNO, CALIFORNIA
ADDING SUB-SECTION 1003.2.9.1 TO SECTION 13-100 AND
SECTION 9-71211.1 TO THE FRESNO MUNICIPAL CODE,
RELATING TO MEANS OF EGRESS ILLUMINATION

THE COUNCIL OF THE CITY OF FRESNO DOES ORDAIN AS FOLLOWS:

SECTION 1. Section 13-100.1003.2.9.1 of the Fresno Municipal Code is added to read as follows:

[Section 1003.2.9.1 of the 2001 California Building Code is amended to read:

[100.1003.2.9.1 General. Any time a building [for SFM] or portion of a building is occupied, the means of egress serving the occupied portion shall be illuminated at an intensity of not less than 1 foot - candle (10.76 lx) at the floor level.

EXCEPTIONS: 1. In Group R, Divisions 2.1.1, 2.2.1, 2.3.1, 6.1.1, 6.2.1 and 3 Occupancies and within individual units of Group R, Division 1 Occupancies.

2. In auditoriums, theaters, concert or opera halls, and similar assembly uses, the illumination at the floor level may be reduced during performances to not less than 0.2 foot candle (2.15 lx), provided that the required illumination be automatically restored upon activation of a premise's fire alarm system when such system is provided.

3. [For SFM] Sleeping rooms in Group I Occupancies, and sleeping rooms in Group R, Divisions 2.1, 2.2, 2.3, 6.1, and 6.2 Occupancies.

Approved photoluminescent exit path markings shall be provided in all enclosed stairways in all new buildings with three or more stories above grade or three or more floors below grade and in any exit pathways leading from the stairways to the exterior of the building.

EXCEPTION: Ground floor lobbies shall not require photoluminescent exit path markings.

Installations shall meet the requirements of Fresno Fire Departments' "UNIFORM STANDARDS FOR PHOTOLUMINESCENT EXIT PATH MARKINGS". Retrofit of existing R-1, I and E occupancy three story buildings and all four story or more buildings above grade or three or more floors below grade and in any exit pathways leading from the stairways to the exterior of the building existing buildings shall be completed no later than January 1, 2012.

EXCEPTION: Exit path markings in existence at the time of the adoption of this ordinance may continue to exist as installed subject to approval by the Fire Chief.]

SECTION 2. Section 9-71211.1 of the Fresno Municipal Code is added to read as follows:

[Section 1211.1 of the 2001 California Fire Code is amended to read:

1211.1 General. Means of egress illumination shall be provided and maintained in accordance with] the Building Code [Section 13-1003.2.9.1 of this Code. Means of egress shall be illuminated when the building or structure is occupied.]

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SECTION 3. This ordinance shall become effective and in full force and effect at 12:01 a.m. on the thirty-first day after its passage.

* * * * *

STATE OF CALIFORNIA)
COUNTY OF FRESNO) ss.
CITY OF FRESNO)

I, REBECCA E. KLISCH, City Clerk of the City of Fresno, certify that the foregoing ordinance was adopted by the Council of the City of Fresno, at a regular meeting held on the _____ day of _____, 2006.

AYES :
NOES :
ABSENT :
ABSTAIN :

Mayor Approval: _____, 2006

Mayor Approval/No Return: _____, 2006

Mayor Veto: _____, 2006

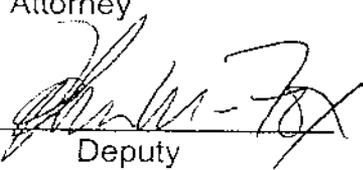
Council Override Vote: _____, 2006

REBECCA E. KLISCH
City Clerk

BY: _____
Deputy

APPROVED AS TO FORM:

JAMES C. SANCHEZ
City Attorney

BY: 
Deputy

RESOLUTION NO. _____

A RESOLUTION OF THE COUNCIL OF THE CITY OF FRESNO, CALIFORNIA ADOPTING FINDINGS RELATING TO LOCAL CLIMACTIC, GEOLOGICAL AND TOPOGRAPHICAL CONDITIONS THAT SUPPORT AMENDING THE UNIFORM FIRE CODE AND UNIFORM BUILDING CODE TO REQUIRE THE INSTALLATION OF PHOTOLUMINESCENT EXIT PATH MARKING FOR BUILDINGS WITH THREE OR MORE STORIES.

WHEREAS, the State of California has adopted the 1997 Edition of the Uniform Building Code, with amendments, which is entitled the 2001 California Building Code, effective November 1, 2002; and

WHEREAS, the State of California has adopted the 2000 edition of the Uniform Fire Code, with amendments, which is entitled the 2001 California Fire Code, effective November 1, 2002; and,

WHEREAS, neither the 2001 California Building Code nor the 2001 California Fire Code require the installation of photoluminescent exit path markings in buildings with three or more stories; and,

WHEREAS, pursuant to California Health & Safety Code, sections 17958.5, 17958.7 and 18941.5, a city may amend the California Fire Code and California Building Code to include additional regulations if the city adopts findings concerning local climactic, geological or topographical conditions that support the additional regulations; and,

WHEREAS, the Council of the City of Fresno believes that the Express Findings attached to this Resolution support amendments to the California Fire Code and California Building Code to require the installation of photoluminescent exit path marking for buildings three stores or more as set forth in Ordinance Bill No. B-13

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Fresno as follows:

1. The Council of the City of Fresno hereby adopts the findings attached as Exhibit "A" to support the amendments to the California Fire Code and the California Building Code to require the installation of photoluminescent exit path marking for buildings three stores or more as set forth in Ordinance Bill No. B-13

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STATE OF CALIFORNIA)
COUNTY OF FRESNO) ss.
CITY OF FRESNO)

I, REBECCA E. KLISCH, City Clerk of the City of Fresno, certify that the foregoing resolution was adopted by the Council of the City of Fresno, at a regular meeting held on the _____ day of _____, 2007.

AYES :
NOES :
ABSENT :
ABSTAIN :

Mayor Approval : _____, 2007

Mayor Approval/No Return: _____, 2007

Mayor Veto: _____, 2007

Council Override _____, 2007

REBECCA E. KLISCH
City Clerk

BY: _____
Deputy

APPROVED AS TO FORM:
CITY ATTORNEY'S OFFICE

BY: 
JOHN W. FOX
Deputy City Attorney

Attachment:

- Attachment "A" - Findings

[40306sz/reso/jwf]2/28/07

EXHIBIT "A"

FINDINGS RELATING TO LOCAL CLIMACTIC, GEOLOGICAL AND TOPOGRAPHICAL CONDITIONS THAT SUPPORT AMENDING THE UNIFORM FIRE CODE AND UNIFORM BUILDING CODE TO REQUIRE THE INSTALLATION OF PHOTOLUMINESCENT EXIT PATH MARKING FOR BUILDINGS WITH THREE OR MORE STORIES.

1. Local climatic, topographical or geological conditions make the amendments to the Uniform Building Code and Uniform Fire Code, as set forth in Ordinance Bill No. B-13 reasonably necessary. As documented in the 2025 Fresno General Plan¹ and the Master Environmental Impact Report No. 10130² for the General Plan, during the summer months the City of Fresno experiences periods of what can only be described as extreme heat. For example, attached as Exhibit "1" and incorporated by reference is a chart setting forth the high temperatures in Fresno, San Francisco and San Diego for each day from July 1, 2006 through July 31, 2006 as reported by the National Weather Service. During this approximately 31 day period, the average high temperature in Fresno was 103.4 degrees, the average high temperature in San Diego was 81.2 degrees and the average high temperature in San Francisco was 68.8 degrees. Furthermore, during this 31 day period, the average temperature in Fresno was 87.8 degrees, the average temperature in San Diego was 76.3 degrees and the average temperature San Francisco was 61.7 degrees. Finally, during this 31 day period Fresno experienced 20 days where the maximum temperature exceeded 100 degrees, while neither San Diego nor San Francisco experienced such temperatures at any time during the 31 day period. Though Health & Safety Code § 17958.7 does not require the local conditions to be unique to a particular jurisdiction, the temperature chart demonstrates that the temperatures experienced in Fresno are extreme as compared to temperatures experienced in other parts of California.

2. The Heat Stress Index published by the Federal Emergency Management Agency in its publication entitled Emergency Incident Rehabilitation sets forth the stress placed on the human body when exposed to various temperatures and humidities. This Heat Stress Index is attached as Exhibit "2" and incorporated by reference. A note under the Heat Stress Chart states that 10 degrees should be added to the temperature when protective clothing is worn and an additional 10 degrees should be added when the person is standing in direct sunlight. According to this chart, a person exposed to temperatures between 90 and 105 degrees is subject to heat cramps and heat exhaustion if exposure to

¹ The 2025 Fresno General Plan at p. 166 states, "Fire Hazards. Fresno's high summer temperatures, intense sunlight, and low rainfall potentiate fires by drying and pre-heating combustible material and by fostering spontaneous combustion of flammable material. Fresno's estimated maximum wind speed (used to design structures) is 70 mph, which could fan blazes to a high intensity."

² Master Environmental Impact Report No. 10130 at p. states, "The climate of the FMA [Fresno Metropolitan Area] is characterized by hot, dry summers ... Temperatures in the FMA range from a mean monthly maximum of 97.9 [degrees] F in July to a mean monthly minimum of 36.3 [degrees] F in December."

these temperatures is prolonged and there is physical activity. A person exposed to temperatures of 105 to 130 degrees is likely to experience heat cramps and heat exhaustion. Furthermore, heat stroke is possible if exposure is prolonged and there is physical activity. A person exposed to temperatures above 130 degrees or greater faces a high risk of suffering from heat stroke.

3. Because of the extreme heat Fresno experiences during the summer months, Fresno Fire Fighters responding to fires and other incidents requiring the evacuation of a building, are regularly exposed to temperatures in excess of 105 degrees, when accounting for their protective gear, exposing them to the probability of heat cramps, heat exhaustion and possibly heat stroke.

4. Reports and studies related to building evacuation have concluded that the use of photoluminescent floor path indicators are effective in guiding occupants out of a building, with or without the use of electrical power.³ This is because photoluminescent markings are not dependent upon electricity for illumination and they are placed at floor level as this is where the most visibility is in the event of smoke.⁴ Traditional electrical exit lighting is located higher (above doorways) which is obscured when smoke fills a room or hallway.

5. By making it easier for individuals to evacuate buildings unassisted, fewer fire fighters will have to enter buildings to assist with evacuation. Accordingly, fewer fighters will be exposed to health risks associated with exposure to sustained high temperatures. As such, this ordinance mandating installation of photoluminescent markings in certain occupancies three stories or more is reasonably necessary to protect the health and safety of fire fighters and other emergency personnel in light of Fresno's extremely high temperatures during the summer months.

Attachments:

- Exhibit "1" - Maximum Temperatures Chart
- Exhibit "2" - Heat Stress Index

[40306Asz/jwf]2/28/07

³ Amy, James D.; The Path at Your Feet – The Shift in Emergency Lighting; International Fire Protection Magazine.

⁴ Amy, James D.; The Path at Your Feet – The Shift in Emergency Lighting; International Fire Protection Magazine.

JULY 2006 MAXIMUM TEMPERATURES

DATE	FRESNO		FRESNO		SAN DIEGO		SAN DIEGO		SAN DIEGO		SAN FRANCISCO		SAN FRANCISCO	
	HIGH TEMP	AVG. HIGH	MONTHLY AVG.	HIGH TEMP	AVG. HIGH	MONTHLY AVG.	HIGH TEMP	AVG. HIGH	MONTHLY AVG.	HIGH TEMP	AVG. HIGH	MONTHLY AVG.	HIGH TEMP	MONTHLY AVG.
7/1	98			83									61	
7/2	101			79									61	
7/3	101			80									60	
7/4	99			79									61	
7/5	96			78									62	
7/6	93			77									63	
7/7	96			79									73	
7/8	103			81									73	
7/9	107			79									67	
7/10	107			76									61	
7/11	101			79									62	
7/12	95			82									66	
7/13	99			83									71	
7/14	103			82									64	
7/15	104			86									64	
7/16	107			80									70	
7/17	109			78									80	
7/18	105			79									77	
7/19	107			79									78	
7/20	109			80									73	
7/21	109			82									75	
7/22	112			99									87	
7/23	113			83									83	
7/24	113			85									77	
7/25	113			76									75	
7/26	112			84									65	
7/27	106			86									64	
7/28	99			83									64	
7/29	97			80									64	
7/30	94			80									68	
7/31	96			79									64	
		103.4	87.8			81.2	76.3			68.8	61.7			

HEAT STRESS INDEX

TEMPERATURE °F	RELATIVE HUMIDITY									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	
104	98	104	110	120	132					
102	97	101	108	117	125					
100	95	99	105	110	120	132				
98	93	97	101	106	110	125				
96	91	95	98	104	108	120	128			
94	89	93	95	100	105	111	122			
92	87	90	92	98	100	108	115	122		
90	85	88	90	92	96	100	108	114	122	
88	82	86	87	89	93	95	100	106	115	
86	80	84	85	87	90	92	98	100	109	
84	78	81	83	85	86	89	91	95	99	
82	77	79	80	81	84	86	89	91	95	
80	75	77	78	79	81	83	85	86	89	
78	72	75	77	78	79	80	81	83	85	
76	70	72	75	76	77	77	77	78	79	
74	68	70	73	74	75	75	75	76	77	

NOTE: Add 10°F when protective clothing is worn and add 10°F when in direct sunlight.

HUMITURE °F	DANGER CATEGORY	INJURY THREAT
BELOW 60°	NONE	LITTLE OR NO DANGER UNDER NORMAL CIRCUMSTANCES
80° - 90°	CAUTION	FATIGUE POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
90° - 105°	EXTREME CAUTION	HEAT CRAMPS AND HEAT EXHAUSTION POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
105° - 130°	DANGER	HEAT CRAMPS OR EXHAUSTION LIKELY, HEAT STROKE POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
ABOVE 130°	EXTREME DANGER	HEAT STROKE IMMINENT!

Table 1-1

Code Amendments

BUILDING CODE

Fresno Municipal Code Section 13-1003.2.9.1 shall be amended to read:

1003.2.9 Means of egress illumination.

1003.2.9.1 General. Any time a building [for SFM] or portion of a building is occupied, the means of egress serving the occupied portion shall be illuminated at an intensity of not less than 1 foot - candle (10.76 lx) at the floor level.

EXCEPTIONS: 1. In Group R, Divisions 2.1.1, 2.2.1, 2.3.1, 6.1.1, 6.2.1 and 3 Occupancies and within individual units of Group R, Division 1 Occupancies.

2. In auditoriums, theaters, concert or opera halls, and similar assembly uses, the illumination at the floor level may be reduced during performances to not less than 0.2 foot candle (2.15 lx), provided that the required illumination be automatically restored upon activation of a premise's fire alarm system when such system is provided.

3. *[For SFM] Sleeping rooms in Group I Occupancies, and sleeping rooms in Group R, Divisions 2.1, 2.2, 2.3, 6.1, and 6.2 Occupancies.*

Approved photoluminescent exit path markings shall be provided in all enclosed stairways in all new construction with three or more stories above grade or three or more floors below grade and in any exit pathways* leading from the stairways to the exterior of the building.

***Exception: ground floor lobbies. Installations shall meet the requirements of Fresno Fire Departments' "UNIFORM STANDARDS FOR PHOTOLUMINESCENT EXIT PATH MARKINGS."**

The retrofit of existing buildings three or more stories above grade or three or more floors below grade to install approved photoluminescent exit path markings shall be completed no later than January 1, 2012. (**Exception: R-1, I, and E occupancies are the only three story buildings requiring approved photoluminescent exit path marking). Exception: Exit path markings in existence at the time of the adoption of this ordinance may continue to exist as installed subject to approval by the Chief.**

**** Three story buildings included in this ordinance change are R-1, I, and E occupancies (Apartments/Assisted living facilities, Hospitals, Educational facilities) as these have the highest life loss potential.**

FIRE CODE

**Fresno Municipal Code Section 9-71211.1 shall be amended to read:
Section 1211 - Means of Egress Illumination**

1211.1 General. Means of egress illumination shall be provided and maintained in accordance with the Building Code. Means of egress shall be illuminated when the building or structure is occupied.

Approved photoluminescent exit path markings shall be provided in all enclosed stairways in all new and existing buildings with three or more stories above grade or three or more floors below grade and in any exit pathways leading from the stairways to the exterior of the building (*Exception: ground floor lobbies). Installations shall meet the requirements of Fresno Fire Departments' "UNIFORM STANDARDS FOR PHOTOLUMINESCENT EXIT PATH MARKINGS".**

The retrofit of existing buildings three stories or more to install approved photoluminescent exit path markings shall be completed no later than January 1, 2012. (**Exception: R-1, I, and E occupancies are the only three story buildings requiring approved photoluminescent exit path marking). Exception: Exit path markings in existence at the time of the adoption of this ordinance may continue to exist as installed subject to approval by the Chief.**

FRESNO FIRE DEPARTMENT

UNIFORM STANDARDS FOR PHOTOLUMINESCENT EXIT PATH MARKINGS

References: FMC Sections 9-71211.1 & 13-1003.2.9.1

Approved photoluminescent exit path markings shall be provided in all enclosed stairways in all new buildings three or more stories above grade or three or more floors below grade and in any exit pathways* leading from the stairways to the exterior of the building

(*Exception: ground floor lobbies). Installations shall meet the requirements of Fresno Fire Departments' "UNIFORM STANDARDS FOR PHOTOLUMINESCENT EXIT PATH MARKINGS".

The retrofit of existing buildings three** or more stories above grade or three or more floors below grade to install approved photoluminescent exit path markings shall be completed no later than January 1, 2012. (**Exception: R-1, I, and E occupancies are the only three story buildings requiring approved photoluminescent exit path marking). Exception: Exit path markings in existence at the time of the adoption of this ordinance may continue to exist as installed subject to approval by the Chief.

SCOPE: To provide details regarding the requirements for photoluminescent exit path markings.

PURPOSE: This standard is intended to provide minimum requirements for photoluminescent exit path markings that will aid in the evacuation from buildings in the event of failure of both the power and back-up power to the lighting and illuminated exit signs. Photoluminescent material is charged by exposure to light and will emit luminance after the activating light source is unavailable. The markings covered by this standard are not designed to provide enough light to illuminate a dark exit path, but rather will provide luminescent signs and outlines of the egress path, stairs, handrails and obstacles, so that the occupants can discern these egress path elements in dark conditions. The markings are generally required to be located at a low location in case of smoke and to be readily seen, such as in a crowd situation. They are in addition to, and not as a substitute for any signage required under the Building Code.

This standard covers:

Minimum installation requirements;

Minimum lighting requirements;

Maintenance requirements;

The technical specifications for minimum performance of the materials.

Note: These standards are subject to change without prior notice

MINIMUM INSTALLATION REQUIREMENTS:

All photoluminescent exit path markings, signs and materials shall be approved by the City of Fresno Fire Department and the Building Official and meet the "Technical specifications for minimum performance" of the NYC Department of Buildings' MEA reference Standards 6-1 and 6-1A.

Approved stair markings shall be provided for all enclosed stairways in buildings three or more stories above grade or three or more levels below grade and in any exit pathways* leading from the stairways to the exterior of the building (*Exception: ground floor lobbies) in the following manner:

1. The horizontal leading edge of each stair step shall be marked with either a minimum 1" (25 mm) solid and continuous contrasting stripe of photoluminescent material or with an "L" shaped contrasting marker of photoluminescent material on both sides edges of the step. These markers shall be placed a maximum of 1/2"(13 mm) from the leading edge of the step parallel to the nose of the step or landing.
2. Stair landings shall also be marked with a contrasting photoluminescent pathway marker located around the perimeter wall and across the face or floor in front of non-exit doors, on or within 4" (102 mm) of the floor. The dimensions, distances and locations shall be consistent and uniform throughout the same exit. Any spaces intervening between portions of the stairwell shall be marked as directed by the Chief. (see figures 7,9,10,13,14) The leading edge of the stair landing shall be marked with a minimum of 1" solid and continuous contrasting stripe of photoluminescent material. (This stripe will indicate the edge of the landing, see figure 3 or color Attachment B)
3. Photoluminescent directional signs shall be placed in the following locations: (see figure11)
 - a. Stairwell or exit — A directional arrow visible upon opening the door into the stairwell or exit indicating the direction of travel in basements.
 - b. Transfer levels — A directional arrow on the wall.
Exception: Markings shall be as directed by the Chief if walls are not available.
 - c. Wherever egress direction is not clear (at turns along horizontal extensions; at transitions from vertical to horizontal direction; at "T" intersections; etc.) A directional arrow or outlined path (or both as determined by the Chief).
4. The door frames (top and sides) of all stair entry, intermediate and final exit doors of the enclosed stairway shall be marked with a solid and continuous contrasting 1" minimum (25 mm) stripe of photoluminescent material. (see figures 13,14)
5. An approved photoluminescent "exit" sign shall be mounted on all stair entry, intermediate and final exit doors or adjacent to the door (on the latch side) within 18 "(455 mm) of the floor. The sign shall state "EXIT", "FINAL EXIT", "EXIT THROUGH LOBBY", or "EXIT TO STREET". These signs shall

be required to be UL 924 listed if they are to be viewed at a distance of 50 feet or more. (see figures 1,2,15)

6. All provided handrails shall be marked with a minimum 1" (25 mm) solid and continuous stripe of photoluminescent material either on the handrail or on the wall adjacent to handrail. (see figure 6)
7. Obstacles at or below 6'-6" (1981 mm) in height and projecting more than 4" (102 mm) into the egress path shall be outlined with markings no less than 1" (25 mm) in width comprised of a pattern of alternating equal bands of photoluminescent material and black, with the alternating bands no more than 2" thick and angled at 45 degrees. Examples of such obstacles include standpipes, hose cabinets, wall projections, and restricted height areas. (see figure 8)
8. Exit pathways shall be marked with a minimum 1" (25 mm) solid and continuous stripe of photoluminescent pathway marking material on or within 4" of the floor along each side of the pathway. Pathways more than 50' in length shall have directional arrows along the wall at intervals not exceeding 50'. (see figure 11)

Minimum Lighting Requirements:

All installed photoluminescent materials shall be exposed to a minimum of 2 foot-candles of fluorescent light illumination at all times while the building is occupied.; or if incandescent lighting is used, the photoluminescent material chosen must be capable of meeting the minimum brightness rating required by this standard with the lighting provided.

Motion sensor activated lighting is prohibited in the stairwells addressed by this standard.

Timers on stairwell lighting, if used, shall be set to turn on the lights not less than one hour before the building is occupied each day.

Maintenance Requirements:

Owners shall maintain the required photoluminescent signs and markings in good repair. At minimum, owners shall, every 12 months, perform a visual inspection of the signs and markings with the normal lighting turned on. Signs and/or markings that are missing, damaged, loose or that show signs of wear shall be noted and properly repaired or replaced.

Attachments:

Installation Figures

New York City Department of Buildings' MEA standard 6-1 (portions) and 6-1A

Note: These standards are subject to change without prior notice.

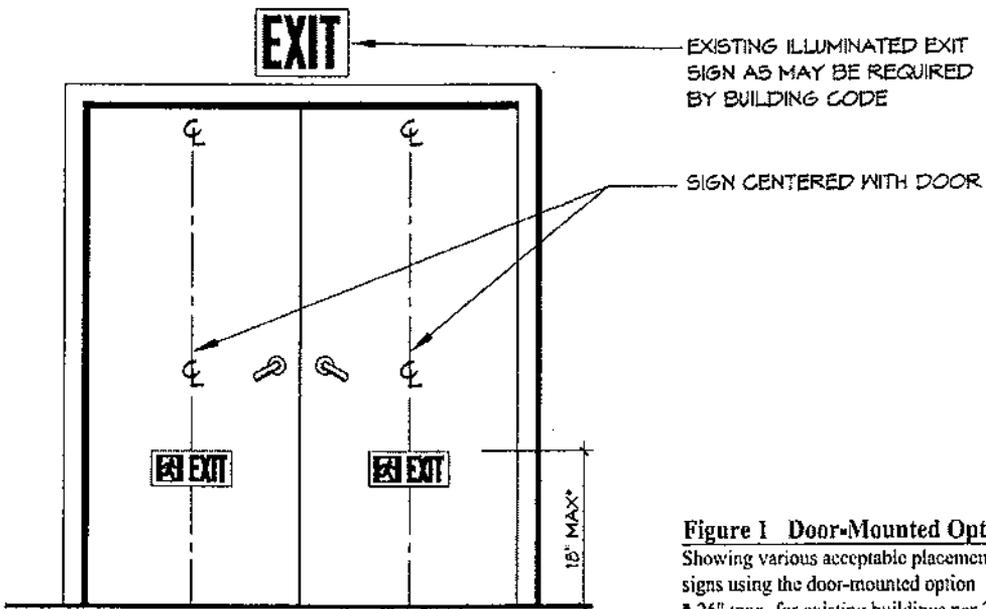
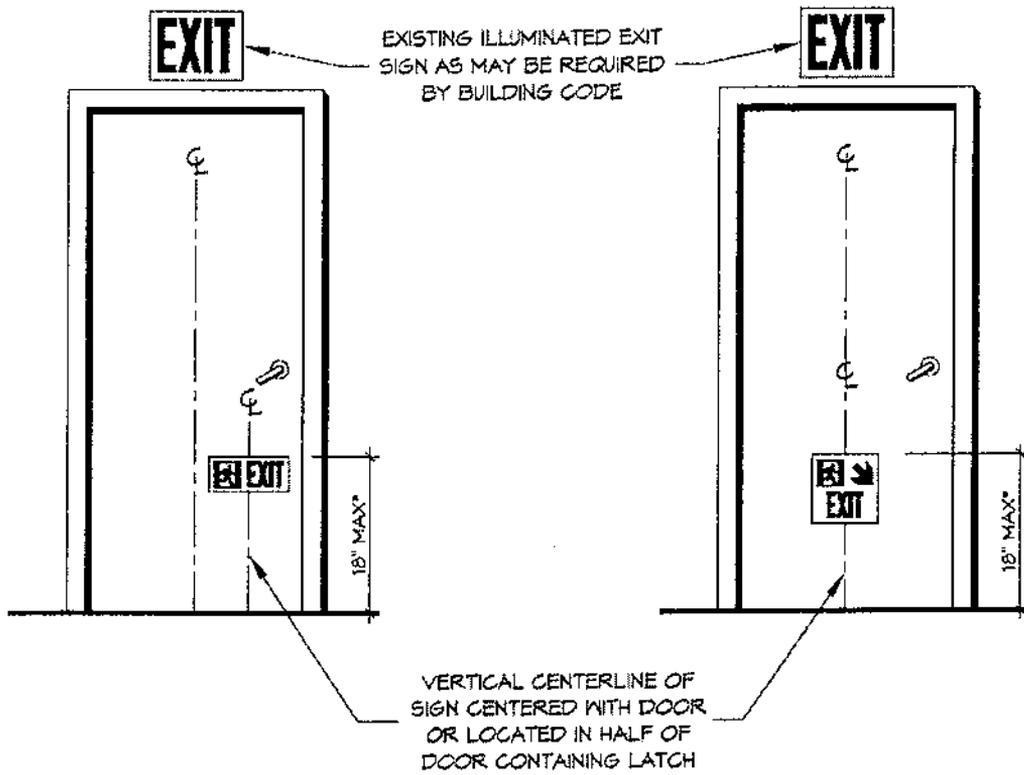


Figure 1 Door-Mounted Option (2.1.1.1)

Showing various acceptable placements for door signs using the door-mounted option

* 26" max. for existing buildings per 2.1.1

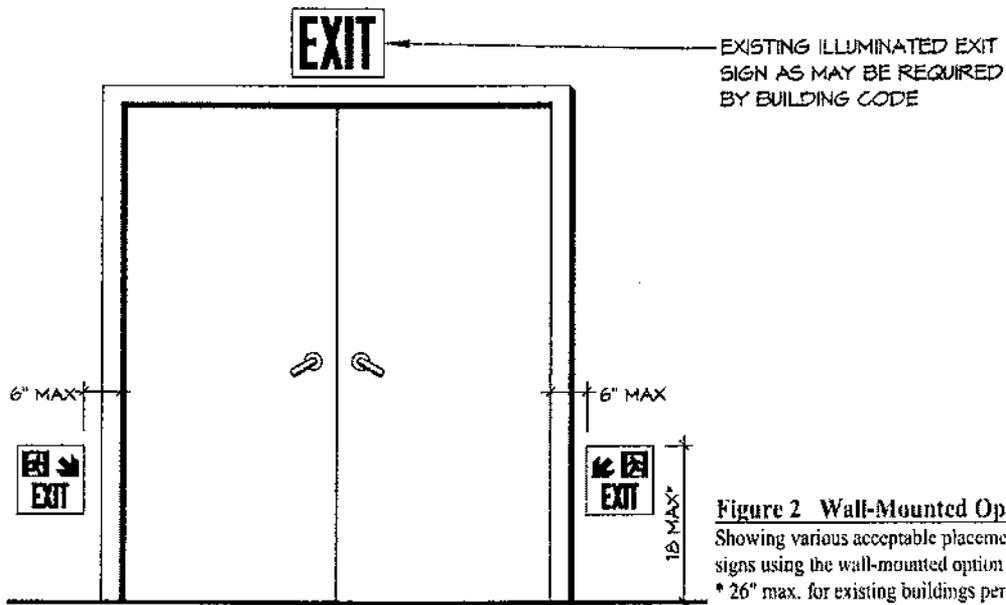
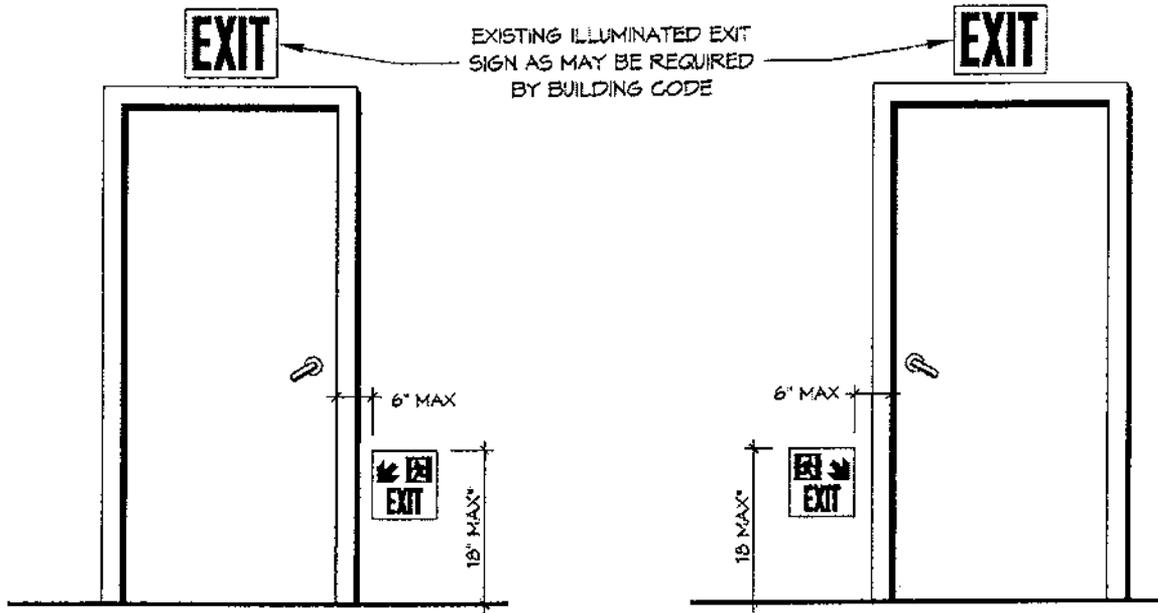


Figure 2 Wall-Mounted Option (2.1.1.2)
 Showing various acceptable placements for door signs using the wall-mounted option
 * 26" max. for existing buildings per 2.1.1

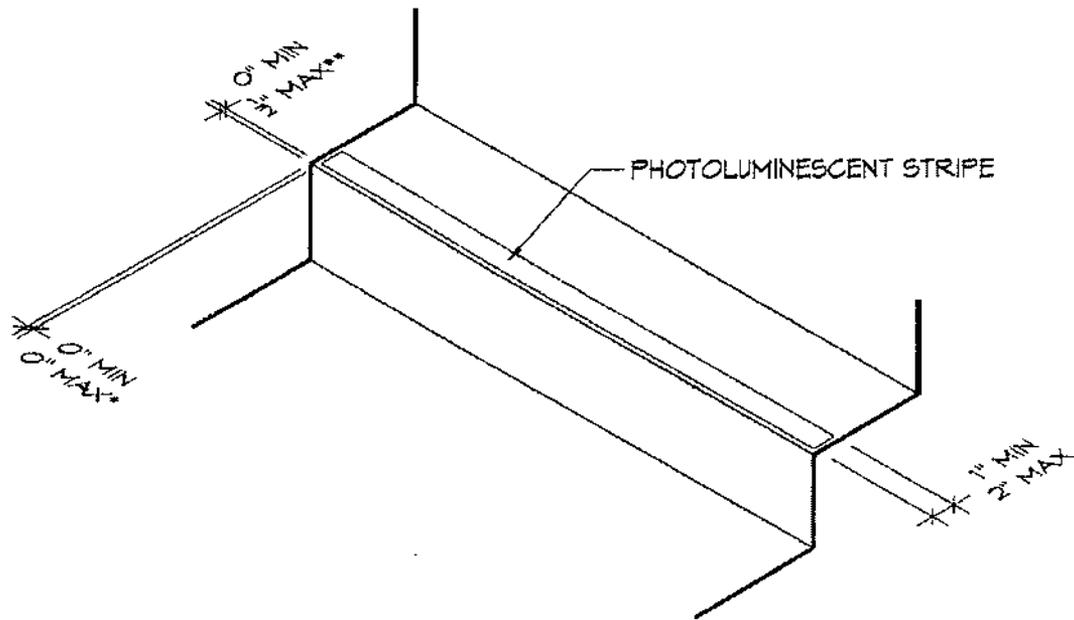


Figure 3: Horizontal Leading Edge of Step (2.2.1)
 * 2" max. for existing buildings
 ** 1" max. for existing buildings

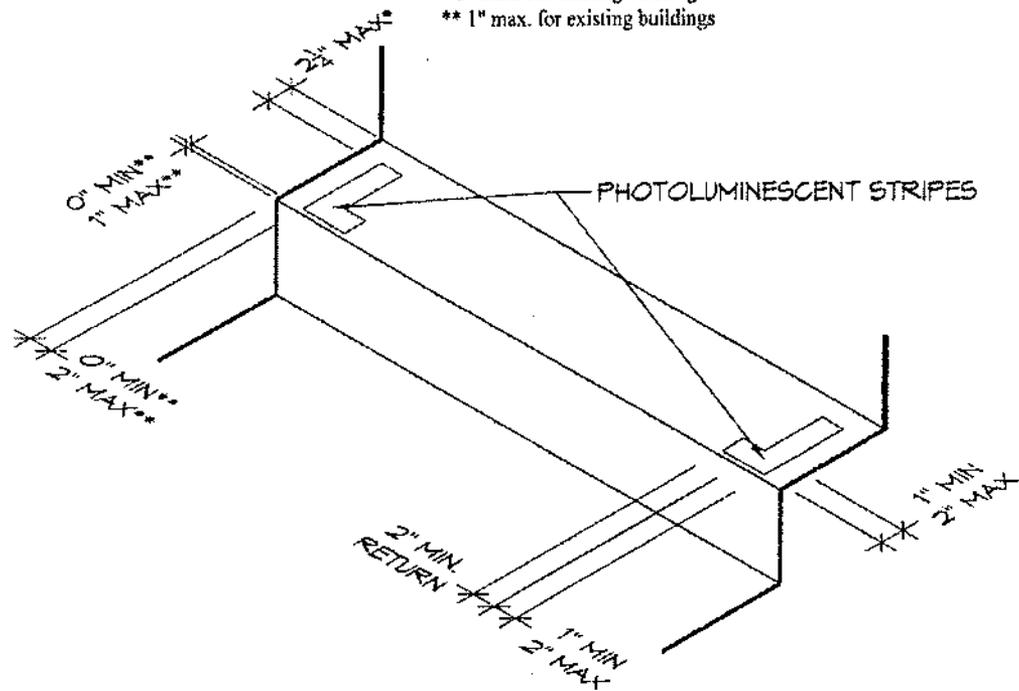


Figure 4: Alternate for Existing Buildings (2.2.1)
 * Minor variations in consistency and uniformity through same exit permitted.
 ** Consistency and uniformity required.

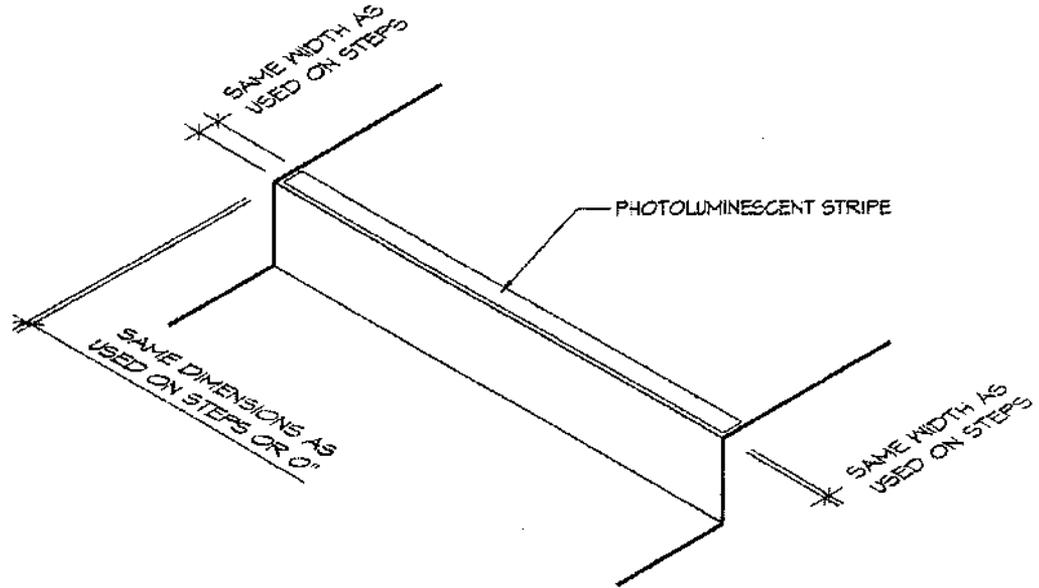


Figure 5 Leading Edge of Landings (2.2.2)
Does not show perimeter demarcation lines.

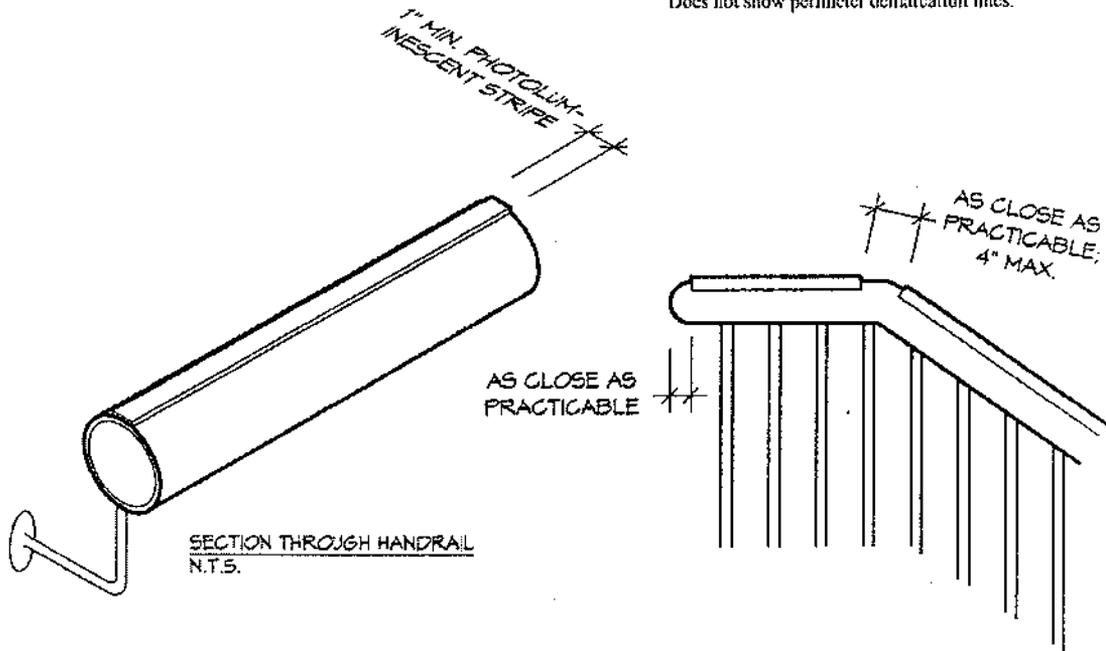


Figure 6 Handrails (2.2.3)

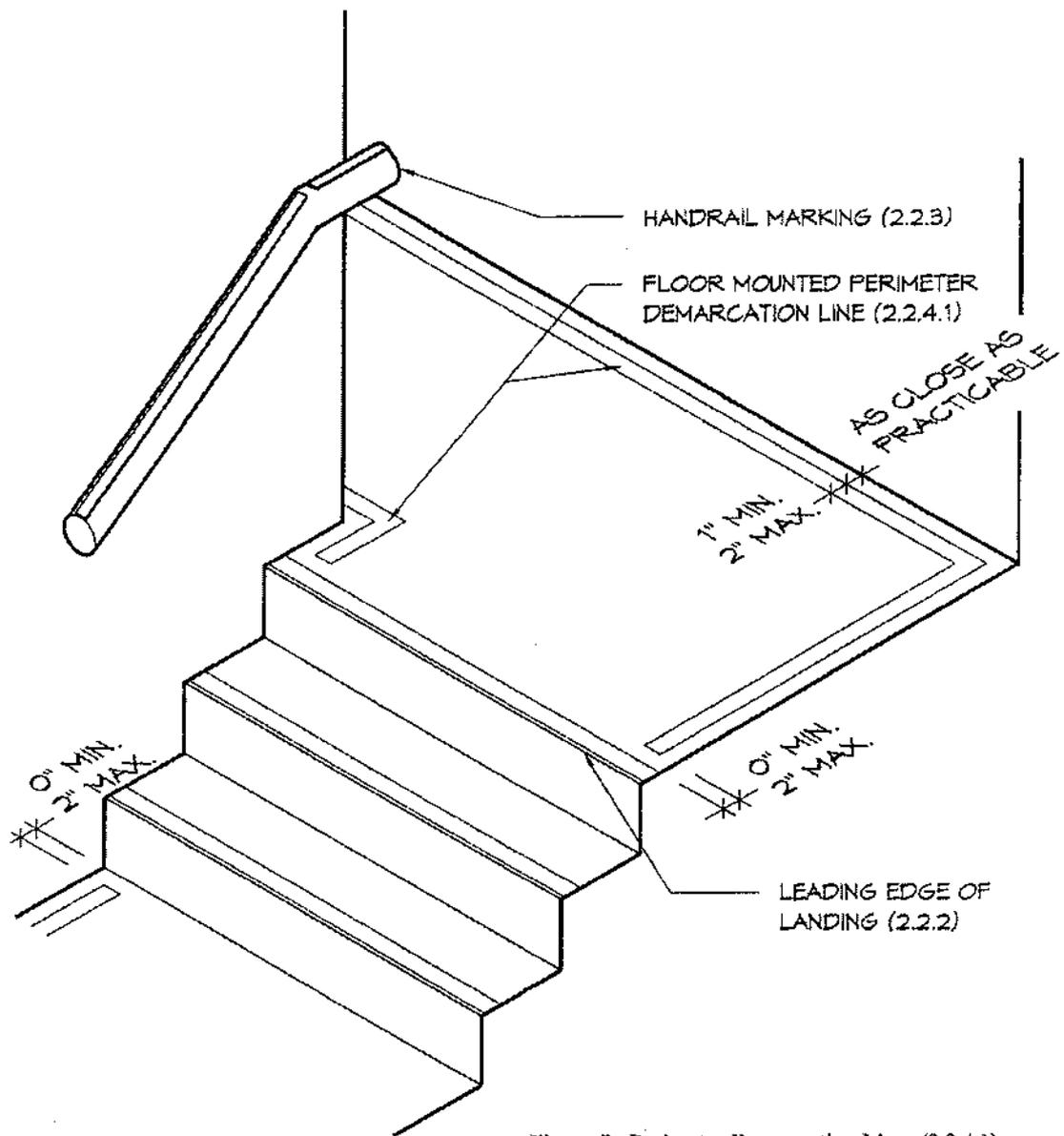


Figure 7 Perimeter Demarcation Lines (2.2.4.1)
 Showing floor-mounted option.

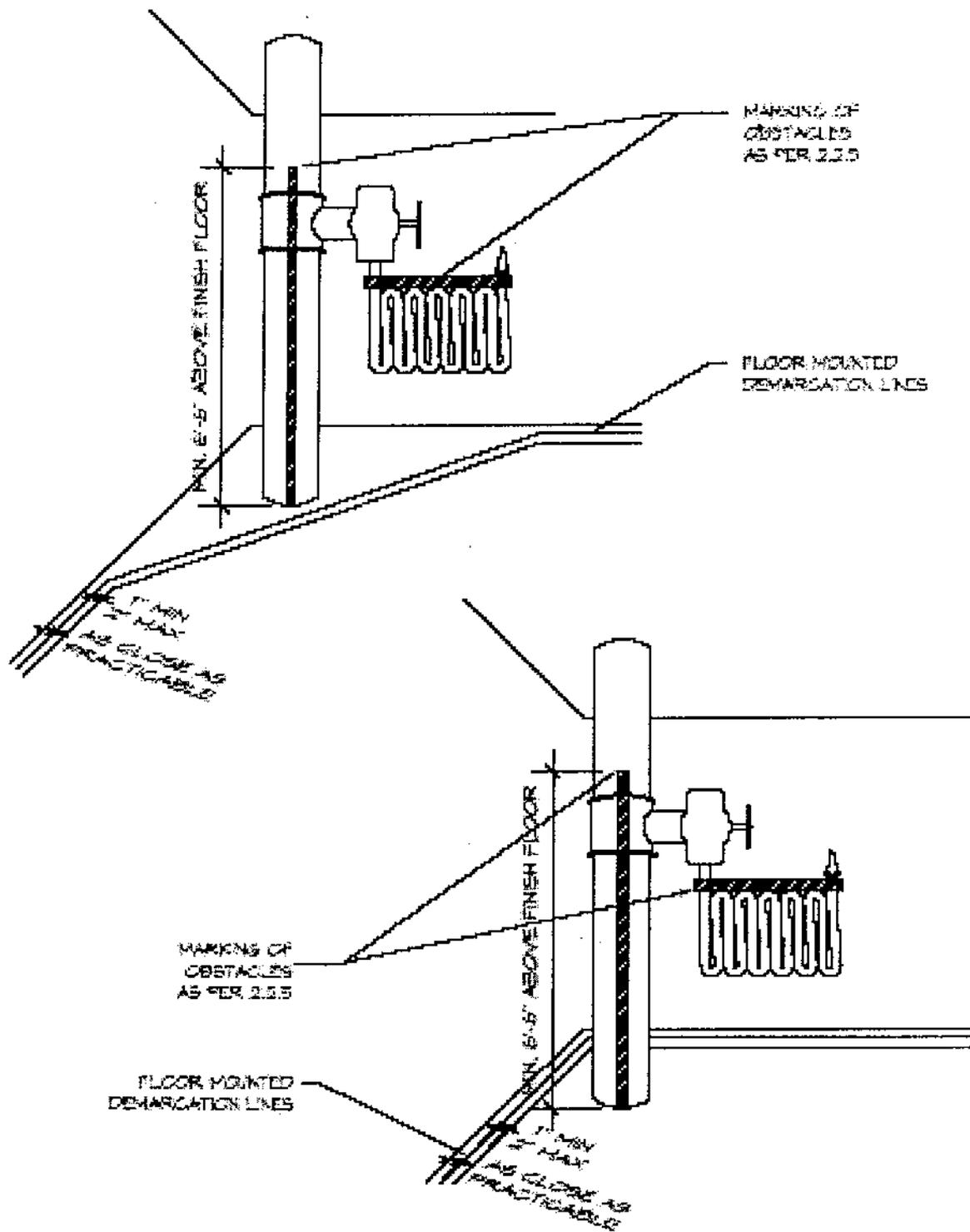


Figure 8 Perimeter Demarcation Lines (2.2.4.1)
 Showing two options at obstacles for floor-mounted demarcation lines.

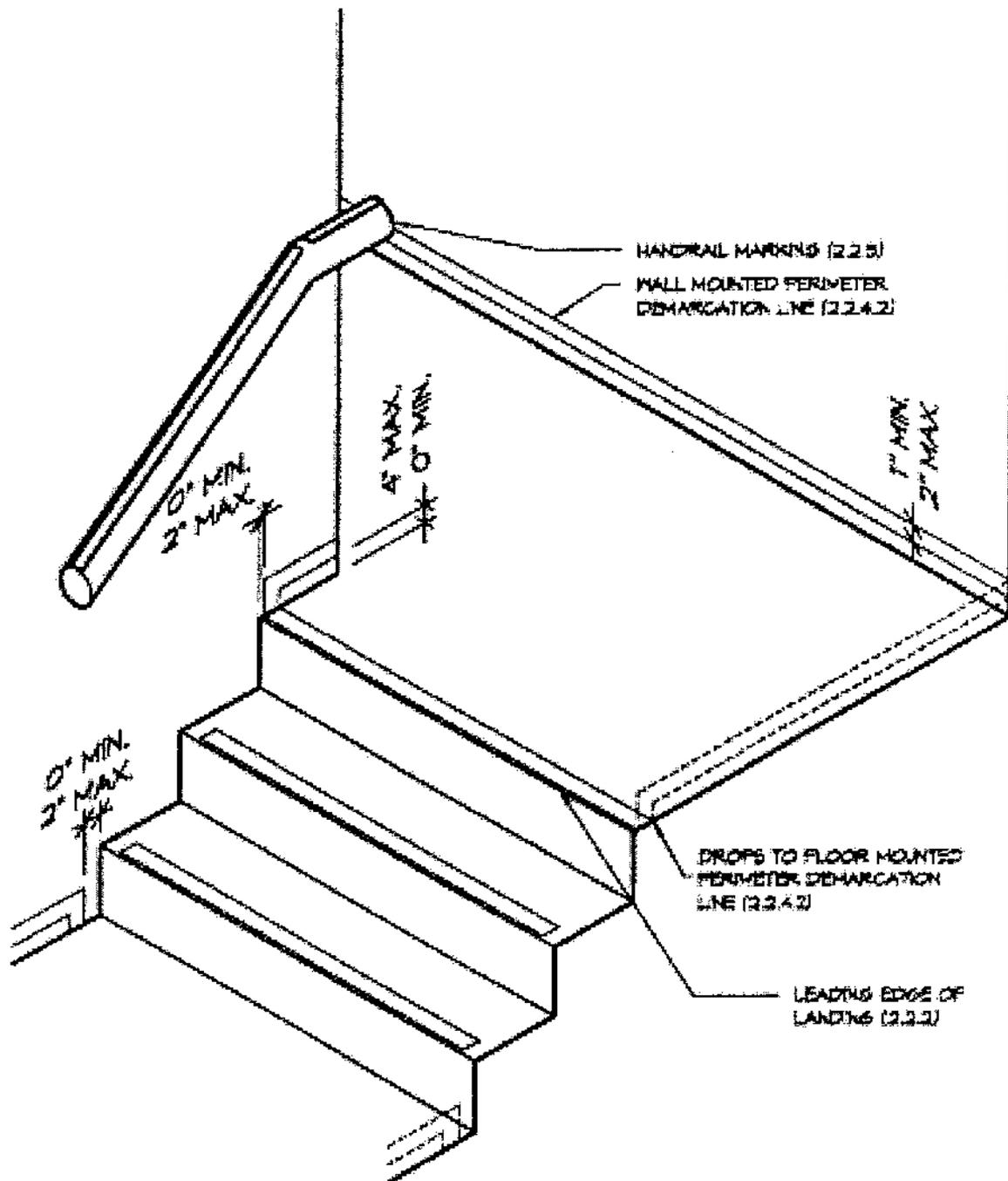


Figure 9 Perimeter Demarcation Lines (2.2.4.2)
 Showing wall-mounted option at vertical drop to floor-mounted line.

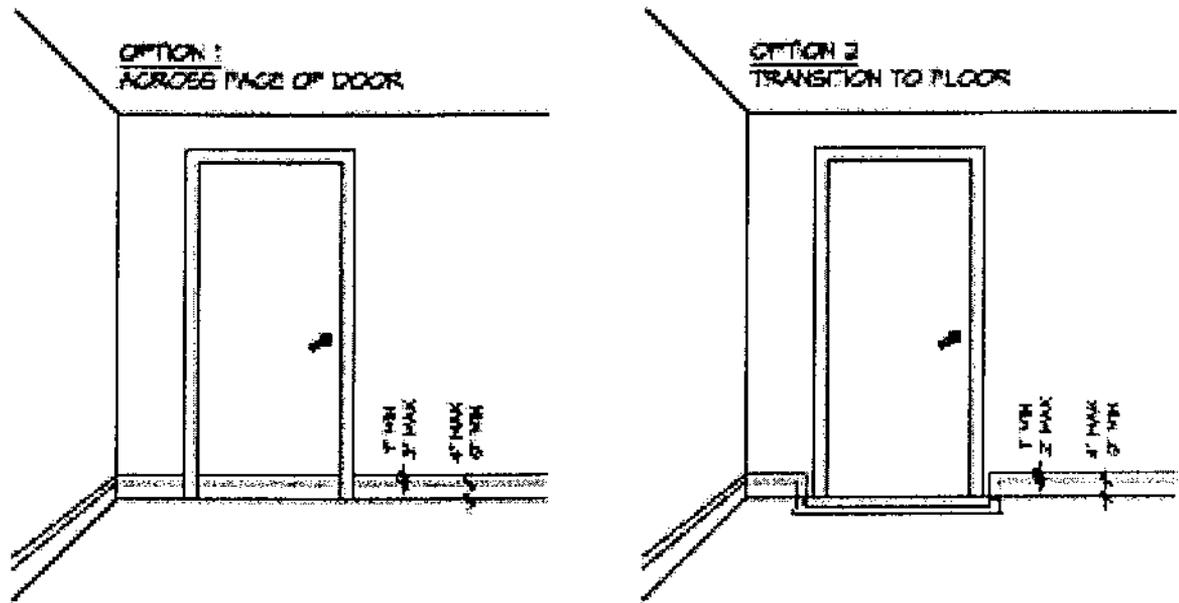


Figure 10 Perimeter Demarcation Lines (2.2.4.2)
Showing wall-mounted options at doors that are not provided with door frame marking.

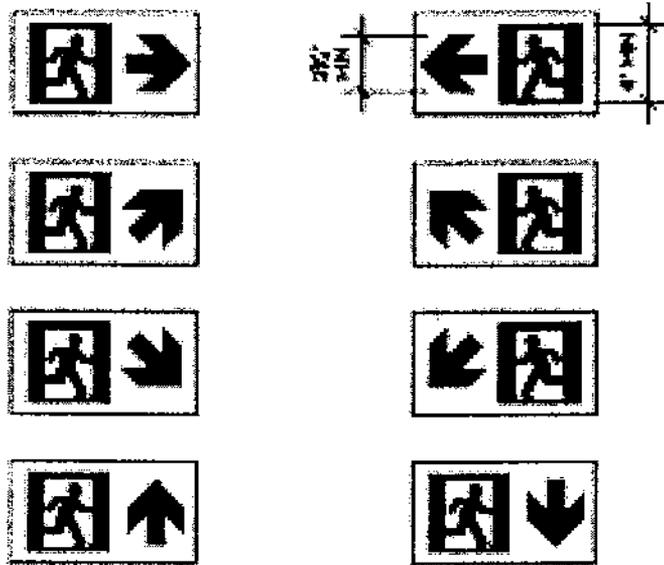


Figure 11 Directional Signage (2.2.6 and 2.2.7)

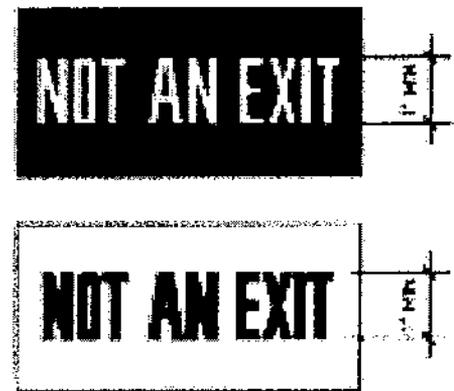


Figure 12 (2.2.8)

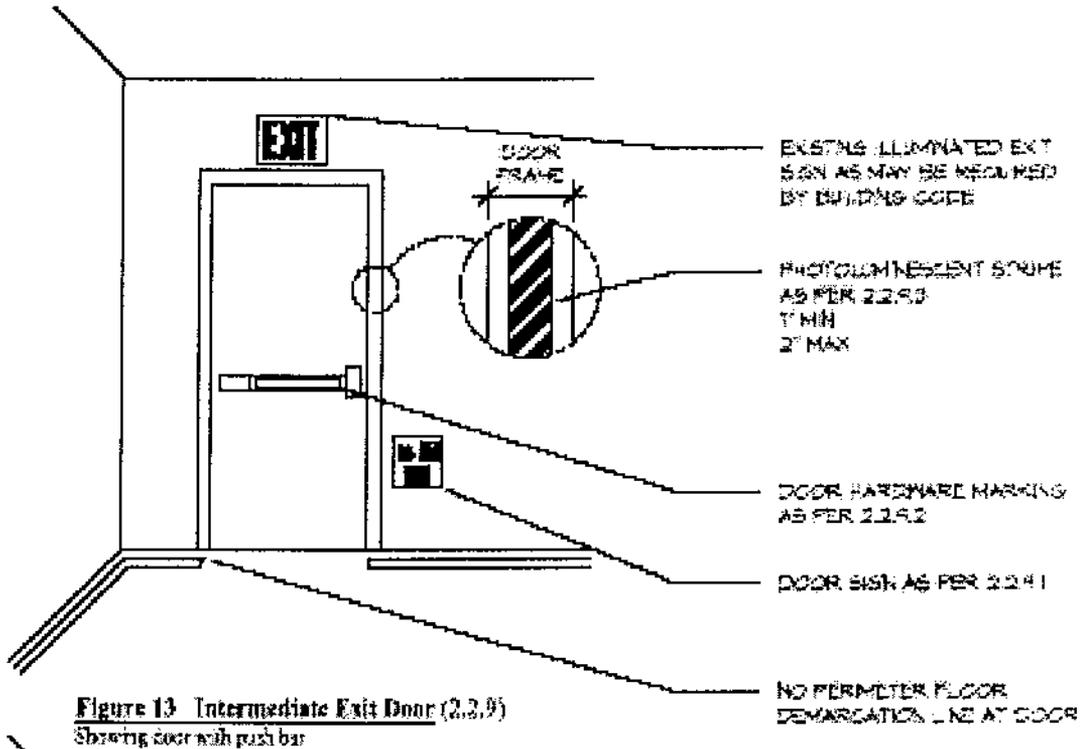


Figure 13 Intermediate Exit Door (2.2.9)
Showing door with push bar

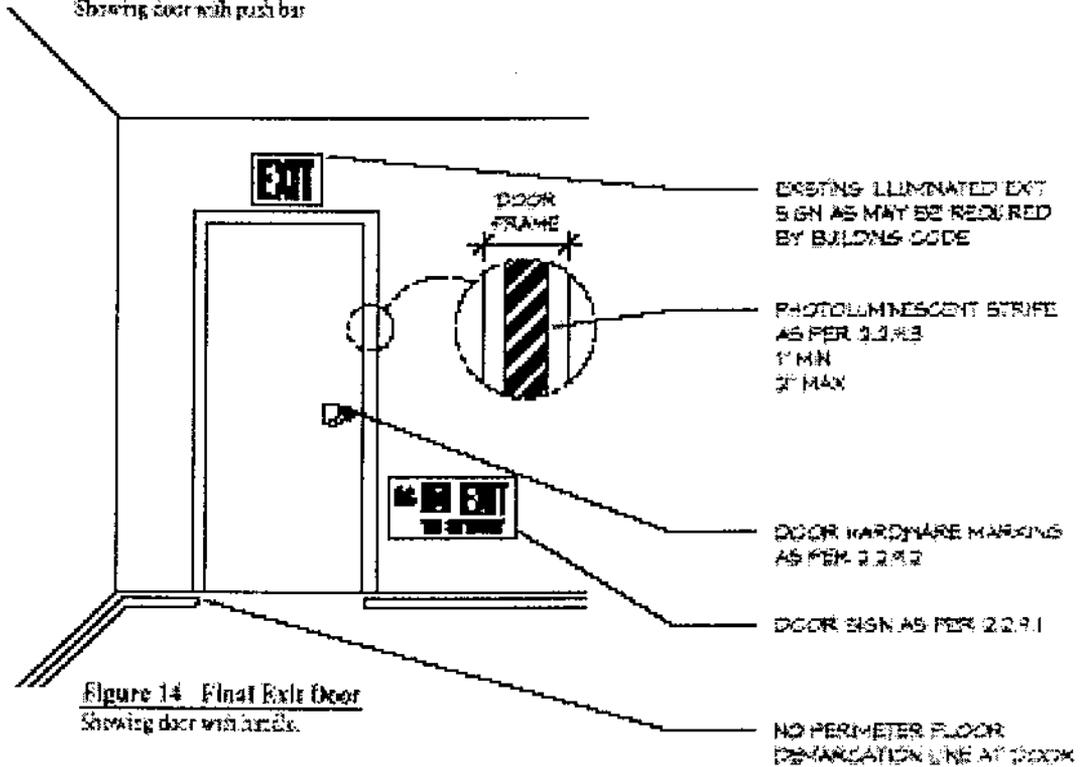


Figure 14 Final Exit Door
Showing door with handle

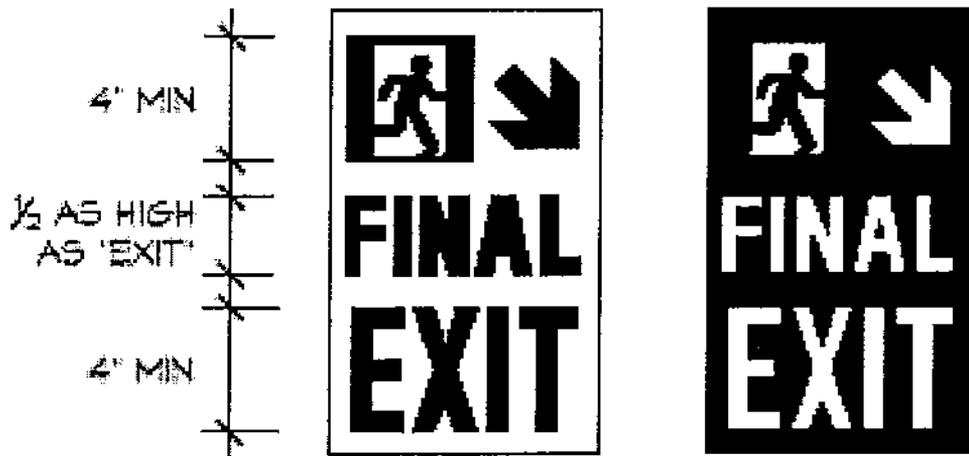


Figure 15 Final Exit Door Signs (2.2.9)
 Showing various acceptable door signs for final exit doors

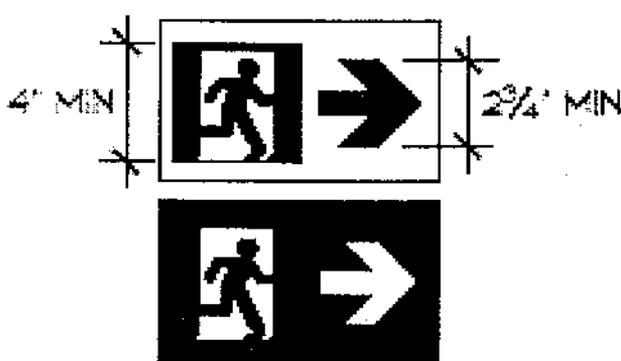


Figure 16 (2.2.6; 2.2.7; 2.3.3)
 Showing positive and negative options for directional signs

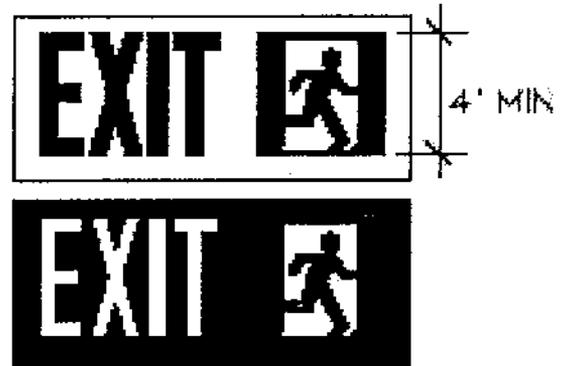


Figure 17 (2.2.1; 2.3.3)
 Showing positive and negative options for door-installed sign options

Photoluminescent exit path markings

Introduction

This standard is intended to provide minimum requirements for photoluminescent exit path markings that will aid in evacuation from buildings in the event of failure of both the power and back-up power to the lighting and illuminated exit signs. Photoluminescent material is charged by exposure to light and will emit luminance after the activating light source is unavailable. The markings covered by this standard are not designed to provide enough light to illuminate a dark egress path, but rather will provide luminescent signs and outlines of the egress path, stairs, handrails, and obstacles, so that occupants can discern these egress path elements in dark conditions. The markings are generally required to be located at a low location in case of smoke and to be readily seen, such as in a crowd situation. They are in addition to, and not as a substitute for, any other signage required under the Building Code, such as electrically illuminated exit signs with electrical back-up power required under

This standard covers:

- 1) the technical specifications for minimum performance of the materials;
- 2) the minimum requirements for placement of the signs and markings;
- 3) administrative filings to certify compliance; and 4) maintenance requirements.

1.0 Technical specifications for minimum performance

1.1 Mandatory certifications. All photoluminescent products covered by this standard shall be independently tested to certify compliance with the following characteristics in accordance with Reference Standard RS 6-IA:

- 1.1.1 Brightness Rating ("BR"): Minimum BR of 30-7-5, being the laboratory measurement of luminance at 10, 60, and 90 minutes, respectively
- 1.1.2 Washability
- 1.1.3 Toxicity
- 1.1.4 Radioactivity
- 1.1.5 Flame spread

1.2 Additional certification. For manufacturers seeking to represent their photoluminescent products in New York City as UV resistant (resistant to UV degradation and weather), such products shall be independently tested to certify compliance with Reference Standard RS 6-IA for UV degradation. Only products meeting this characteristic shall be installed in locations exposed to unfiltered sunlight or exterior weather conditions. UV-approved products may also be used in other locations where materials with proven long-term stability are desired by the owner.

- 1.3 Approval.** Only those products approved by the Department of Buildings' Material and Equipment Acceptance Division ("MEA") shall be installed.
- 1.4 Labeling.** All approved materials shall be labeled and identified with the model number as well as with "MEA # _____ BR: " in a minimum of 6 point type with at least one such identification on each piece of material installed. However, labeling is not required for pieces of material less than 1 foot in length that are placed in immediate proximity of an identical model that is labeled. Those products certified for UV degradation shall be labeled with "UV" (e.g.: MEA 892-05-M BR: 39-8-6 UV). Products may include supplemental identifying information such as the manufacture's name, trade name, or "NYC".

Note: A Brightness Rating of 30-7-5 means that the brightness (luminance) will be 30.0 mcd/m² (millicandelas per square meter) at 10 minutes, 7.0 mcd/m² at 60 minutes, and 5.0 mcd/m² at 90 minutes, under test conditions.

2.0 General standards.

2.3.1 Design of door and directional signs. Unless otherwise specified, all photoluminescent door signs and directional signs referenced herein (see figs. 11, 15, 16, 17):

1. may be either positive or negative image;
2. shall be made with the non-photoluminescent portions of the signs in safety green as per ANSI Z535. 1-2002, American National Standard for Safety Color Code;
3. shall include three components:
 - 3.1 the word EXIT printed in sans serif letters at least 4" high (102 mm) with strokes no less than 2" (13 mm);
 - 3.2 an emergency exit symbol at least 4" high (102 mm), complying with E00 1 or E002 as per ISO 7010 (2003-10-01), Graphical Symbols—Safety Colors and Safety Signs—Safety Signs Used in Workplaces and Public Areas; and
 - 3.3 an arrow at least 2 ¾" (70 mm) high, complying with E005 or E006 as per ISO 7010.

Exceptions:

1. Arrows are not mandatory on door-mounted door signs.
2. The word EXIT is not mandatory on directional signs required by "Minimum Installation Requirement" 3.a. and 3.b.

3. Additional descriptive text is permitted, provided such words are in sans serif letters and, where the word EXIT or emergency exit symbol is required on such sign, such descriptive text is no more than one-half as high as any of the word EXIT or the emergency exit symbol.

2.3.2 Solid and continuous. For the purposes of this standard, solid and continuous means without gaps or interruption, except as required for the control of expansion and contraction. A series of dashes, chevrons, dots, or other similar patterns is not solid and continuous. Nonetheless, photoluminescent materials shall be considered solid and continuous if they occasionally contain the following safety green (ANSI Z535.1) symbols or text: 1) the word EXIT, 2) egress symbol E001 or E002 as per Iso 7010; 3) direction arrows E005 or E006 as per ISO 7010, or other text or symbols as approved by the Commissioner.

2.3.3 Consistent and uniform. Where markings are required to be consistent and uniform throughout the same exit, those portions of an exit in which the egress travel direction is downward may be treated differently from those portions of the same exit in which the egress travel is upward.

2.3.4 Figures. The figures annexed are intended only for illustration, and where there is a conflict between the figures and the text, the text shall govern.

2.5 Installation of additional signs and markings. Where photoluminescent signs or markings are installed in locations where they are not required by 2.1 and 2.2, such signs and markings shall be MEA-approved in accordance with 1.0 (technical specifications for minimum performance). Examples of such other signs could include floor numbering signs, elevator landing signs, elevator bank indicator signs, reentry signs, etc. Where door hardware or door frame markings in accordance with 2.2.9.2 or 2.2.9.3 are provided at reentry doors, the reentry signs required by the building code shall be photoluminescent and MBA-approved in accordance with 1.0.

3.0 Plans to certify compliance

3.1.2 Product identification. The owner shall submit plans and specifications to identify the manufacturer and MEA approval number of each product installed, along with the manufacturer's product literature. The submittal shall describe which particular products were installed in each part of the building.

4.0 Maintenance program. Owners shall keep the required photoluminescent signs and markings in good repair. At a minimum, owners shall, every 12 months, perform a visual inspection of the signs and marking with the normal lighting turned on. Signs and markings that are missing, damaged, loose, or that show signs of wear or missing MEA labels shall be noted and promptly repaired.

EXPLANATORY MATERIAL

The following are additional technical considerations for Reference Standard RS 6-1 and do not constitute a portion of the mandatory requirements.

A. Activating Illumination.

The products approved for use under Reference Standard 6-1 are tested in a laboratory with a fluorescent activating light source of 2 footcandles as measured on the surface of the test specimen. The measurement of 2 footcandles was derived from the minimum lighting levels as measured on the floor in exits as required by the New York City Building Code for buildings constructed after December 1, 1968. The Department of Buildings recognizes that many buildings are voluntarily providing more than 2 footcandles, and that many buildings erected before 1968 may properly be providing less. Additionally, some existing buildings are illuminated with incandescent lamps, which might not efficiently charge certain photoluminescent materials.

Reference Standard 6-1 does not permit the use of lower-performing photoluminescent products for brightly-lit environments, nor does it mandate the use of higher-performing photoluminescent products for grandfathered lighting environments. Therefore, prior to choosing a product, owners are encouraged to conduct a survey of existing lighting conditions to ensure adequate performance of the photoluminescent materials selected for the particular installation.

Reference Standard 6-1 relies on the current requirement of the New York City Building Code that continuous illumination be provided at all periods of building occupancy in corridors and exits⁴. Over the years, on a case-by-case basis, some buildings have been approved for the installation of motion-sensor activating switches allowing dark exit stairs, with the determination made that the resulting installation was equivalent to what was then required under the code. However, such determinations were made prior to the requirement of photoluminescent materials; motion-sensor devices that reduce continuous illumination to a level below the required 2 footcandles are no longer acceptable in exits where photoluminescent materials are required.

B. Dissimilar Luminance Levels Within Same Environment

It is neither necessary nor possible to require that photoluminescent products in the same environment emit identical luminance levels; many factors, including the distance to the activating light source, the angle of incidence and shadows, will result in different luminance levels for identical photoluminescent products placed in the same stairway. Variations in actual luminance are expected in the same environment. However, grossly dissimilar brightness ratings within the same environment should be avoided.

C. Contrasting Colors

Photoluminescent material are effective in completely dark conditions, and, conversely, are usually visible in normal lighting conditions. However, in dim or semi-lit conditions, such as when batteries for an emergency light are running low or when a stair is dark but a door is open to a lighted area, the photoluminescent materials forming the outlines of steps, landing, demarcation lines, and handrails might become hard to discern. Photoluminescent materials installed adjacent to a contrasting, dark color ameliorate this effect.

D. Abrasion Resistance

Reference Standard 6-1 does not mandate minimum standards for abrasion resistance. For products that are to be applied to walking surfaces, it is recommended that owners consider 1) the amount of traffic in the stairs by building occupants, and 2) the products' durability and resistance to abrasion. For instance, certain thin films and paints may be sufficient where the stairs are alarmed and only used in emergencies. However, where the occupants use the stairs on a daily basis, more durable products should be considered. Ultimately, the building owner is responsible for maintaining the photoluminescent materials in accordance with Reference Standard 6- 1, Section 4.0.

E. Adhesives.

Reference Standard 6-1 does not specify the adhesives to be used. The choice of adhesive should be carefully considered for the longevity of the installation, particularly if the surface to which the product to be applied is porous, uneven, or subject to temperature or humidity variation. At a minimum owners should follow the manufacturers' instructions.

F. Slip-resistance.

Reference Standard 6-1 does not specify minimum slip-resistance requirements for photo luminescent products installed on walking surfaces. Whether or not a particular building's egress path is subject to any slip- resistance requirements may depend on the original date of construction. Any photoluminescent materials installed should be as slip-resistant as the minimum standard that is applicable to the building in which they are being installed. A stripe of photoluminescent material that is not slip-resistant may, depending on the design of the stair nosing product, be compensated for by the inclusion of an adjacent, slip-resistant strip.

G. Wall-mounted floor perimeter markings at doors.

In deciding whether to continue a wall-mounted demarcation line across a door or to transition to the floor (2.2.4.2), consideration should be given to how the door is used or secured so as to avoid the possibility that the demarcation line on the door, if left open, might lead evacuees into a non-egress space or area.



New York City Department of Buildings' MEA Reference Standard RS 6-1A

Additional Standards as Required by Reference Standard RS 6-1 for
Photoluminescent exit path markings

Specimens to be tested shall be finished products as they would be sold to purchasers. Each distinct product material shall be separately tested and receive its respective test results for its respective Materials, Equipment and Acceptance (MEA) Division approval number. However, variation in the size of the product and differences in the text or arrow directions, etc., shall not constitute a distinct product material, but shall constitute a different model number—provided that product literature describing with pictorial representations of all such model numbers associated with the test specimens is submitted to MEA.

Thin gauge films and paints shall be tested when applied to a rigid cement board ¼" thick. In the case of paints, such painted test specimens shall be submitted along with the description of the procedures used to produce the test specimens (such as surface preparation, primer coats, number of photoluminescent coats, encapsulant coat if applicable, maximum/minimum temperature or humidity during painting if applicable, etc.). Such description shall be included in the laboratory's test report; and such description shall be included in the MEA resolution as the mandatory labeling on the paint cans as instructions to purchasers.

1.0 Brightness Rating

Iso 17398:2004, Safety Colours and Safety Signs—Classification, Performance and Durability of Safety Signs, Clause 7.11. Three specimens shall be tested (separately for each distinct product material). Thin gauge films and paints shall be tested when applied to a rigid cement board ¼" thick. The testing shall be in accordance with ISO 17398, clause 7.11, with the following modifications:

- 1.1 Clause 7.11.5 — Excitation Light Conditions. The test established in Clause 7.11.5.1. for classification of photoluminescent materials in accordance with Clause 5.5 is not required. The test in Clause 7.11.5.2 is required, however subclauses a), b), and c) are replaced with the following excitation standard: "Excitation of the

phosphorescent test specimens shall be by a 4000K to 4500 K fluorescent light providing a mean illuminance of 2 footcandles (21.6 lux) on the surface of the test specimen. The excitation duration shall be 2 hours.”

- 1.2 Clause 7.11.6.1 — Luminance Instrumentation. This Clause 7.11.6.1 describes two luminance instrumentation options. For this Reference Standard 6-IA, the contact luminance meter option shall be limited only to test specimens that are both smooth and flat.
- 1.3 Clause 7.11.6.4.2 — Luminance recordings for classification purposes. This Clause 7.11.6.4.2 is not required.
- 1.4 Clause 7.11.6.4.3 — Luminance recordings for product description purposes. The luminance performance shall be based on the mean values of the three test specimens measured at 10 minutes, the mean values of the three test specimens measured at 60 minutes, and the mean values of the three test specimens measured at 90 minutes. The resulting luminance performances shall constitute a “brightness rating”, which shall be indicated in the test report. The minimum brightness rating shall be 30.0 mcd/m² at 10 minutes, 7.0 mcd/m² at 60 minutes, and 5.0 mcd/m² at 90 minutes. For example, a product that minimally meets the luminance levels would have a brightness rating of 30-7-5.

2.0 Washability

ASTMD 4828-1994 (2003), Standard Test Methods for Practical Washability of Organic Coatings.

- 2.1 Three specimens (of each distinct product material) shall be tested for each soil/staining medium in accordance with ASTM D 4828. Thin gauge films and paints shall be tested when applied to a rigid cement board ¼” thick.
- 2.2 The laboratory shall prepare the soils and staining media that shall include: crayon, water-borne felt-tipped pen, lipstick, and a mineral-oil-borne soilants as outlined in clause 6.2.
- 2.3 The cleaning media shall include liquid household cleansers available at supermarkets or laboratory-standardized liquid cleansers as outlined in clause 6.3.
- 2.4 After completion of the test, each specimen shall be rated at 5 or greater in accordance with clause 8.8.

3.0 Toxicity

Bombardier SMP 800-C (Rev. 4, 11/1/2000) Toxic Gas Generation Test. One test specimen (of each distinct product material) shall be tested in each of the flaming and non-flaming modes in accordance with SlvfP 800-C. Where the test specimen is narrower than the required 3” x 3” (76 mm x 76 mm), more than one test specimens shall be placed next to each other to provide 9 in² (229 mm²) of

surface area. Thin gauge films and paints shall be tested when applied to a rigid cement board ¼" thick. The testing shall be in accordance with SMP 800-C, with the following modifications:

- 3.1 Clause 4.3 — For determining the concentration of the toxic gases in accordance with the referenced Boeing BSS 7239 specification, the Commissioner may accept a procedure that uses gas detection tubes or other procedures, in lieu of the absorptive sampling procedure, provided that the testing laboratory outlines the procedures in its report and certifies that equivalent results are obtained.
- 3.2 Clause 5.0 — In accordance with the Building Code and departmental rules, the Department of Buildings' Materials, Equipment and Acceptance Division may approve any testing laboratory it deem qualified to perform this test.

EXCEPTION: For photoluminescent products that, when installed, provide coverage exceeding the limits of interior trim, such products shall instead be tested for toxicity as interior finishes and/or interior floor coverings if and as required by Building Code § 27-348(e) and/or § 27-351. Tread nosings with a horizontal depth of 4" or less and that contain a photoluminescent stripe may be tested in accordance with RS 6-1A.

4.0 **Radioactivity**

ASTM D 3648-2004, Standard Practices for the Measurement of Radioactivity.

- 4.1 Three test specimens (of each distinct product material) shall be tested in accordance with ASTM D 3648. Thin gauge films and paints shall be tested when applied to a rigid cement board.
- 4.2 The activity of the test specimens shall be shown to be statistically indistinguishable from background.
- 4.3 Alpha and beta activity shall be measured on a test specimen of at least 1 in x 1 in (25.4 mm x 25.4 mm) and counted using a proportional counter for a minimum of 15 minutes.
- 4.4 Gamma activity shall be measured on the same test specimen using a gamma spectrometer counted for at least 1 hour.

5.0 **Flame Spread** — either one of the following two standards:

- 5.1 ASTM E 162-2002, Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.

5.1.1 Four test specimens (of each distinct product material) shall be tested in accordance with ASTM E 162. Where the test specimen is narrower than required by the test, several pieces may be grouped together to provide the necessary surface area. Thin gauge films and paints shall be tested when applied to a rigid cement board ¼" thick.

5.1.2 The specimens shall have a flame spread index (Is) not to exceed 35.

5.2 ASTM D 635-2003, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

5.2.1 Ten test specimens shall be prepared for use in accordance with ASTM D 635.

5.2.2 The test specimens shall not burn beyond the 25 mm reference mark.

EXCEPTION: For photoluminescent products that, when installed, provide coverage exceeding the limits of interior trim, such products shall instead be tested for flame spread and smoke density as interior finishes and/or interior floor coverings if and as required by Building Code § 27-348(c) and (d) and/or § 27-351. Tread nosings with a horizontal depth of 4" or less and that contain a photoluminescent stripe may be tested in accordance with RS 6-1A.

6.0 UV Degradation ("UV") (only where a "UV" rating is requested for exterior weather conditions or unfiltered sunlight applications) ASTM G 155-2004, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials.

6.1 Three specimens (of each distinct product material) shall be tested for a period of 1000 hours in accordance with ASTM G 155. The specimens shall be subjected to Cycle 1 exposure condition noted in Table x3.1 of such standard. Thin gauge films and paints shall be tested when applied to a rigid cement board ¼" thick.

6.2 The testing laboratory that conducted the weathering test shall certify that none of the following surface characteristics exist when viewed under a minimum of 5x magnification: cracking, checking, crazing, or erosion.

6.3 After conclusion of the testing, such laboratory shall directly send the specimens to the testing laboratory that conducted the brightness rating tests in 1.0.

6.4 The brightness rating testing laboratory shall perform luminance tests as per 1.0 on the weathered specimens and report the results. The specimens shall indicate at least 90% of the original brightness at 10 minutes, at least 90% of the original brightness at 60 minutes, and at least 90% of the original brightness at 90 minutes, as compared to the brightness ratings prior to the weathering test.

**MODIFICATIONS: EXPRESS FINDINGS
AMENDMENTS TO THE UNIFORM FIRE CODE
AND UNIFORM BUILDING CODE**

SECTION 9-71211.1 and SECTION 13-100.1003.2.9.1
MEANS OF EGRESS ILLUMINATION

- Modification is based on Health and Safety Code Section 17922, where local fire zone requirements are specifically and entirely reserved to the local jurisdiction notwithstanding any other requirements.
- The Fresno Development Department is the local enforcing agency pursuant to Section 13146, Health and Safety Code for permit issuance for the installation of exit path illumination systems. The Fresno Fire Department is the enforcing agency for the maintenance of such systems.
- Modification will also apply to buildings regulated by the State Fire Marshal considering local requirements for installation of stairway photoluminescent exit path marking as a more restrictive requirement relating to enforcement of fire and panic safety in buildings.

Finding: Modification considers local climatic, geological and topographical conditions for firefighting suppression activities including the required use of stairwell photoluminescent stairwell markings in new and existing buildings located in the City of Fresno due to extreme heat and dryness, as is required by Health & Safety Code §§ 17958.5, 17958.7 and 18941.5.

- a. Climactic/Physiological: Temperatures in the Fresno/Clovis Metropolitan area can experience summer peak (dry bulb) temperatures as high as 108°F for several hours at a time.

For most intense physical activity, the low wet bulb (low relative humidity) temperature makes up for the high dry bulb temperature.

However, the heavy, relatively impermeable clothing worn by firefighters cancels or negates the advantages of the low wet bulb.

The impact on the firefighting capability for personnel is described on attached exhibit, "Heat Stress Index¹" attached as Exhibit "A". The chart relates performance level with exposure limit for different environmental conditions.

Superimposed on the chart is the relationship between dry bulb temperatures and the wet bulb globe temperature (WBGT for the

¹ United States fire Administration, Emergency Incident Rehabilitation, (FA-114, July, 1992) Table 1-1.

special case of heavy impermeable clothing. Also superimposed on the chart is the relative severity of firefighting conditions in the Fresno area versus much of the rest of the state, with Fresno having as much as 440 hours with a WBGT in excess of 86°F while many large coastal communities have WBGTs less than 80°F.

The relatively high effective WBGT severely reduces the effectiveness of the firefighter to function in a large prolonged conflagration type fire.

The conditions discussed above are ambient conditions and do not take into account the localized heat stress experienced in a particular fire condition.

Firefighting, rescue, and evacuation operation in multi-story buildings place high physiological stress demands on firefighters. Elevators are not normally used in such operations due to the inherent susceptibility of elevator control units and circuitry to damage during a fire. A reliably illuminated stairwell is critical to maintain visibility and to enable firefighters to climb and descend stairs in as efficient a manner as possible. Such systems also aid in the orderly exit of building occupants lessening the need for firefighters to assist in evacuation of able bodied individuals. Fire fighters are thus able to concentrate on assisting the disabled, and conducting fire fighting activities more efficiently during times of extreme climatic stress.

JULY 2006 MAXIMUM TEMPERATURES

DATE	FRESNO	FRESNO		SAN DIEGO		SAN FRANCISCO	SAN FRANCISCO	SAN FRANCISCO	
	HIGH TEMP	FRESNO AVG. HIGH	MONTHLY AVG.	SAN DIEGO HIGH TEMP	SAN DIEGO AVG. HIGH	MONTHLY AVG.	FRANCISCO HIGH TEMP	FRANCISCO AVG. HIGH	FRANCISCO MONTHLY AVG
7/1	98			83			61		
7/2	101			79			61		
7/3	101			80			60		
7/4	99			79			61		
7/5	96			78			62		
7/6	93			77			63		
7/7	96			79			73		
7/8	103			81			73		
7/9	107			79			67		
7/10	107			76			61		
7/11	101			79			62		
7/12	95			82			66		
7/13	99			83			71		
7/14	103			82			64		
7/15	104			86			64		
7/16	107			80			70		
7/17	109			78			80		
7/18	105			79			77		
7/19	107			79			78		
7/20	109			80			73		
7/21	109			82			75		
7/22	112			99			87		
7/23	113			83			83		
7/24	113			85			77		
7/25	113			76			75		
7/26	112			84			65		
7/27	106			86			64		
7/28	99			83			64		
7/29	97			80			64		
7/30	94			80			68		
7/31	96			79			64		
		103.4	87.8		81.2	76.3		68.8	61.7

EXHIBIT "B-1"

HEAT STRESS INDEX

TEMPERATURE °F	RELATIVE HUMIDITY								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
104	98	104	110	120	132				
102	97	101	108	117	125				
100	95	99	105	110	120	132			
98	93	97	101	106	110	125			
96	91	95	98	104	108	120	128		
94	89	93	95	100	105	111	122		
92	87	90	92	96	100	106	115	122	
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
84	78	81	83	85	86	89	91	95	99
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

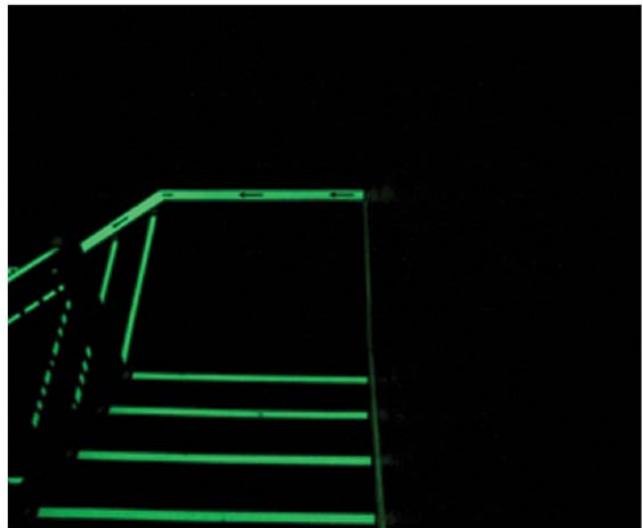
NOTE: Add 10°F when protective clothing is worn and add 10°F when in direct sunlight.

HUMITURE °F	DANGER CATEGORY	INJURY THREAT
BELOW 60°	NONE	LITTLE OR NO DANGER UNDER NORMAL CIRCUMSTANCES
80° - 90°	CAUTION	FATIGUE POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
90° - 105°	EXTREME CAUTION	HEAT CRAMPS AND HEAT EXHAUSTION POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
105° - 130°	DANGER	HEAT CRAMPS OR EXHAUSTION LIKELY, HEAT STROKE POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
ABOVE 130°	EXTREME DANGER	HEAT STROKE IMMINENT!

Photoluminescent Exit Pathway Markings

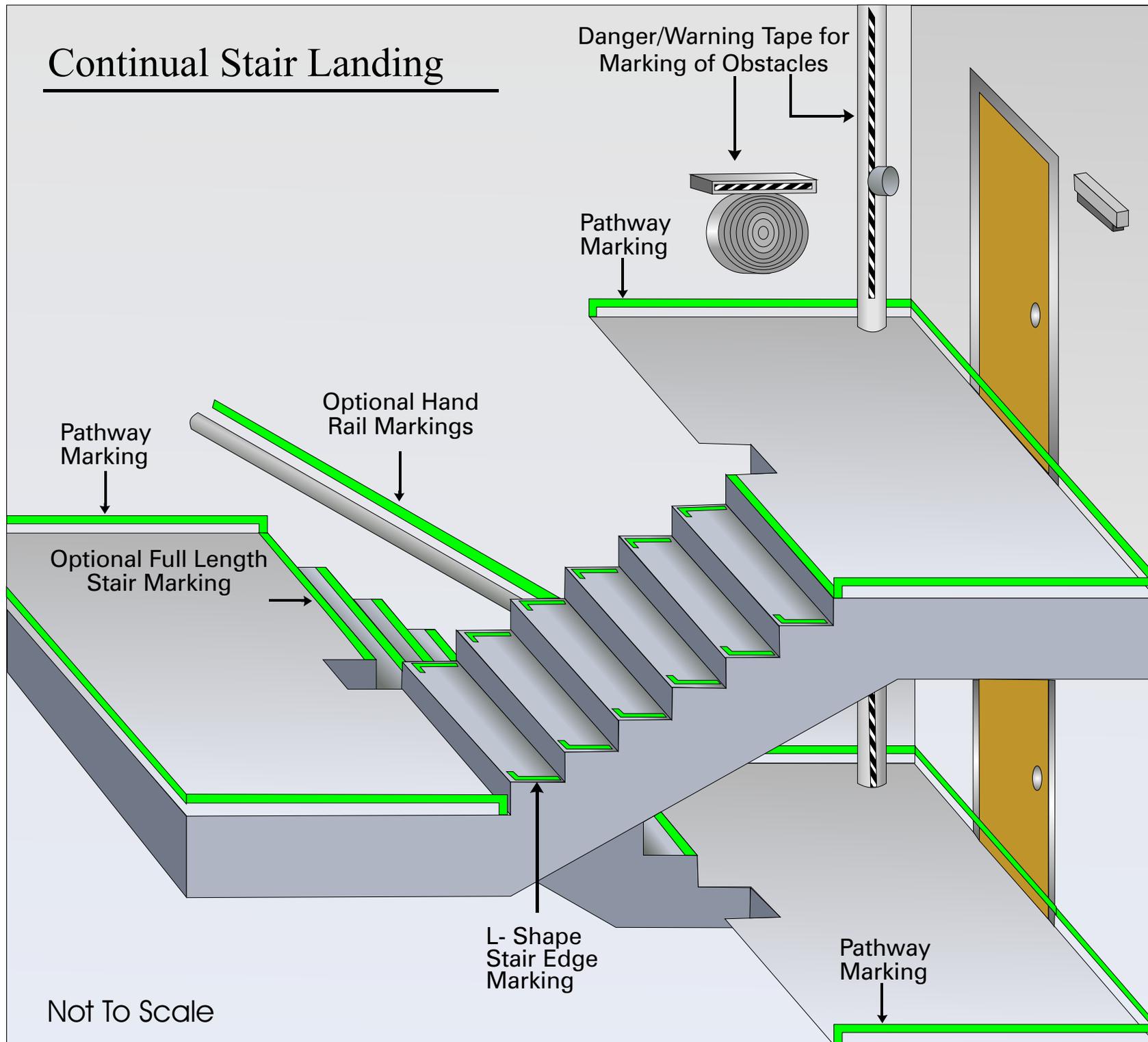


The Exit markings on the door above are examples of both daytime and “blackout” conditions.



The exit markings for the landings include stair, hand rail, and directional pathway markings for emergency egress.

Continual Stair Landing



Not To Scale

EXHIBIT "D-1"



THE SALVATION ARMY
FOUNDED IN 1865
SILVERCREST RESIDENCE
1824 FULTON STREET
FRESNO, CALIFORNIA 93721
(559) 237-9111
TTY 1-877-735-2959

July 11, 2006

Mr. Kach Hovanessian
Bright Path Lighting
2910 East Heaton, Suite B
Fresno, California 93721

Dear Kach,

We are roughly half-way through the completion of our building with your company's lighting material and I wanted to write to let you know how very pleased we are with both your product and your staff. My tenants (who range in age from 62 to 98, with a few younger wheelchair-bound handicap tenants) have commented on how safe they feel knowing that they can find their apartment door, emergency cord switches and the stairwells in times of emergencies. They are finding that they really like the lighting even when there isn't an emergency as the material serves well as a night light in their bathrooms (around their emergency pull cord switches). Your staff has been courteous and timely. You know that they are accepted around here when the tenants offer them sodas or refreshments.

I sincerely hope that we never have to put the lighting to the test in a real emergency, but everyone around here is sleeping better knowing that they will have no problem finding their way out of the building to a safe place if something did happen.

It has been such a pleasure working with you and your staff. I look forward to working together and my building is always available for a "show and tell" if others would like to see your company's workmanship.

Sincerely,

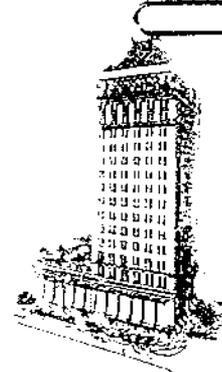
Dawn Trueblood
Fresno Silvercrest Administrator



EXHIBIT "D-2"

FRESNO PACIFIC TOWERS, INC.
1060 FULTON MALL SUITE 916
FRESNO, CA 93721
PHONE (559) 495-1442
FAX (559) 497-8072

FRESNO PACIFIC
TOWERS, INC.



February 3, 2005

Kach Hovanesian
Bright Path Lighting, Inc.
3034 Tulare St.
Fresno, CA 93721

RE: Photoluminescent Egress Pathway Markings

Sandra King
1060 Fulton Mall, 916 • Fresno, CA 93721
(559) 495-1442 • Fax (559) 497-8072
Cell (805) 704-8102
sandra@fresnopt.com

Dear Mr. Hovanesian:

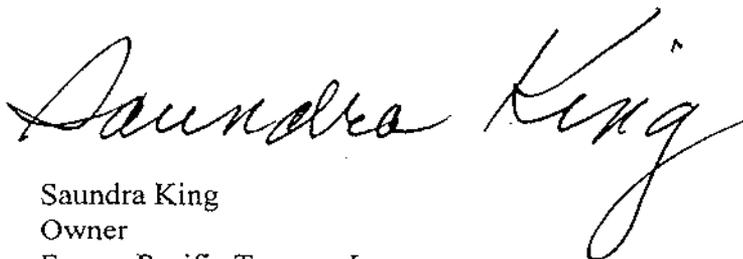
I am very impressed with the photoluminescent egress pathway markings that your company has installed in my building. It is absolutely incredible the way your product lights up our stairwells and hallways even in total darkness. I knew from the samples that you presented to me that the product was superior, but after seeing it installed, I can honestly say that it far exceeded my expectations.

Also, I would also like to compliment your installation staff, as they were very meticulous, professional and quiet so as not to disturb our tenants during business hours.

You are welcome to use me as a reference, as I would highly recommend your product and services to any building owner anywhere. I may be reached at 559-495-1442.

Thank you for making our building a better and much safer place to work.

Sincerely,



Sandra King
Owner
Fresno Pacific Towers, Inc.

RESOLUTION NO. _____

A RESOLUTION OF THE COUNCIL OF THE CITY OF FRESNO, CALIFORNIA ADOPTING FINDINGS RELATING TO LOCAL CLIMACTIC, GEOLOGICAL AND TOPOGRAPHICAL CONDITIONS THAT SUPPORT AMENDING THE UNIFORM FIRE CODE AND UNIFORM BUILDING CODE TO REQUIRE THE INSTALLATION OF PHOTOLUMINESCENT EXIT PATH MARKING FOR BUILDINGS WITH THREE OR MORE STORIES.

WHEREAS, the State of California has adopted the 1997 Edition of the Uniform Building Code, with amendments, which is entitled the 2001 California Building Code, effective November 1, 2002; and

WHEREAS, the State of California has adopted the 2000 edition of the Uniform Fire Code, with amendments, which is entitled the 2001 California Fire Code, effective November 1, 2002; and,

WHEREAS, neither the 2001 California Building Code nor the 2001 California Fire Code require the installation of photoluminescent exit path markings in buildings with three or more stories; and,

WHEREAS, pursuant to California Health & Safety Code, sections 17958.5, 17958.7 and 18941.5, a city may amend the California Fire Code and California Building Code to include additional regulations if the city adopts findings concerning local climactic, geological or topographical conditions that support the additional regulations; and,

WHEREAS, the Council of the City of Fresno believes that the Express Findings attached to this Resolution support amendments to the California Fire Code and California Building Code to require the installation of photoluminescent exit path marking for buildings three stores or more as set forth in Ordinance Bill No. B-13

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Fresno as follows:

1. The Council of the City of Fresno hereby adopts the findings attached as Exhibit "A" to support the amendments to the California Fire Code and the California Building Code to require the installation of photoluminescent exit path marking for buildings three stores or more as set forth in Ordinance Bill No. B-13

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DRAFT

STATE OF CALIFORNIA)
COUNTY OF FRESNO) ss.
CITY OF FRESNO)

I, REBECCA E. KLISCH, City Clerk of the City of Fresno, certify that the foregoing resolution was adopted by the Council of the City of Fresno, at a regular meeting held on the _____ day of _____, 2007.

AYES :
NOES :
ABSENT :
ABSTAIN :

Mayor Approval : _____, 2007

Mayor Approval/No Return: _____, 2007

Mayor Veto: _____, 2007

Council Override _____, 2007

REBECCA E. KLISCH
City Clerk

BY: _____
Deputy

APPROVED AS TO FORM:
CITY ATTORNEY'S OFFICE

BY: _____
JOHN W. FOX
Deputy City Attorney

Attachment:

- Attachment "A" - Findings

[40306sz/reso/jwf]2/28/07

EXHIBIT "A"

FINDINGS RELATING TO LOCAL CLIMACTIC, GEOLOGICAL AND TOPOGRAPHICAL CONDITIONS THAT SUPPORT AMENDING THE UNIFORM FIRE CODE AND UNIFORM BUILDING CODE TO REQUIRE THE INSTALLATION OF PHOTOLUMINESCENT EXIT PATH MARKING FOR BUILDINGS WITH THREE OR MORE STORIES.

1. Local climatic, topographical or geological conditions make the amendments to the Uniform Building Code and Uniform Fire Code, as set forth in Ordinance Bill No. B-13 reasonably necessary. As documented in the 2025 Fresno General Plan¹ and the Master Environmental Impact Report No. 10130² for the General Plan, during the summer months the City of Fresno experiences periods of what can only be described as extreme heat. For example, attached as Exhibit "1" and incorporated by reference is a chart setting forth the high temperatures in Fresno, San Francisco and San Diego for each day from July 1, 2006 through July 31, 2006 as reported by the National Weather Service. During this approximately 31 day period, the average high temperature in Fresno was 103.4 degrees, the average high temperature in San Diego was 81.2 degrees and the average high temperature in San Francisco was 68.8 degrees. Furthermore, during this 31 day period, the average temperature in Fresno was 87.8 degrees, the average temperature in San Diego was 76.3 degrees and the average temperature San Francisco was 61.7 degrees. Finally, during this 31 day period Fresno experienced 20 days where the maximum temperature exceeded 100 degrees, while neither San Diego nor San Francisco experienced such temperatures at any time during the 31 day period. Though Health & Safety Code § 17958.7 does not require the local conditions to be unique to a particular jurisdiction, the temperature chart demonstrates that the temperatures experienced in Fresno are extreme as compared to temperatures experienced in other parts of California.

2. The Heat Stress Index published by the Federal Emergency Management Agency in its publication entitled Emergency Incident Rehabilitation sets forth the stress placed on the human body when exposed to various temperatures and humidities. This Heat Stress Index is attached as Exhibit "2" and incorporated by reference. A note under the Heat Stress Chart states that 10 degrees should be added to the temperature when protective clothing is worn and an additional 10 degrees should be added when the person is standing in direct sunlight. According to this chart, a person exposed to temperatures between 90 and 105 degrees is subject to heat cramps and heat exhaustion if exposure to

¹ The 2025 Fresno General Plan at p. 166 states, "Fire Hazards. Fresno's high summer temperatures, intense sunlight, and low rainfall potentiate fires by drying and pre-heating combustible material and by fostering spontaneous combustion of flammable material. Fresno's estimated maximum wind speed (used to design structures) is 70 mph, which could fan blazes to a high intensity."

² Master Environmental Impact Report No. 10130 at p. states, " The climate of the FMA [Fresno Metropolitan Area] is characterized by hot, dry summers ... Temperatures in the FMA range from a mean monthly maximum of 97.9 [degrees] F in July to a mean monthly minimum of 36.3 [degrees] F in December."

these temperatures is prolonged and there is physical activity. A person exposed to temperatures of 105 to 130 degrees is likely to experience heat cramps and heat exhaustion. Furthermore, heat stroke is possible if exposure is prolonged and there is physical activity. A person exposed to temperatures above 130 degrees or greater faces a high risk of suffering from heat stroke.

3. Because of the extreme heat Fresno experiences during the summer months, Fresno Fire Fighters responding to fires and other incidents requiring the evacuation of a building, are regularly exposed to temperatures in excess of 105 degrees, when accounting for their protective gear, exposing them to the probability of heat cramps, heat exhaustion and possibly heat stroke.

4. Reports and studies related to building evacuation have concluded that the use of photoluminescent floor path indicators are effective in guiding occupants out of a building, with or without the use of electrical power.³ This is because photoluminescent markings are not dependent upon electricity for illumination and they are placed at floor level as this is where the most visibility is in the event of smoke.⁴ Traditional electrical exit lighting is located higher (above doorways) which is obscured when smoke fills a room or hallway.

5. By making it easier for individuals to evacuate buildings unassisted, fewer fire fighters will have to enter buildings to assist with evacuation. Accordingly, fewer fighters will be exposed to health risks associated with exposure to sustained high temperatures. As such, this ordinance mandating installation of photoluminescent markings in certain occupancies three stories or more is reasonably necessary to protect the health and safety of fire fighters and other emergency personnel in light of Fresno's extremely high temperatures during the summer months.

Attachments:

- Exhibit "1" - Maximum Temperatures Chart
- Exhibit "2" - Heat Stress Index
-

[40306Asz/jwf]2/28/07

³ Amy, James D.; The Path at Your Feet – The Shift in Emergency Lighting; International Fire Protection Magazine.

⁴ Amy, James D.; The Path at Your Feet – The Shift in Emergency Lighting; International Fire Protection Magazine.

JULY 2006 MAXIMUM TEMPERATURES

DATE	FRESNO HIGH TEMP	FRESNO FRESNO AVG. HIGH	FRESNO MONTHLY AVG.	SAN DIEGO SAN DIEGO HIGH TEMP	SAN DIEGO SAN DIEGO AVG. HIGH	SAN DIEGO MONTHLY AVG.	SAN FRANCISCO HIGH TEMP	SAN FRANCISCO AVG. HIGH	SAN FRANCISCO MONTHLY AVG
7/1	98			83			61		
7/2	101			79			61		
7/3	101			80			60		
7/4	99			79			61		
7/5	96			78			62		
7/6	93			77			63		
7/7	96			79			73		
7/8	103			81			73		
7/9	107			79			67		
7/10	107			76			61		
7/11	101			79			62		
7/12	95			82			66		
7/13	99			83			71		
7/14	103			82			64		
7/15	104			86			64		
7/16	107			80			70		
7/17	109			78			80		
7/18	105			79			77		
7/19	107			79			78		
7/20	109			80			73		
7/21	109			82			75		
7/22	112			99			87		
7/23	113			83			83		
7/24	113			85			77		
7/25	113			76			75		
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HEAT STRESS INDEX

TEMPERATURE °F	RELATIVE HUMIDITY								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
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96	91	95	98	104	108	120	128		
94	89	93	95	100	105	111	122		
92	87	90	92	96	100	106	115	122	
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
84	78	81	83	85	86	89	91	95	99
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

NOTE: Add 10°F when protective clothing is worn and add 10°F when in direct sunlight.

HUMITURE °F	DANGER CATEGORY	INJURY THREAT
BELOW 60°	NONE	LITTLE OR NO DANGER UNDER NORMAL CIRCUMSTANCES
80° - 90°	CAUTION	FATIGUE POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
90° - 105°	EXTREME CAUTION	HEAT CRAMPS AND HEAT EXHAUSTION POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
105° - 130°	DANGER	HEAT CRAMPS OR EXHAUSTION LIKELY, HEAT STROKE POSSIBLE IF EXPOSURE IS PROLONGED AND THERE IS PHYSICAL ACTIVITY
ABOVE 130°	EXTREME DANGER	HEAT STROKE IMMINENT!

Table 1-1