

**THE PORT AUTHORITY** OF NY & NJ

Engineering Department

***Design Guidelines  
Architectural***

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## 1.0 ARCHITECTURE DISCIPLINE

### 1.1 OVERVIEW

These guidelines are provided as an overview of the Port Authority's design standards. Design details and associated documents outlined in these documents will be provided to the success client.

The Guidelines shall not replace professional design analyses nor are the Guidelines intended to limit innovative design where equal performance in value, safety, and maintenance economy can be demonstrated. The design team shall be responsible for producing designs that comply with the Guidelines in addition to all applicable codes, ordinances, statutes, rules, regulations, and laws. Any conflict between the Guidelines and an applicable code, ordinance, statute, rule, regulation, and/or law shall be addressed with the respective functional chief. The use and inclusion of the Guidelines, specifications, or example drawing details as part of the Contract Documents does not alleviate the design professional from their responsibilities or legal liability for any Contract Documents they create. It is also recognized that the Guidelines are not universally applicable to every project. There may be instances where a guideline may not be appropriate. If the design professional believes that a deviation from the Guidelines is warranted, such a deviation shall be submitted in writing for approval to the respective functional chief.

*Our mission* is to support of the Port Authority of New York & New Jersey's core transportation and infrastructure programs by providing the highest quality and most innovative design solutions for our facilities within a project's scope, schedule, and budget.

The Architectural Design unit is a diverse group of design professionals that include architects, landscape architects, and graphic designers. We provide a broad range of design services that include:

- ❑ Site Planning
- ❑ Building Programming
- ❑ Life Safety Assessments
- ❑ Architectural Design
- ❑ Construction Documents
- ❑ Landscape Design
- ❑ Graphic and Way-Finding Design
- ❑ Sustainable Design

### 1.2 TECHNICAL AND CODES STANDARDS/REGULATIONS

#### 1.2.1 BUILDING CODES

##### 1.2.1.1 NEW YORK STATE

##### 1.2.1.2 NEW YORK CITY BUILDING CODE

##### 1.2.1.3 NEW JERSEY STATE UNIFORM CONSTRUCTION CODE (UCC)

#### 1.2.2 NATIONAL FIRE PROTECTION AGENCY (NFPA) 101 & 130

#### 1.2.3 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

#### 1.2.4 AMERICANS WITH DISABILITIES ACT (ADA) & ARCHITECTURAL BARRIERS ACT (ABA)

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In unsprinklered areas, upholstered materials, furniture, and draperies shall conform to the specifications governing flammability. See [Appendix A](#).

**1.3.5.1.2 *Specifications Governing the Flammability of Upholstery Materials & Plastic Furniture in Unsprinklered Areas***

In unsprinklered areas, upholstered materials, furniture, and draperies shall conform to the specifications governing flammability. See [Appendix B](#).

**1.3.5.1.3 *Specifications Governing the Flammability of Plastic Laminate & Wood Veneer Furniture in Unsprinklered Areas***

In unsprinklered areas, upholstered materials, furniture, and draperies shall conform to the specifications governing flammability. See [Appendix C](#).

#### 1.3.5.2 CONVEYOR BELTING

Conveyor belting shall be flame resistant. When subjected to a flame test in accordance with ASTM D378, the duration of flame shall not exceed an average of 1 minute after removal of the applied flame (after-flame time) and the duration of afterglow shall not exceed an average of 3 minutes. Test results shall be submitted for review.



### 1.3.5.3 WALL OPENINGS

#### 1.3.5.3.1 Conveyor Openings

Conveyor openings in fire-rated construction shall be protected with fire shutters with the appropriate fire-protection rating. Fire shutters shall be provided with positive means to ensure the prevention of obstructions interfering with the closing of fire shutters. These fire shutters shall be integrated with:

- ❑ Smoke detectors provided on each side of the wall and located in concordance with NFPA 80 and the manufacturer's listing, in order to actuate the motorized shutters and the alarm system
- ❑ Leading edge or electric eye devices to permit the passage of an obstruction on the conveyor by retraction of the fire shutter
- ❑ Emergency power for the operation of the rated shutter(s), as well as for an adequate portion of the conveyors, to enable the passage of obstructions at the rated shutter(s)
- ❑ Stoppage of the conveyors
- ❑ Operation of other smoke and heat detectors within the fire zone shall also actuate these shutters

#### 1.3.5.3.2 Openings in Walls

For openings in walls with fire resistance rating of 2 hours or less, a system of water spray nozzles may be used in lieu of fire shutters. At least four nozzles shall be provided on each side of the opening so as to give complete coverage of the opening. Nozzles shall be controlled by an automatic valve actuated by a heat detector. Nozzles shall be located at an angle not more than 30 degrees between the centerline of nozzle discharge and a line perpendicular to the plane of the opening. The water discharge rates shall be at least 3 gallons per square foot per minute.

#### 1.3.5.3.3 Grilled Openings

Where spaces are provided with grilled openings for entrance and exiting, a safe means of egress shall be provided for the employees who may stay inside the space after the grille is closed, consisting of:

- ❑ A door in compliance with code requirements
- Or
- ❑ An approved device that will open the grille from inside

### 1.3.5.4 STORAGE UNDER CANOPIES

Storage under canopies (such as at cargo buildings) shall be considered as storage occupancy group S-2, low hazard.

### 1.3.5.5 BAGGAGE HANDLING SPACES

Baggage handling spaces in the airports shall be classified as storage occupancy group S-2, low hazard.

### 1.3.5.6 MARKING OF TRANSPARENT GLASS DOOR

For marking of transparent glass doors and fixed adjacent glass sidelights, see [Appendix D](#).

### 1.3.5.7 [CEILING DESIGN STANDARDS](#)

Existing ceilings to be modified or new ceilings.

*Plaster*

See [Appendix E](#).

*1.3.5.7.1 Suspended Lightweight*

See [Appendix F](#).

**1.3.5.8 AIRPORTS**

*1.3.5.8.1 All Airports*

**A. JFK & LaGuardia**

All construction at JFK and LaGuardia Airports shall comply with the requirements for fire district in accordance with Appendix D in the New York City Building Code.

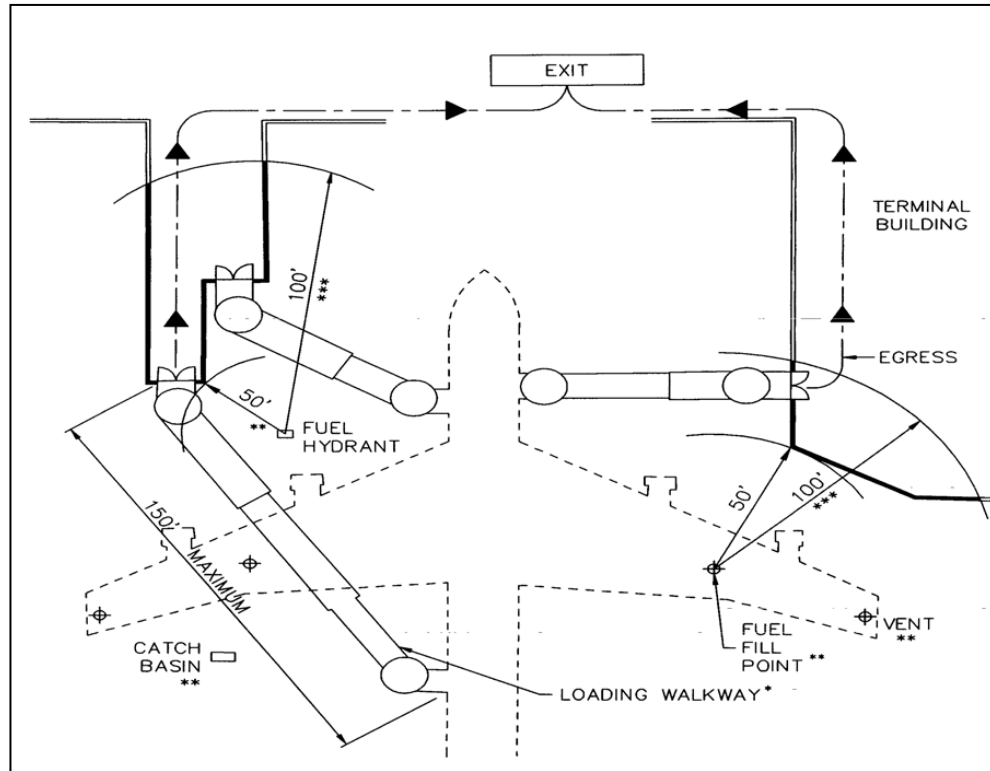
**B. Means of Egress**

The means of egress for passenger terminal buildings shall be designed for an occupant load consisting of the sum of the passengers (100% capacity of aircraft), meeters and greeters, and employees, based on maximum anticipated flight schedules (such as holidays or other seasonal peaks), and a two (2) hour delay of flights. This number shall not be less than the occupant load computed based on the maximum floor area allowances per occupant in the code. Consideration shall be given to locations of concentrated crowding, rather than assuming uniform distribution of occupants over the entire building.

**C. Concessions**

In passenger terminal buildings, concessions serving the public that are open to the public spaces shall be considered as part of the public space (Assembly Occupancy). Storage space belonging to concessions shall be enclosed as required by Code. Also, adjacent concession areas shall be separated from each other as required by Code for different tenancies.

- D. Protection from Airport Rampside Fuel Spill Fire
1. Airport Rampside Clearances



2. Terminal Buildings, Satellites, and Fingers

The exterior walls of the building shall be protected as follows:

- a. There shall be no potential fuel spill points (pfsp) such as fueling hydrants, catch basins, fuel tank fill connections, etc., within 50 feet of the building.

Exception:

Aircraft may be positioned with a minimum distance of 25 feet from the building to the aircraft fuel system vents or fuel tank openings provided that there are no combustion and ventilation air-intake to any boiler, heater, or incinerator room within 50 feet of the vent or tank openings. Exit doors or exit stairs opening onto the apron within 50 feet of pfsp must be protected by a full height radiation barrier.

- b. Large areas of window glass, covering more than 50% of a wall, which has a distance of less than 100 feet from a pfsp, shall be protected by means of an automatic system of water curtain or fire shutters activated by an appropriate fire detection system.

Note:

In determining the above percentages, only that portion of the wall not backed by the building's structural components should be included. Also, the distance from the pfsp shall be measured horizontally to the center of the wall.

3. Aircraft Loading Walkways

- a. The design shall provide a safe exit route from the aircraft for a period of at least 5 minutes under severe fire exposure conditions, equivalent to a free-burning jet fuel spill fire, in compliance with NFPA 415. The Engineer of Record shall certify compliance in writing and submit the test reports and computations as defined in NFPA 415 to demonstrate compliance.
- b. Loading walkways shall be designed to prevent sudden failure (collapse, explosion, development of excessive smoke and gases) during the 10-minute test.
- c. Walkways shall comply with the following:
  - 1.) A maximum travel length of 150 feet. Portions exceeding 150 feet shall be designed as part of the terminal building.
  - 2.) A minimum width of 44 inches or the width of the aircraft door being served, whichever is larger.
  - 3.) Non-slip floor covering.
  - 4.) Emergency lighting.
  - 5.) Light diffusers of plastic material shall be of an approved type for exits or wired glass shall be used.
- d. Compliance shall include:
  - 1.) Structural integrity of the walkway under the fire conditions. For structural criteria see [Structural Design Guidelines](#).
  - 2.) Integrity of flexible closures, slat curtains, and miscellaneous seals with weather-stripping curtain with respect to smoke penetration through cracks and openings shall be established.

Particular attention must be paid to the following details:

    - ❑ There shall be no direct path for flame or smoke between the exterior and the interior of the bridge.
    - ❑ The junctures of bridge components, such as hinge pins and slat curtains, shall be covered or sealed with appropriate fire-resistant material.
  - 3.) The positive pressure ventilation fan shall be of sufficient capacity to provide and maintain a positive pressure throughout the bridge and shall be automatically activated anytime that an aircraft is at the bridge.
- e. The door opening into the walkway shall have an electrical interlock to prevent opening until the walkway is engaged with the aircraft.
- f. The aircraft loading walkway shall not be located over any drainage outlets. See NFPA 415.
- g. The electrical installation shall comply with the applicable requirements of the National Electrical Code, particularly with the hazard requirements; i.e., presence of flammable vapors from aircraft fueling, venting, and storage points.
- h. The hydraulic and electrical system for the walkway shall be demonstrated to be fail-safe.

E. Building Walls & Overhangs

Protection and fire rating of building walls and over-hangs adjacent to aircraft fuel pipeline surge suppressors shall be in accordance with NFPA 30 and shall be designed to have a fire rating depending on their distance 'd' as a radius from the surge suppressor:

- ❑ d > 25 feet; fire rating = 0
- ❑ d > 10 feet; fire rating = 2 hours
- ❑ d < 10 feet; fire rating = 4 hours

#### 1.3.5.8.2 La Guardia Airport Central Terminal Building

- A. The main building conforms to construction classification 1B of 1968 Building Code of the City of New York.
- B. The fingers are unprotected steel construction, classification 1E of the 1968 Building Code of the City of New York, separated from the main building with fire shutters, and are further subdivided into fire areas.
- C. On the third (3rd) floor of the Terminal Building, a Safe Area, in compliance with Article 8 of the 1968 Building Code of the City of New York, constitutes part of the overall means of egress from the floor. The Safe Area consists of the central east-west corridor together with the public areas at the termination of the connectors from the parking garage.

## 1.4 DETAILS, NOTES, AND CUSTOM SPECIFICATIONS

### 1.4.1 DETAIL LIBRARY

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##### [1.4.1.1.2 Door Details](#)

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Under Development

**1.5 REFERENCE MATERIALS**

**1.5.1 LIBRARY**

Under Development

## 2.0 LANDSCAPE ARCHITECTURE

### 2.1 OVERVIEW

Landscape Architecture's mission is to support the agency's environmental stewardship goals and to enhance the public environment at our facilities. Landscape Architecture is the Design Division's resource for a variety of technical and design services that include:

- ❑ Environmental Assessments
- ❑ Airport and Roadway Redevelopment Programs
- ❑ Landscape Operational Upgrades that target landscape and irrigation installations
- ❑ Runway Safety Programs
- ❑ Wetland Mitigation
- ❑ Waterfront Development
- ❑ Streetscapes, Parks, & Playgrounds
- ❑ Sustainable Design Strategies
- ❑ Green Roof Designs
- ❑ Best Management Practices
- ❑ Review of Tenant Landscape Applications

### 2.2 TECHNICAL AND CODE STANDARDS/REGULATIONS

#### 2.2.1 [FEDERAL AVIATION ADMINISTRATION \(FAA\)](#)

#### 2.2.2 [UNITED STATES DEPARTMENT OF AGRICULTURE \(USDA\)](#)

#### 2.2.3 [NATIONAL ENVIRONMENTAL POLICY ACT \(NEPA\)](#)

#### 2.2.4 [NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION \(NJDEP\)](#)

#### 2.2.5 [NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION \(NYSDEC\)](#)

#### 2.2.6 [NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION \(NYCDEP\)](#)

#### 2.2.7 [NEW YORK CITY DEPARTMENT OF PARKS AND RECREATION \(NYCP&R\)](#)

#### 2.2.8 [NEW YORK CITY DEPARTMENT OF TRANSPORTATION \(DOT\)](#)

#### 2.2.9 [AMERICAN WITH DISABILITIES ACT \(ADA\)](#)

#### 2.2.10 [PORT AUTHORITY SUSTAINABLE DESIGN GUIDELINES](#)

### 2.3 DESIGN CRITERIA AND SPECIAL REQUIREMENTS

#### 2.3.1 [AVIATION DESIGN CRITERIA](#)

#### 2.3.2 [PARKING LOT DESIGN CRITERIA](#)

**2.3.3 [WETLAND MITIGATION DESIGN CRITERIA](#)**

**2.3.4 STREETScape DESIGN CRITERIA**

2.3.4.1 [NYC PARKS TREE PLANTING](#)

**2.3.5 [LANDSCAPE PLANTING DESIGN CRITERIA](#)**

**2.3.6 BROWNFIELD DESIGN CRITERIA**

Under Development

**2.3.7 STORMWATER INFILTRATION DESIGN CRITERIA**

New York State Stormwater Management Design Manual available at <http://www.dec.ny.gov/chemical/29072.html>

NJ Stormwater Best Management Practices Manual available at [http://www.njstormwater.org/bmp\\_manual2.htm](http://www.njstormwater.org/bmp_manual2.htm)

**2.3.8 [EROSION AND SEDIMENT CONTROL DESIGN CRITERIA](#)**

**2.3.9 LANDSCAPING ON STRUCTURE DESIGN CRITERIA**

Under Development

**2.3.10 PAVEMENT CRITERIA**

Under Development

2.3.10.1 IMPERVIOUS PAVEMENT TREATMENTS

Under Development

2.3.10.2 PERVIOUS PAVEMENT TREATMENTS

Under Development

**2.3.11 ORNAMENTAL FENCE CRITERIA**

Under Development

**2.3.12 SUSTAINABLE DESIGN CRITERIA**

2.3.12.1 [AVIATION LANDSCAPE](#)

2.3.12.2 [SUSTAINABLE SITES INITIATIVE](#)

2.3.12.3 ENVIRONMENTAL REQUIREMENTS

Under Development

2.3.12.4 PLANTING CALENDAR LIMITATIONS

Planting shall be performed only during the following periods:



Type	Calendar
Deciduous Plants:	March 1 - May 1 and October 15 - December 1
Evergreen Plants:	April 1 - May 15 and September 1 - October 15
Herbaceous Species:	April 1 – June 1 and August 15 – September 30
Lawn Seed:	April 1 – May 31 and August 16 – October 15

2.3.12.5 WEATHER LIMITATIONS

Perform operations only during the following weather conditions:

- ❑ There shall be no frost in the ground and the soil and backfill materials temperature at each planting area shall be above 32 degrees Fahrenheit.
- ❑ Perform planting and soil-related operations only when no form of precipitation is falling or forecast to fall within the next 2 hours. Following a period of precipitation, resume operations only after the soil has drained.

**2.4 DETAILS, NOTES, AND CUSTOM SPECIFICATIONS**

**2.4.1 DETAILS AND NOTES**

2.4.1.1 AIRPORTS

See [Appendix G](#).

2.4.1.2 BROWNFIELDS

Under Development

2.4.1.3 WETLANDS

Under Development

2.4.1.4 ASIAN LONGHORNED BEETLE QUARANTINE AREAS

Under Development

2.4.1.5 UPLAND RESTORATION

Under Development

2.4.1.6 LANDSCAPING ON STRUCTURE

Under Development

2.4.1.6.1 Extensive

Under Development

2.4.1.6.2 Intensive

Under Development

**2.4.2 SPECIFICATIONS**

2.4.2.1 CUSTOM LIST OF SPECIFICATIONS

The following specifications are C-Specs and must be obtained through the Port Authority of New York & New Jersey Engineering Design Division Landscape Architecture.

<b>Spec No</b>	<b>Spec Title</b>	<b>Classification</b>	<b>PA Facility</b>	<b>Remarks</b>
02515	UNI Eco-Stone Precast Concrete Pavers	C-Spec	EWR	
02516	Concrete Block Paver	C-Spec	EWR	
02520	Asphaltic Block Pavers	C-Spec	JFK	
02520	Asphaltic Block Pavers	C-Spec	EWR/Frontage Islands	
02546	Stabilized Crushed Screenings	C-Spec	All	
02732	Stabilized Crushed Screenings	C-Spec	EWR	Used with Section 02515
02837	Ornamental Steel Fence and Gates	C-Spec	All	
02920	Soil Testing	C-Spec	All	
02921	Screened Loam Soil	C-Spec	All	
02930	Seeding	C-Spec	All	
02934	Tidal Wetland Planting	C-Spec		
02936	Wetland Maintenance	C-Spec		
02940	Trees, Shrubs & Groundcover in Ground (NY)	C-Spec		
02954	Trees, Shrubs & Groundcover in Ground (NJ)	C-Spec	NJ Facilities	
02956	Tree Transplanting – Machine Dug (NY)	C-Spec	NY Facilities	
02957	Air Spading and Tree Healthcare	C-Spec	NY Facilities	
02958	Tree Removal and Disposal (NJ)	C-Spec	NJ Facilities	
02958	Tree Removal and Disposal (NY)	C-Spec	NY Facilities	
02959	Tree Protection During Construction	C-Spec	All	
02960	Adding Compost	C-Spec	All	
02961	Adding Planting Mix	C-Spec	All	Used with Sections 02940 or 02954
02971	Maintenance of Permanent Planting and Hardscape (NJ)	C-Spec	NJ Facilities	Maintenance prior to Certificate of Final Completion
02971	Maintenance of Permanent Planting and Hardscape (NY)	C-Spec	NY Facilities	Maintenance. Prior to Certificate of Final Completion
02972	Maintenance of Permanent Planting and Hardscape (NJ)	C-Spec	NJ Facilities	Maintenance. After Receipt of Certif. of Final Completion.
02972	Maintenance of Permanent Planting and Hardscape (NY)	C-Spec	NY Facilities	Maintenance. After Receipt of Certif. of Final Completion.
02976	Tree Crown Reduction, Pruning, Removal and Disposal	C-Spec		
02994	Vertical Drains in Tree Pits	C-Spec		
02995	Gravel Mulch	C-Spec	All	

<b>Spec No</b>	<b>Spec Title</b>	<b>Classification</b>	<b>PA Facility</b>	<b>Remarks</b>
02998	Gravel Mulch – Non Landscape Areas	C-Spec	All	

**2.4.3 DETAILS**

2.4.3.1 STANDARD PLANTING DETAILS

2.4.3.1.1 [Conifer Tree Planting & Staking](#)

2.4.3.1.2 [Deciduous Tree Planting & Staking](#)

2.4.3.1.3 [Perennial Planting](#)

2.4.3.1.4 [Shrub Planting](#)

2.4.3.2 STANDARD PAVEMENT DETAILS

2.4.3.2.1 [JFK-Paver Block Salt Splash](#)

2.4.3.2.2 [EWR Concrete Block Salt Splash \(Super Deco\)](#)

2.4.3.2.3 [EWR Concrete Block Salt Splash \(Uni-Eco Stone Pavers\)](#)

2.4.3.3 STANDARD WETLAND DETAILS

Under Development

2.4.3.4 STANDARD ORNAMENTAL FENCE DETAILS

Under Development

**2.4.4 SCHEDULES**

2.4.4.1 [STANDARD PLANT SCHEDULE](#)

**2.4.5 SYMBOLS AND CONVENTIONS**

2.4.5.1 [LABEL BLOCK](#)

2.4.5.2 TREES

2.4.5.2.1 [Canopy Tree](#)

2.4.5.2.2 [Evergreen Tree](#)

2.4.5.2.3 [Existing Tree](#)

2.4.5.3 SHRUBS

2.4.5.3.1 [Individual](#)

2.4.5.3.2 [Mass](#)

[2.4.5.4 PERENNIAL](#)

[2.4.5.5 SEEDING](#)

[2.4.5.6 GRAVEL MULCH](#)

[2.4.5.7 SPADE-CUT EDGING](#)

[2.4.5.8 SALT SPLASH](#)

## **2.5 REFERENCE MATERIALS**

### **2.5.1 MATERIALS TESTING OF SOIL REQUIREMENTS**

Under Development

### **2.5.2 [AMERICAN STANDARD FOR NURSERY STOCK](#)**

### **2.5.3 TREE CARE OPERATIONS**

Under Development

### **2.5.4 [PEST MANAGEMENT GUIDELINES FOR COMMERCIAL TURFGRASS \(2006\)](#)**

### **2.5.5 [PEST MANAGEMENT GUIDE FOR COMMERCIAL PRODUCTION/MAINTENANCE OF TREES/SHRUBS](#)**

### **2.5.6 FAA ADVISORY—HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS**

Under Development

## 3.0 ARCHITECTURAL GRAPHICS

### 3.1 OVERVIEW

Our mission is to provide way finding and information system designs for our public architecture. This includes enhancement of facilities with sense-of-place environmental graphics and specialty wall treatments. Our aim is to help create facilities that are more environmentally friendly and functionally clear to the traveling public.

### 3.2 TECHNICAL CODE STANDARDS AND REGULATIONS

#### 3.2.1 [AMERICANS WITH DISABILITIES ACT](#)

#### 3.2.2 [ANSI A 117.1](#)

### 3.3 DESIGN CRITERIA AND SPECIAL REQUIREMENTS

#### 3.3.1 [PORT AUTHORITY STANDARDS](#)

The scope of the architectural review shall comprise compliance with the applicable codes, regulations, and standards.

##### 3.3.1.1 STANDARDS FOR INTERIOR PLASTIC SIGNS

For Interior Plastic Sign Standard, see [Appendix H](#).

##### 3.3.1.2 MARKING OF TRANSPARENT GLASS DOOR

For marking of transparent glass doors and fixed adjacent glass sidelights, see [Appendix D](#).

##### 3.3.1.3 SUSPENDED OVERHEAD MOUNTED SIGNS.

See [Ceiling Design Standards](#).

### 3.4 DETAILS, NOTES, AND CUSTOM SPECIFICATIONS

#### 3.4.1 [EADD TECHNICAL SPECIFICATIONS](#)

#### 3.4.2 [INSTRUCTION TO SPECIFIER](#)

#### 3.4.3 SIGN BOX

##### 3.4.3.1 FABRICATING

##### 3.4.3.1.1 [Internally Illuminated Single-Faced Ceiling-Mounted](#)

##### 3.4.3.1.2 [Internally Illuminated Doubled-Faced Ceiling-Mounted](#)

##### 3.4.3.1.3 [Kiosk Detail](#)

##### 3.4.3.1.4 [Internally Illuminated Ceiling-Mounted Section](#)

3.4.3.2 [MOUNTING](#)

**3.5 REFERENCE MATERIALS**

3.5.1 [PORT AUTHORITY CORPORATE COMMUNICATION STANDARDS](#)

3.5.2 [AIRPORT STANDARDS MANUAL](#)

3.5.3 [AIRTRAIN GRAPHICS STANDARD MANUAL](#)

3.5.4 [PATH STATIONS STANDARD MANUAL](#)

3.5.5 **BUS TERMINAL GRAPHIC STANDARDS**

Available from the Engineering Department as contained in various documents.

**APPENDIX A**  
**FLAMMABILITY OF DRAPERY & CURTAIN MATERIAL**

**APPENDIX A****SPECIFICATIONS GOVERNING THE FLAMMABILITY OF DRAPERY & CURTAIN MATERIALS IN UNSPRINKLERED AREAS**

- A. All drapery and curtain materials, including linings, shall be subject to the vertical flame tests as required by Federal Aviation Regulation FAR 25.853(a) and Appendix F, revised February 2, 1995.

The test method requires that the flame shall be applied for 12 seconds and then removed, that the average char length shall not exceed eight (8) inches, that the average flame time after removal of the flame specimen shall not continue to flame for more than five (5) seconds after falling.

- B. The manufacturer of the finished item shall submit written certification for each component fabric of the completed items as follows:

4. If the material contains 100% fibers that are inherently flame resistant by virtue of the physical properties of the untreated fiber, a written certification by a recognized independent testing laboratory, attesting to the permanent flame resistant properties of all the fibers within, shall be submitted to the Port Authority.
5. If the material contains fibers which are not inherently flame resistant in the untreated state, a written certification by a recognized independent testing laboratory shall be submitted to the Port Authority, attesting that the treated materials have maintained their flame resistant properties, as determined by the burn test in paragraph A above, after five (5) washings and/or dry cleanings. The washing test procedure shall be performed as defined by the Technical Manual of the American Association of Textile Chemists and Colorists (AATCC) Test Method 124-1978 using the wash temperature of  $120^{\circ} \pm 5^{\circ}\text{F}$  and the "Tumble Dry" procedure. The dry cleaning test procedure shall be performed by subjecting the material to dry cleaning in a "Coin-OP" machine as manufactured by Norge or Westinghouse or an equal machine.

The size sample of material and the machine size are to be commensurable to each other. When necessary, dummy pieces of material shall be added to the test specimens to make up a load equal to the machine rating.



**APPENDIX B**  
**FLAMMABILITY OF UPHOLSTERY MATERIAL & PLASTIC FURNITURE**

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*Appendix B — Specifications Governing the Flammability Of Upholstery Material & Plastic Furniture in Unsprinklered Areas*

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**APPENDIX B****SPECIFICATIONS GOVERNING THE FLAMMABILITY OF UPHOLSTERY MATERIAL & PLASTIC FURNITURE IN UNSPRINKLERED AREAS**

- A. All upholstery materials, including covering, interliner, lining, webbing, cushioning, and padding shall be subject to the vertical flame test as required by Federal Aviation Regulation FAR 25.853(a) and Appendix F, revised February 2, 1995.

The test method requires that the flame be applied for 12 seconds and then removed, that the average burn length shall not exceed eight (8) inches, that the average flame time after removal of the flame source shall not continue to flame for more than an average of five (5) seconds after falling.

Test samples subject to the vertical test shall be tested using the thickness of the material as used in the finished product; except that, the maximum thickness of a test sample shall be one-half inch (1/2") in cases where the final product material exceeds that thickness.

- B. Padding that exceeds one-half inch (1/2") thickness and all cushioning, in addition to meeting the requirements of Section A above, shall be tested in accordance with the Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source – ASTM E162-94. Wire mesh screen and aluminum foil shall be used as indicated in Section 5.8.1 of this standard test method.

Padding and cushioning with a flame propagation index not exceeding 100 is acceptable for use with an external covering that meets the requirements of Section A of this specification.

Padding and cushioning with a flame propagation index exceeding 100 may be covered with materials or interliners complying with paragraph A of this specification. However, the final assembly of these materials which make up the cushion, arm rest, or other parts of the furniture, shall be subject as a composite unit to Standard Test Method ASTM E162-94. Composite assemblies with a flame spread index not exceeding 100 will be acceptable.

- C. All self-supporting plastic materials shall be subject to the vertical flame test as required by FAR 25.853(a) and Appendix F. The test method requires that the flame be applied for 60 seconds and then removed, that the average burn length shall not exceed six (6) inches, that the average flame time after removal of the flame source shall not exceed 15 seconds, and that drippings from the test specimens shall not continue to flame for more than an average of three (3) seconds after falling.
- D. The thickness of the materials and of the composite assemblies tested under paragraphs B and C above shall be the same as the thickness used in the finished item. Certification submitted by the manufacturer shall indicate the thickness of the materials as tested.
- E. The manufacturer of the finished item shall submit a certification by a recognized, independent, testing laboratory of the results of the tests specified above and of the service life of the flame retardancy of a treated material or a certification that the flammability characteristics of the material are inherent therein by virtue of the chemical properties of the material. Treated material may be used only when the certified flame retardant service life exceeds that of the planned service life of the finished item.

**APPENDIX C**  
**FLAMMABILITY OF PLASTIC LAMINATE & WOOD VENEER FURNITURE**

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*Appendix C — Specifications Governing the Flammability of Plastic Laminate & Wood Veneer Furniture in Unsprinklered Areas*

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**APPENDIX C****SPECIFICATIONS GOVERNING THE FLAMMABILITY OF PLASTIC LAMINATE & WOOD VENEER FURNITURE IN UNSPRINKLERED AREAS**

- A. Test and Criteria:
1. Flame spread indices for this specification shall be determined by either ASTM-E-84 or ASTM-E162. Flame spread indices shall not exceed 25.
  2. The vertical flame test shall be performed in accordance with Federal Aviation Regulation, FAR 25.853(a) and Appendix F, revised February 2, 1995. This test method requires that the flame be applied for 12 seconds and then removed, that the average burn length shall not exceed eight (8) inches, that the average lame time after removal of the flame source shall not exceed 15 seconds, and that drippings from the test specimen shall not continue to flame for more than five (5) seconds after falling.
- B. Free Standing Office Partitions:
1. All core and/or structural materials shall be tested and meet the requirements specified in A.1 above.
  2. All insulation and covering materials shall be tested and meet the requirements specified in A.2 above.
- C. Desk, Tables, Credenzas, Bookcases, etc.:
1. All core and/or structural materials shall be tested and meet the requirements specified in A.1 above.
  2. Plastic laminate or wood veneer layer materials having a thickness not greater than 1/28 inch shall be tested and meet the requirements specified in A.2 above.
  3. Plastic laminates or veneer layer materials having a thickness greater than 1/28 inch shall be subject to vertical flame test as per Federal Aviation Regulation, FAR 25.853(a) or (c), and Appendix F determined by the PA's Risk Management Division.
  4. The application of intumescent coatings to achieve fire resistance.
- D. Certification:

The supplier of the finished item shall submit a certification and test data by a recognized independent testing laboratory of the results of the tests specified above. The certification and tests shall cover the materials supplied in the finished product. Proof of use of UL labeled products meeting the specified flammability criteria will be accepted in lieu of the certification.

**APPENDIX D**

**MARKING OF TRANSPARENT GLASS DOORS & FIXED ADJACENT GLASS SIDELIGHTS**

**APPENDIX D**

**MARKING OF TRANSPARENT GLASS DOORS & FIXED ADJACENT GLASS SIDELIGHTS**

**1.0 GENERAL**

These rules are identical to New York City Board of Standards and Appeals Rule 4-01 and shall be applicable to all new construction at Port Authority facilities, both in New York and New Jersey.

**2.0 DEFINITIONS**

Sidelights	Fixed panels of transparent glass which form part of or are immediately adjacent to and within six feet horizontally of the vertical edge of an opening in which transparent glass doors are located. For purposes of this section, a sidelight shall consist of transparent glass in which the transparent area above a reference line 18 inches above the adjacent ground, floor or equivalent surface is 80 percent or more of the remaining area of the panel above such reference line.
Transparent glass	Material predominantly ceramic in character which is not opaque and through which objects lying beyond are clearly visible. For the purpose of this section, rigid transparent plastic material shall be construed as transparent glass.
Transparent glass door	A door, Manually or power actuated, fabricated of transparent glass, in which the transparent area above a reference line 18 inches above the bottom edge of the door is 80 percent or more of the remaining area of the door above such reference line.
Transparent safety glazing materials	Materials which will clearly transmit light and also minimize the possibility of cutting or piercing injuries resulting from breakage of the material. Materials covered by this definition include laminated glass, tempered glass (also known as heat-treated glass, heattoughened glass, case hardened glass or chemically tempered glass), wired glass, and rigid plastic.

**3.0 REQUIREMENTS**

1. Transparent glass doors and fixed adjacent transparent glass sidelights shall be marked in two areas on the glass surface thereof.
2. Fixed adjacent transparent glass sidelights 20 inches or less in width with opaque stiles at least one and three-quarters inches in width shall be exempt from the marking requirements.
3. Where the ground, floor or equivalent surface area in the path of approach to a fixed adjacent transparent glass sidelight from either side for a minimum distance of three feet from such sidelight is so arranged, constructed or designed as to deter persons from approaching such sidelight or a permanent barrier is installed in the path of approach, the sidelight shall be exempt from this requirement.
4. Decorative pools, horticultural planting or similar installations shall be considered as indicating that the ground, floor or equivalent surface area is not a path of approach. Planters, benches and similar barriers which are securely fastened to the floor or wall to prevent their removal shall be considered as blocking the path of approach provided they shall be not less

*Appendix D— Marking of Transparent Glass Doors & Fixed Adjacent Glass Sidelights*

- than 18 inches in height from the ground, floor or equivalent surface and extend across at least 2/3 of the total width of the glazed area of the sidelight.
5. Fixed adjacent transparent glass sidelights which are supported by opaque sill and wall construction of at least 18 inches above the ground, floor or equivalent surface immediately adjacent shall be exempt from the marking requirements.
  6. Display windows in any establishment, building or structure which fall within the definition of a sidelight shall be exempt from the marking requirements if the top of the supporting sill and wall construction is not less than 18 inches above the ground, floor or equivalent surface immediately adjacent and the interior area is occupied with merchandise or similar displays to clearly indicate to the public that it is not a means of ingress or egress.

**4.0 MARKING LOCATIONS**

1. One such area shall be located at least 30 inches but not more than 36 inches and the other at least 60 inches but not more than 66 inches above the ground, floor or equivalent surface below the door or sidelight. The use of horizontal separation bars, muntin bars or equivalent at least one and one-half inches in vertical dimension that extends across the total width of the glazed area and are located at least 40 inches but not more than 50 inches above the bottom of the door or sidelight is permitted in lieu of markings.
2. The marking design shall be at least four inches in diameter if circular or four inches in its least dimension if elliptical or polygonal, or shall be at least 12 inches in horizontal dimension if the marking is less than four inches in its least dimension. In no event shall the vertical dimension of any marking including lettering be less than one and one-half inches in height. In addition to horizontal muntin bars, separation bars or equivalent, any of the following methods may be used to alert persons to the presence of transparent glass doors and fixed adjacent transparent glass sidelights in their path of movement:
  - i) Chemical etching
  - ii) Sand blasting
  - iii) Adhesive strips not less than one and one-half inches in vertical dimension extending across at least two-thirds of the total glazed area
  - iv) Decals
  - v) Paint, gilding or other opaque marking materials
  - vi) Opaque door pulls or push bars extending across at least two-thirds of the total width of the glazed area

**5.0 REPLACEMENT & NEW INSTALLATIONS**

1. Any transparent glazing material used for replacement in existing transparent glass doors shall be transparent safety glazing material. Transparent safety glazing material shall be used in all new transparent glass door installations. The manufacturer's permanent identification mark denoting safety glazing materials shall be visible on the glass after installation of the door.
2. Replacement of fixed adjacent transparent glass sidelights shall be of transparent safety glazing material or annealed glass at least one-half inch in thickness. New fixed adjacent transparent glass sidelights shall be of transparent safety glazing material or annealed glass at least one-half inch in thickness. The manufacturer's permanent identification mark denoting safety glazing material shall be visible on the glass after installation of the sidelight.

Appendix D— Marking of Transparent Glass Doors & Fixed Adjacent Glass Sidelights

<p><b>A</b> DEFINITION SECTION 2.0</p>	<p><b>F</b> DISPLAY WINDOWS SECTION 3.0.6</p>
<p><b>B</b> SIDELIGHTS WIDTH SECTION 3.0.2</p>	<p><b>G</b> MUNTIN BARS OR EQUIVALENT SECTION 4.0.1</p>
<p><b>C</b> SURFACE DETERRENCE SECTION 3.0.3</p>	<p><b>H</b> MARKING LOCATION SECTION 4.0.1</p>
<p><b>D</b> BARRIERS SECTION 3.0.4</p>	<p><b>I</b> MARKING DESIGN SECTION 4.0.2</p>
<p><b>E</b> SIDELIGHT SILLS SECTION 3.0.5</p>	<p><b>J</b> OPAQUE PULLS OR PUSH BARS SECTION 4.0.2.VI</p>
<p><b>THE PORT AUTHORITY OF NY &amp; NJ</b></p>	<p><b>MARKING OF GLASS DOORS &amp; FIXED SIDELIGHTS</b></p>



**APPENDIX E**  
**PLASTER CEILING DESIGN STANDARDS**

**APPENDIX E**

**PLASTER CEILING DESIGN STANDARDS**

See the following pages.

**DESIGN CRITERIA FOR INACCESSIBLE HEAVYWEIGHT CEILINGS**

**I. LOADING**

THIS CEILING DESIGN STANDARD APPLIES TO ALL INACCESSIBLE CEILINGS WITH A DEAD LOAD GREATER THAN 4 PSF. FOR INACCESSIBLE CEILING SYSTEMS OTHER THAN CEMENT PLASTER OR GYPSUM PLASTER, THE DESIGNER SHALL FOLLOW ALL THE REQUIREMENTS OF CEMENT PLASTER OR GYPSUM PLASTER CEILING BASED ON THE DESIGN DEAD LOAD OF THE CEILING SYSTEM.

**I. LOADING:**

- A. DEAD LOAD: CEILING DESIGN DEAD LOAD SHALL BE:  
 CEMENT PLASTER: LARGER OF 15 PSF OR ACTUAL CEILING WEIGHT  
 GYPSUM PLASTER: LARGER OF 10 PSF OR ACTUAL CEILING WEIGHT  
 ALL OTHER CEILING SYSTEMS: LARGER OF 15 PSF OR ACTUAL CEILING WEIGHT.
- B. LIVE LOAD (LL) : 20LBS CONCENTRATED LOAD (MIN).
- C. WIND LOAD (W) : (EXTERIOR CEILINGS ONLY) MINIMUM LOAD SHALL BE:
  - a. UP TO 50 FT. CEILING HEIGHT: 30 PSF POSITIVE PRESSURE OR 20 PSF SUCTION NORMAL TO SURFACE.
  - b. HIGHER THAN 50 FT.: USE WIND FORCES IN ACCORDANCE WITH THE APPLICABLE CODES, REGULATIONS AND STANDARDS.
  - c. EACH CEILING PANEL SHALL BE CAPABLE OF RESISTING A LATERAL WIND FORCE OF 2.5 PSF OR 0.5 PERCENT OF THE POSITIVE WIND PRESSURE, WHICHEVER IS GREATER, ACTING PARALLEL TO THE CEILING SURFACE.
- D. LOADING COMBINATIONS: LOAD COMBINATIONS SHALL BE IN ACCORDANCE WITH THE APPLICABLE CODES, REGULATIONS AND STANDARDS.

MINIMUM SIZE OF CARRYING CHANNEL FOR INTERIOR INACCESSIBLE CEMENT PLASTER CEILINGS

TABLE "IP"

W AVERAGE	S	3'-6"	3'-9"	4'-0"	4'-3"	4'-6"
3'-1"	1 1/2" C.R.	475LBS/1000 L.F.				
3'-3"						
3'-9"		1 1/2" CHANNEL (HOT ROLLED)				
4'-0"		MINIMUM WEIGHT = 1120LBS/1000 L.F.				
4'-2"				2" CHANNEL (HOT ROLLED)		
4'-6"				MINIMUM WEIGHT = 1260LBS/1000 L.F.		

SIZES, SPANS AND SPACINGS SHOWN ARE FOR CEILING SYSTEMS WITH A DEAD LOAD = 15 PSF.

**II. MATERIALS**

- A. IN ADDITION TO THE MATERIALS SPECIFIED IN SECTION IX THE FOLLOWING MATERIAL SPECIFICATIONS SHALL BE FOLLOWED:
  - 1. PLASTER: ASTM C828-81 AND ANSI A42.2.
  - 2. SURFACE APPLIED BONDING AGENTS FOR EXTERIOR PLASTERING: ASTM C832-80.
  - 3. LATH: ASTM C847 AND ANSI A42.3.
- B. THE FOLLOWING MATERIALS SHALL NOT BE USED:
  - 1. METAL DECK TABS AND HOOKS.
  - 2. POWER ACTUATED FASTENERS.
  - 3. WIRE HANGERS.
  - 4. STOVE BOLTS.
- C. THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT CATALOG CUTS, SAMPLES, LAYOUT DRAWINGS AND DETAILS OF ALL COMPONENTS OF CEILING SUPPORT SYSTEM FOR THE ENGINEER'S APPROVAL PRIOR TO STARTING OF ANY WORK IN THE FIELD.

MINIMUM SIZE OF CARRYING CHANNEL FOR INTERIOR INACCESSIBLE GYPSUM PLASTER CEILINGS

TABLE "IG"

W AVERAGE	S	3'-6"	3'-9"	4'-0"	4'-3"	4'-6"
2'-9"		1 1/2" CHANNEL (COLD ROLLED)				
3'-0"		MINIMUM WEIGHT = 475LBS/1000 L.F.				
3'-6"				1 1/2" CHANNEL (HOT ROLLED)		
4'-0"				MINIMUM WEIGHT = 1120LBS/1000 L.F.		
4'-6"						

SIZES, SPANS AND SPACINGS SHOWN ARE FOR CEILING SYSTEMS WITH A DEAD LOAD = 10 PSF.

**III. JOINTS**

- A. CONTROL JOINTS: MAXIMUM LENGTH OF CEILING PANEL BETWEEN CONTROL JOINTS SHALL BE 40 FT. AND MAXIMUM AREA OF THE PANEL SHALL BE 1600 SQ.FT.
- B. EXPANSION JOINTS: LOCATION AND SIZE OF CEILING EXPANSION JOINTS SHALL MATCH BUILDING EXPANSION JOINTS. EXPANSION JOINTS ARE ALSO REQUIRED WHERE CEILING CHANGES DIRECTION.

MINIMUM SIZE OF CARRYING CHANNEL FOR EXTERIOR INACCESSIBLE PLASTER CEILINGS

TABLE "EP"

W AVERAGE	S	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-6"
2'-1"		1 1/2" CHANNEL (HOT ROLLED)					
2'-4"		MINIMUM WEIGHT = 1120LBS/1000 L.F.					
2'-6"				2" CHANNEL (HOT ROLLED)			
2'-8"				MINIMUM WEIGHT = 1260LBS/1000LBS L.F.			
3'-1"						2 1/2" CHANNEL (HOT ROLLED)	
3'-6"						MINIMUM WT. 2270LBS/1000 L.F.	
4'-0"							

SIZES, SPANS AND SPACINGS SHOWN ARE FOR A CEILING SYSTEM WITH A 15 PSF DEAD LOAD + 20 PSF WIND SUCTION.



THE PORT AUTHORITY OF NY & NJ

**INACCESSIBLE HEAVYWEIGHT CEILING DESIGN STANDARDS**  
 FOR CEILINGS WITH A DL GREATER THAN 4PSF DESIGN CRITERIA


ATTACHMENT S1  
 SHEET 1 OF 8

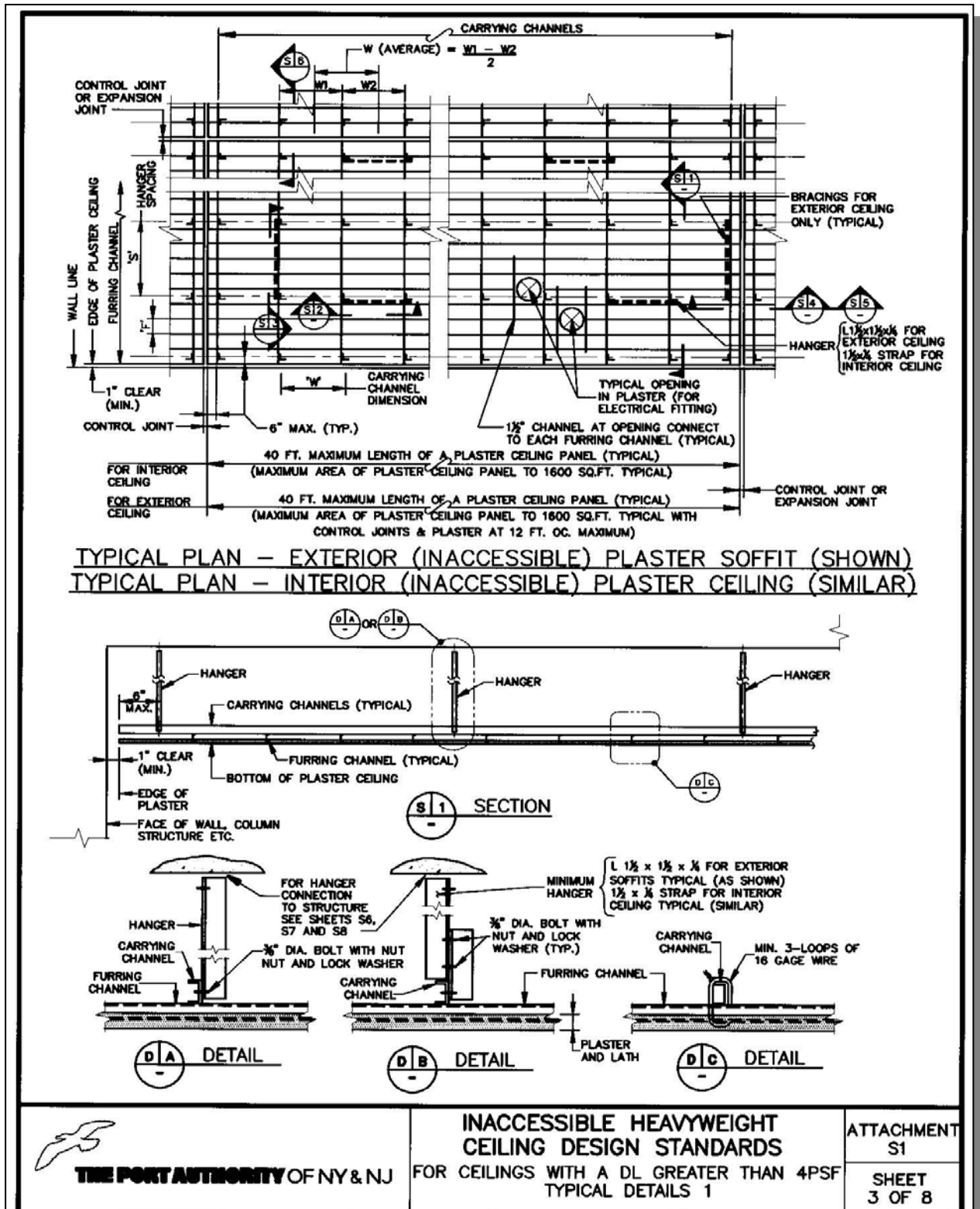
**IV. DESIGN OF CEILING COMPONENTS**

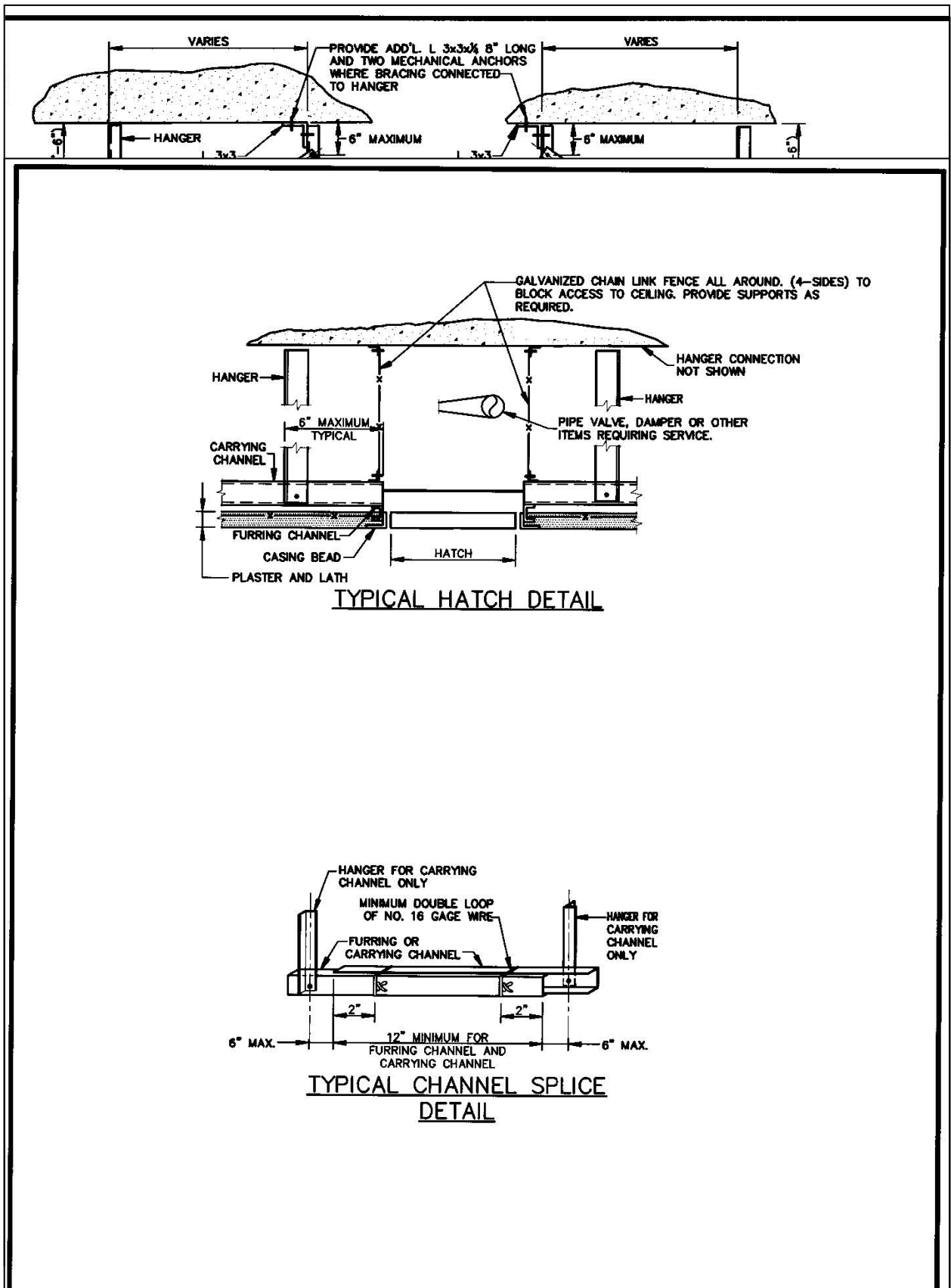
CEILING COMPONENT	DESIGN PARAMETER	INTERIOR CEMENT PLASTER CEILINGS	INTERIOR GYPSUM PLASTER CEILINGS	EXTERIOR CEMENT PLASTER SOFFITS	MATERIALS AND COATINGS	NOTES
WIRE TIES	MAXIMUM SPACING MINIMUM SIZE	6 INCHES 16 GAGE	6 INCHES 16 GAGE	6 INCHES 18 GAGE	STAINLESS STEEL AISI TYPE 304 OR MONEL METAL	a. MIN. DOUBLE LOOP AROUND LATH AND CHANNEL WITH MIN. THREE TWISTED TURNS. b. IN LIEU OF WIRE TIES, BSA* OR ICBO** APPROVED CLIPS MAY BE USED.
FURRING CHANNEL	MAXIMUM SPAN (DIM. W) MAXIMUM SPACING (DIM. F) MINIMUM SIZE	4'-6" 1'-6" 1 1/2" COLD ROLLED CHANNEL (475LBS/1000 LF.)	4'-6" 1'-6" 1 1/2" COLD ROLLED CHANNEL (475LBS/1000 LF.)	4'-6" 1'-6" 1 1/2" COLD ROLLED CHANNEL (475LBS/1000 LF.)	HOT ROLLED ASTM A36 OR COLD ROLLED CHANNELS, GALVANIZED FOR EXTERIOR AND PAINTED FOR INTERIOR.	a. MAX. DEFLECTION < SPAN/360. b. FURRING CHANNELS AND EDGE CASING BEADS SHALL BE INTERRUPTED AT CONTROL AND EXPANSION JOINTS. c. EDGE CASING BEAD AND EDGE BEAM SHALL NOT BE USED AS SUPPORT FOR CEILING. d. WHERE LIGHT FIXTURE OPENING REQUIRES CUTTING OF ONE FURRING CHANNEL, SUPPORT THE ENDS WITH 1 1/2" CHANNELS. e. WHERE LIGHT FIXTURE OPENING REQUIRES CUTTING OF MORE THAN ONE FURRING CHANNEL, USE CARRYING CHANNELS AND HANGERS ON EACH SIDE OF THE OPENING. f. FURRING CHANNEL SPLICES SHALL BE AS SHOWN ON SHEET 5.
CARRYING CHANNEL	SPACING (DIM. W AVG.) SPAN (DIM.S) SIZE	TABLE 'IP'	TABLE 'IG'	TABLE 'EP'	HOT ROLLED ASTM A36 OR COLD ROLLED CHANNELS, GALVANIZED FOR EXTERIOR AND PAINTED FOR INTERIOR.	a. MAX. DEFLECTION < SPAN/360. b. CARRYING CHANNELS SHALL BE INTERRUPTED AT CONTROL AND EXPANSION JOINTS. c. CARRYING CHANNELS SHALL NOT BE INTERRUPTED FOR LIGHT FIXTURE OPENINGS. d. CARRYING CHANNEL SPLICES SHALL BE AS SHOWN ON SHEET 5.
FURRING CHANNEL TO CARRYING CHANNEL CONNECTION	MINIMUM SIZE	MIN. 3 LOOPS OF 16 GAGE WIRE OR L 1 1/2 X 1 1/2 X 1/4 X 2 1/2" LONG WITH 3/8" A307 BOLTS	MIN. 3 LOOPS OF 16 GAGE WIRE OR L 1 1/2 X 1 1/2 X 1/4 X 2 1/2" LONG WITH 3/8" A307 BOLTS	MIN. 3 LOOPS OF 16 GAGE WIRE OR L 1 1/2 X 1 1/2 X 1/4 X 2 1/2" LONG WITH 3/8" A307 BOLTS. (GALVANIZED)	HOT ROLLED ASTM A36 OR COLD ROLLED CHANNELS, GALVANIZED FOR EXTERIOR AND PAINTED FOR INTERIOR.	SEE DETAIL C FOR TYPICAL DETAIL. BOLTS MAY BE SUBSTITUTED WITH CLIPS APPROVED BY BSA* OR ICBO**.
HANGER CONNECTIONS	MINIMUM SIZE	ONE 3/8" BOLT	ONE 3/8" BOLT	ONE 3/8" BOLT	A307 BOLTS, NUTS AND LOCK WASHER (GALVANIZED)	SEE DETAILS A AND B TYPICAL DETAILS.
HANGER	MINIMUM SIZE MAXIMUM SPACING	1 1/2 X 1/4" STRAP 4'-8" O.C. EACH WAY ACTUAL SPACING DEPENDS ON CARRYING CHANNEL SIZE—SEE TABLE IP	1 1/2 X 1/4" STRAP 4'-6" O.C. EACH WAY ACTUAL SPACING DEPENDS ON CARRYING CHANNEL SIZE—SEE TABLE IG	L 1 1/2 X 1 1/2 X 1/4" 4'-6" O.C. EACH WAY ACTUAL SPACING DEPENDS ON CARRYING CHANNEL SIZE—SEE TABLE EP	HOT ROLLED ASTM A36 STEEL GALVANIZED FOR EXTERIOR AND PAINTED FOR INTERIOR	FOR CONNECTION TO STRUCTURE SEE SHEETS 6, 7 AND 8. a. HANGER SPLICES SHALL HAVE A MINIMUM OF 2-3/8" BOLTS WITH NUTS AND LOCK WASHERS b. HANGER SHALL BE PLUMB. c. MINIMUM THICKNESS OF STEEL MEMBERS FOR EXTERIOR SOFFITS SHALL BE 1/4".
BRACING		NONE REQUIRED	NONE REQUIRED	MIN. TWO BRACES IN EACH DIRECTION PER PANEL		SEE SECTIONS S2 AND S3 ON SHEET 4.

NOTE: IN CASES WHERE ACTUAL LOADS ARE HIGHER THAN SPECIFIED UNDER LOADING (SHEET S1) DESIGN SHALL BE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE CODES, STANDARDS AND REGULATIONS.

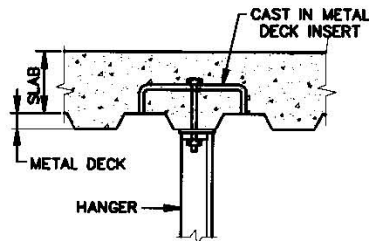
- \* BOARD OF STANDARDS AND APPEALS NEW YORK CITY (BSA)
- \*\* INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO)

 <b>THE PORT AUTHORITY OF NY &amp; NJ</b>	<b>INACCESSIBLE HEAVYWEIGHT CEILING DESIGN STANDARDS</b> FOR CEILINGS WITH A DL GREATER THAN 4PSF DESIGN CRITERIA (CONTINUED)	ATTACHMENT S1
		SHEET 2 OF 8

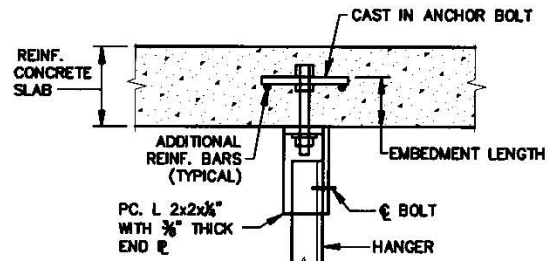




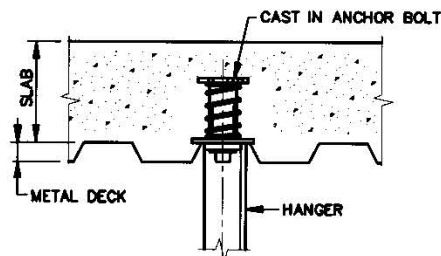
**TYPICAL DETAILS FOR HANGER CONNECTION TO STRUCTURE**



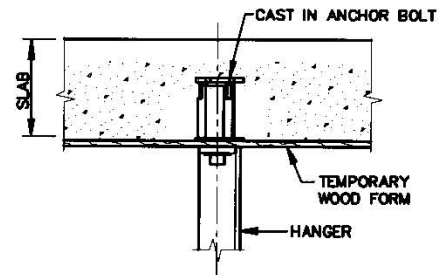
**DETAIL - D**  
**IN CONCRETE SLAB**  
**OVER METAL DECK**



**DETAIL - E**  
**CAST IN ANCHOR BOLT IN**  
**CONCRETE SLAB**



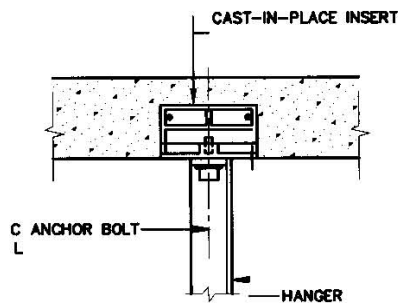
**DETAIL - F**  
**CAST IN ANCHOR BOLT IN**  
**CONCRETE SLAB**  
(OVER METAL DECK)



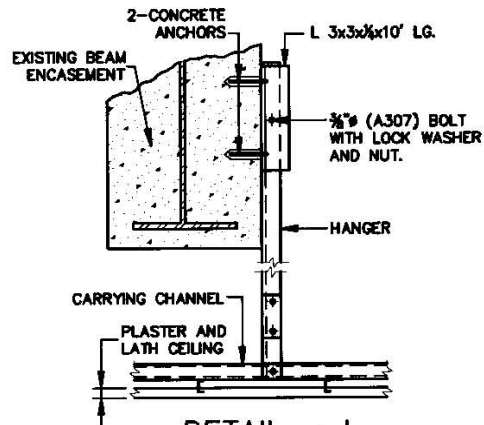
**DETAIL - G**  
**INSERT IN CONCRETE SLAB**  
(OVER TEMPORARY WOOD FORM)



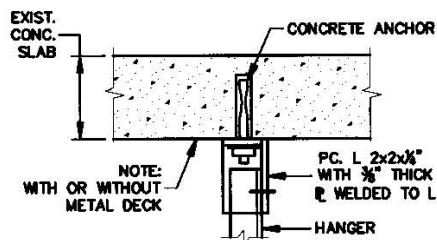
**TYPICAL DETAILS FOR HANGER CONNECTION TO STRUCTURE (CONT.)**



**DETAIL - H**  
**INSERT IN CONCRETE SLAB**



**DETAIL - I**  
**CONCRETE ANCHORS IN ENCASED STEEL BEAM**



**DETAIL - J**  
**CONCRETE ANCHOR IN SLAB**

**CONNECTION TO STRUCTURE—MATERIALS**

**ACCEPTABLE ANCHORAGE DEVICES**

**NEW CONSTRUCTION —WITH METAL DECKING:**

1. DETAIL D: CAST IN METAL DECK INSERT.
  - a. ZINC COATED ADJUSTABLE METAL DECK CEILING BOLT TYPE 83019 AS MANUFACTURED BY COOPER B-LINE. INSTALL BEARING PLATE ON TOP OF DECK RIBS.
  - b. METAL DECK HANGER AS MANUFACTURED BY ANVL INTERNATIONAL, TYPE A, B OR C. PLATE SHALL BEAR ON TOP OF DECK RIBS AS SHOWN.
  - c. AN APPROVED EQUAL ANCHOR MUST BE DESIGNED SUCH THAT THE ALLOWABLE ANCHOR LOADING IS BASED ON A F.O.S. OF 4.0. ANCHOR CAPACITY SHALL BE GREATER THAN THE ALLOWABLE CAPACITY OF THE CONNECTING ROD, BASED ON A36 STEEL.
2. DETAIL F: HILTI HCL—MD CAST IN ANCHORS. 1/4", 3/8", OR 1/2". LARGER SIZES NOT ACCEPTABLE.
3. AN APPROVED EQUAL ANCHOR MUST BE DESIGNED SUCH THAT THE ALLOWABLE ANCHOR LOADING IS BASED ON A F.O.S. OF 4.0. ANCHOR ALLOWABLE LOAD SHALL BE GREATER THAN THE HANGER ALLOWABLE LOAD, BASED ON A36 THREADED ROD.

2. DETAIL H: CHANNEL TYPE INSERT IN CONCRETE SLAB
  - A. UNISTRUT P3200 SERIES, P3300 SERIES, OR M24 (SP0T)
  - B. B-LINE 82505
  - C. AN APPROVED EQUAL

**EXISTING CONSTRUCTION —WITH OR WITHOUT METAL DECKING:**

1. DETAILS I AND J: CONCRETE ANCHORS
 

NOTE: FOR CONDITIONS WITH METAL DECKING, INSTALL AT TOP OF FLUTE WHERE FEASIBLE. DETAIL J IS NOT APPLICABLE FOR LIGHTWEIGHT CONCRETE SLABS.

  - A. HILTI HSL, HSLB, OR HDA UNDERCUT ANCHOR.
  - B. LUEBIG SAFETY BOLT, SUPERPLUS UNDERCUT ANCHOR.
  - C. AN APPROVED EQUAL MECHANICAL ANCHOR RATED FOR OVERHEAD, VIBRATION LOADING.
2. DETAILS K, L, M AND N: STEEL SUBFRAMING
 

REQUIREMENT: DESIGN IN ACCORDANCE WITH AISC OR AISI (COLD FORM APPLICATIONS)

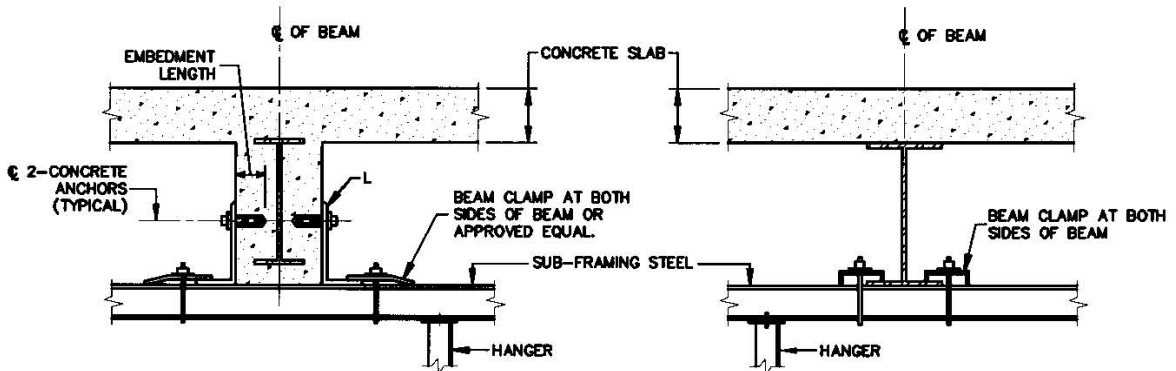
**NEW CONSTRUCTION —WITHOUT METAL DECKING:**

1. CAST IN ANCHOR BOLT
  - A. DETAIL E: REQUIREMENT: MIN. 3/8" THICK PLATE, WITH NUT TOP AND BOTTOM. ADDITIONAL REINFORCEMENT AS SHOWN IN DETAIL.
  - B. DETAIL G: HILTI HCL—WF 1/4", 3/8", OR 1/2" WOOD FORM APPLICATIONS LARGER SIZES NOT ACCEPTABLE.
  - C. AN APPROVED EQUAL ANCHOR MUST BE DESIGNED SUCH THAT THE ALLOWABLE ANCHOR LOADING IS BASED ON A F.O.S. OF 4.0. ANCHOR ALLOWABLE LOAD SHALL BE GREATER THAN THE HANGER ALLOWABLE LOAD, BASED ON A36 THREADED ROD.



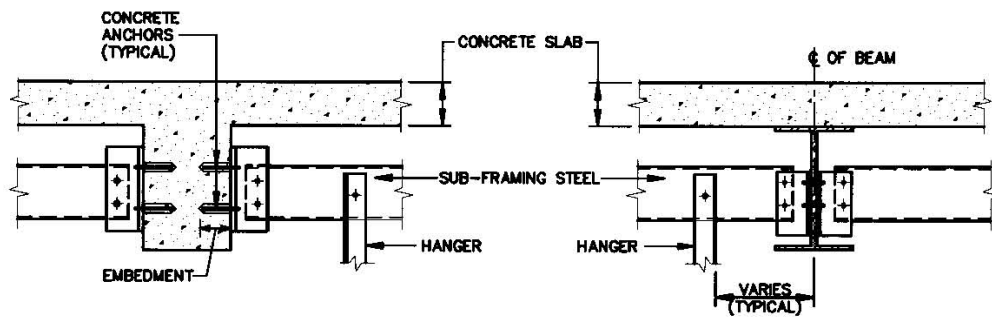


**TYPICAL DETAILS FOR HANGER CONNECTION TO STRUCTURE**



**DETAIL - K**  
**SUBFRAMING AT ENCASED BEAM**

**DETAIL - L**  
**SUBFRAMING CLAMPED TO STEEL BEAM**



**DETAIL - M**  
**SUBFRAMING AT CONCRETE BEAM**

**DETAIL - N**  
**SUBFRAMING CONNECTED TO STEEL BEAM**





**APPENDIX F**  
**SUSPENDED LIGHTWEIGHT CEILINGS DESIGN**

**APPENDIX F****SUSPENDED LIGHTWEIGHT CEILINGS DESIGN CRITERIA**

The design and installation of all ceiling suspension systems for acoustical tile and lay in panels weighing less than 4 lbs., shall comply with the following Port Authority of NY & NJ criteria, in addition to the applicable requirements in the building codes:

- A. Integral metal deck hanger tabs and non-piercing type tabs shall not be used for top hanger connection.
- B. The hanger and its connections shall be capable of supporting the total suspended load with a minimum factor of safety of four.

**APPENDIX G**  
**LANDSCAPE ARCHITECTURAL DESIGN AT AIRPORTS**

## APPENDIX G

### LANDSCAPE ARCHITECTURAL DESIGN AT AIRPORTS

#### 1.0 GENERAL

The goal is to provide a quality landscape environment that complements the design elements (roadways, signage, exists and entrances to frontages and parking facilities and residual open space) serving the airport patron while providing a minimum of attractants to birds,

In order to achieve this goal a successful landscape must satisfy these objectives:

- A. A design that is approved by the FAA/USDA Wildlife Damage Control Division.
- B. A design that is incorporated into an area suitable for vigorous plant growth and maintenance.
- C. A design that includes a sustainable form of irrigation.
- D. A design that includes under a separate, stand alone landscape contract that requires a minimum 2-year maintenance follow up by the installing Contractor, who shall have as his superintendent over the entire installation and maintenance a State Certified Arborist knowledgeable and experienced in this type of work.
- E. A LANDSCAPE DESIGN LEAST LIKELY TO ATTRACT BIRDS SHOULD HAVE THE FOLLOWING QUALITIES:
  1. Avoid plant material and design features that provide birds with a source of FOOD, WATER, COVER and SPATIAL DOMAIN.
  2. Canopy trees should be planted in linear rows, canopies spaced 15-20 feet apart at maturity. Adjacent canopies should never be touching.
  3. Shrubs and small trees should be used moderately and not be planted under or directly adjacent to canopy trees.
  4. Shrub beds should be small in size and discontinuous.
  5. Flowering ornamental trees should be limited in quantity.
  6. Groundcover should be well-manicured, healthy, dense, moderately tall lawn, a fruitless low growing groundcover, gravel or bark mulch.
  7. All plants should be planted at the same size and time.

#### 2.0 PLANT MATERIAL

##### A. Trees

Trees shall be selected that meet the following criteria:

1. To withstand pollution and tough urban environments,
2. To tolerate wind and drought
3. To tolerate excessive road de-icing salts and salt laced prevailing winds
4. To be unattractive to birds as a food source and meet FAA approval
5. To be unattractive to birds as a roosting site and meet FAA approval
6. To be primarily deciduous, since evergreen trees are an ideal bird habitat
7. To have interesting flowers, fall color, size, shape or habit

## 8. To be obtainable on the commercial market

## Sample List

- Gleditsia triacanthos 'Halka'
- Moraine Honeylocust
- Quercus phellos
- Willow Oak
- Zelkova serrata
- Japanese Zelkova

## B. Ornamental Trees

Ornamental trees shall meet the same criteria as trees.

## Sample List

- Chioanthus virginicus
- Fringe Tree
- Cornus x Ruth Ellen
- Stellar White Dogwood
- Koelreuteria paniculata
- Golden Rain Tree
- Malus Spring Snow (Fruitless)
- Spring Snow Crabapple
- Parrotia persica
- Persian Parrotia
- Syringa reticulata 'Ivory Silk'
- Ivory Silk Lilac

## C. Shrubs and Groundcover

Shrubs and groundcovers shall meet the same criteria as trees.

- Abelia x grandiflora
- Glossy Abelia
- Forsythia x 'Goldtide'
- Goldtide Forsythia
- Hamamelis 'Arnold Promise'
- Arnold Promise Witchhazel
- Juniperus chinensis sargentii
- Sargent's Chinese Juniper
- Spiraea nipponica 'Snowmound'
- Snowmound Spirea
- Taxus x media wardii

- Ward's Yew
  - Weigela florida 'Red Prince'
  - Purple Leaf Weigela
- D. Seasonal Display
- Caryopteris x clandonensis 'Blue Mist'
  - Blue Mist Caryopteris
  - Echinacea purpurea 'Magnus'
  - Magnus Purple Coneflower
  - Eupatorium purpureum 'Big Umbrella'
  - Big Umbrella Joe Pye Weed
  - Eupatorium purpureum 'Gateway'
  - Gateway Joe Pye Weed
  - Hemerocallis 'Happy Returns'
  - Happy returns Daylily
  - Hemerocallis 'Stella de Oro'
  - Stella de Oro Daylily
  - Nepeta faassenii 'Walkers Low'
  - Walkers Low Catmint
  - Pennisetum alopecuroides "Cassian"
  - Cassian Fountain Grass
  - Rudebeckia fulgida 'Goldsturm'
  - Black-eyed Susan
  - Sedum x 'Autumn Joy'
  - Autumn Joy Sedum
  - Stachys byzantina 'Helene von Stein'
  - Lambs Ear
  -
- E. Bulbs
- Daffodil x 'Ice Follies'
  - Ice Follies Daffodil
  - Daffodil x 'King Alfred'
  - King Alfred Daffodil



F. Lawn

Select cultivars that can thrive on low nutrient, low water availability and that are “90% endophyte enhanced” variety.

**3.0 STANDARDS**

- A. Federal aviation Administration (FAA) AC 15/5200-33A – Hazardous Wildlife Attractants on or near Airports
- B. USDA- Asian Long Horned Beetle Quarantine and Regulations
- C. American Standard For Nursery Stock, ANSI Z60.1-2004, American Nursery & Landscape Association

**APPENDIX H**  
**STANDARDS FOR INTERIOR PLASTIC SIGNS**

**APPENDIX H**

**STANDARDS FOR INTERIOR PLASTIC SIGNS**

**1.0 GENERAL**

The provisions of this specification shall govern the design and use of interior plastic signs and panels in both New York & New Jersey.

**2.0 DEFINITIONS, SYMBOLS, AND NOTATIONS**

The following definitions, symbols and notations shall apply to the provisions of this standard (units in parenthesis are for the variable described):

AS (ft <sup>2</sup> )	Allowable sign facing area
L (ft)	The length along the ceiling of a ceiling sign
Pw (ft)	Minimum distance between an egress path and a sign Distance can be passage width or height
t (inches)	Thickness of sign facing material(s)
VC (ft <sup>3</sup> )	Volume of space or room in which the sign is located
Ceiling sign	A ceiling mounted sign with its top located within one foot of the ceiling and its bottom located five feet or higher above the floor
Interior plastic sign	A sign, located within a structure, which has a facing which is constructed of plastic
Multiple-faced sign	A sign with more than one exposed face
Sign	Any fabricated sign or display structure, including its structure, consisting of any letter, figure, character, mark, point, plane, marquee sign, design, poster, pictorial, picture, stroke, stripe, line, trademark, reading matter or illuminating device, which is constructed, attached, erected, fastened or manufactured in any manner whatsoever so that the same shall be used for the attraction of the public to any place, subject, person, firm, corporation, public performance, article, machine, or merchandise whatsoever, and displayed in any manner for recognized advertising purposes
Sign facing	The display portion of a sign
Single-faced sign	A sign with display on one face only
Volume of Space or Room (V <sub>c</sub> )	The volume between physical barriers which may limit the movement of fire products (e.g., fire doors in cross corridor partitions). The space shall have a maximum average length to width ratio of 4:1. If the ratio exceeds 4:1, the length of four times the average width shall be used for volume calculation. The volume of a compartment with a ratio exceeding 4:1 shall be calculated by the following equation:  4 x (average width of compartment) <sup>2</sup> x height.

**3.0 FLAME SPREAD RATING**

All plastic sign facings shall have a flame-spread rating, determined by ASTM E84, not greater than 200.

**Exception**

Materials less than 1/28-inch in thickness shall comply with the criteria in NFPA 701, "Flame Tests for Flame-resistant Textiles and Films," or when tested in accordance with ASTM D568, "Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position," exhibit an average burn time for ten specimens of 15 seconds or less and a burning extent of 15 centimeters or less.

**4.0 ALLOWABLE SIGN FACING AREA**

The area of an individual plastic sign facing shall not exceed the limitations established in paragraph 4.1 through paragraph 4.6, or as calculated in accordance with the Appendix to this standard. The maximum area of all signs in a space shall not exceed 20 percent of the aggregate wall and ceiling area of the space. For multiple-faced signs, the calculated allowable area is the total area of all faces of all signs within separation distances specified in paragraph 4.7. Signs which are separated by less than the minimum sign separation distance as given in paragraph 4.7, shall be considered a single sign.

**Exception**

The area of an individual plastic sign facing is not limited where the portion of the building, where the sign is located, is equipped with an automatic sprinkler system. However, the 20 percent limitation, in the paragraph above, shall apply.

**4.1 POLYMETHYLMETHACRYLATE (PMMA) (E.G., ACRYLIC, PLEXIGLASS, LUCITE) SIGN**

Materials: The allowable area of a PMMA sign facing shall be determined from the following equation.

$$A_s = 0.00034 \frac{V_c}{t} \quad | \quad \text{for } t \leq 0.46 \text{ inch}$$

$$A_s = 0.000745 V_c \quad | \quad \text{for } t > 0.46 \text{ inch}$$

**Example**

Given a space (room or compartment) 50' long by 40' wide with a 10' high ceiling, how large a PMMA (acrylic) sign facing is allowable if PMMA is 0.25" thick?

$$A_s = 0.00034 \frac{(50)(40)(10)}{0.25} = 6.8 = 27.2 \text{ sq.ft.}$$

**4.2 POLYCARBONATE (E.G., GE LEXAN S100) SHEET SIGN MATERIAL**

The allowable area of a polycarbonate sign facing shall be determined from the following equation:

$$A_s = 0.00031 V_c$$

**4.3 POLYETHYLENE TERAPHTHALATE (PET) (E.G., IMPET 300) SIGN MATERIAL**

The allowable area of a PET sign facing shall be determined from the following equation:

$$A_s = 0.0000759 \frac{V_c}{t} \quad | \quad \text{for } t \leq 0.46 \text{ inch}$$

$$A_s = 0.000185 V_c \quad | \quad \text{for } t > 0.41 \text{ inch}$$

**4.4 DURATRANS - GLOSSY SIGN FACING MATERIAL**

The allowable area of a Duratrans sign facing shall be determined from the following equation:

$$A_s = 0.000046 V_c \left| \text{for } t \leq 0.43 \text{ inch} \right.$$

$$A_s = 0.00108 V_c \left| \text{for } t > 0.043 \text{ inch} \right.$$

**4.5 DURATRANS MATTE FINISH SIGN FACING MATERIAL**

The allowable area of a Duratrans matte finish sign facing shall be determined from the following equation:

$$A_s = 0.0000224 V_c \left| \text{for } t \leq 0.0576 \text{ inch} \right.$$

$$A_s = 0.000389 V_c \left| \text{for } t > 0.0576 \text{ inch} \right.$$

**4.6 OTHER PLASTIC SIGN MATERIALS**

The allowable area of a sign facing constructed from a plastic material not listed in paragraphs 4.1 through 4.5, or from composites of plastics, shall be determined in accordance with the Appendix to this standard. The method in the Appendix may also be used for plastics listed in paragraphs 4.1 through 4.5.

**4.7 SIGN SEPARATION DISTANCES**

The minimum separation distance between any two individual signs shall be in accordance with paragraphs 4.7.1., 4.7.2, and 4.7.3. Signs located less than the minimum sign separation distances apart shall be considered as one sign for allowable sign facing area.

**Exception**

Sign separation distances do not apply where the signs are located in a space equipped with an automatic sprinkler system.

**4.7.1 SINGLE-FACED SIGN SEPARATION DISTANCES**

The minimum separation distance between two adjacent signs with a single side of sign facing shall be 6 feet.

**4.7.2 MULTIPLE-FACED SIGN SEPARATION DISTANCES**

The minimum separation distance between two signs with multiple faces on different planes shall be 13 feet.

**4.7.3 CEILING SIGN SEPARATION DISTANCES**

Signs greater than 10 feet in length and one foot in height shall have a minimum separation distance of 10 feet, except as noted in 4.7.2. Other signs shall conform to Sections 4.7.1.

**4.8 MINIMUM DEAD END PASSAGE WIDTH FOR SIGNS**

Minimum passage width applies to dead end corridors and rooms having means of egress in locations requiring an occupant to pass by a sign. The minimum passage width shall be 20 feet in locations where an occupant must pass a single-faced sign, and 28 feet in locations where an occupant must pass a multiple-faced sign to exit.

The minimum passage width (Pw) is defined as the minimum distance between an egress path and a sign, i.e., the closest an occupant will be to the sign during egress. The minimum passage width or height (for ceiling signs) where an occupant must pass by a sign which is perpendicular to the occupants' path of travel shall be calculated from the following equation:

$$PW = 0.00255 L^{3.654} \text{ for } L \geq 2 \text{ ft}$$

**Exception**

There is no restriction for signs less than 4 square feet in area and ceiling signs less than 2 feet long.

**ATTACHMENT**

**CALCULATION OF ALLOWABLE SIGN AREA FOR SIGNS OF ANY PLASTIC MATERIAL OR COMPOSITE OF PLASTICS**

**A.1 DEFINITIONS, SYMBOLS, AND NOTATIONS**

The following definitions, symbols and notations shall apply to the provisions of this standard (units in parenthesis are for the variable described).

$A_S$ (ft <sup>2</sup> ) =	Allowable sign facing area.
$A_1$ (ft <sup>2</sup> ) =	Initial allowable sign facing area based on Figure A-1.
$A_2$ (ft <sup>2</sup> ) =	Corrected allowable sign area based on the time to burn through a sign.
$\Delta H_{c,40}$ (kJ/kg) =	Heat of combustion for an incident heat flux of 40 kW/m <sup>2</sup> .
$L$ (ft) =	The length along the ceiling of a ceiling sign.
$\dot{m}_{90}^*$ (kg/s-m <sup>2</sup> ) =	The average specimen mass loss rate of the fuel per unit area with a radiant flux exposure of 40 kW/m <sup>2</sup> . Mass loss rate shall be determined in accordance with average horizontal specimen mass loss rate in ASTM E- 1354.
$P_w$ (ft) =	Minimum distance between an egress path and a sign. Distance can be passage width or height.
$t_b$ (sec) =	Time to burn through a specimen, used to correct allowable areas for thin signs.
$t$ (inches) =	Thickness of sign facing material(s).
$V_c$ (ft <sup>3</sup> ) =	Volume of space or room in which the sign is located.
$\sigma_{m,40}$ (m <sup>2</sup> /kg) =	Specific extinction area, on a mass loss basis for an incident heat flux of 40 kW/m <sup>2</sup> .
$\rho$ (kg/m <sup>3</sup> ) =	Density of sign material.
$SP$ (1/s) =	Smoke production factor used to determine uncorrected sign area based on volume.

**A.2 FLAME SPREAD**

All plastic sign facings shall meet the flame spread rating criteria specified in [Flame Spread Rating](#). All test results and material properties used in the following calculations must be submitted for approval.

**A.3 ALLOWABLE SIGN FACING AREA**

The allowable area of a sign facing constructed from plastic materials shall be determined in accordance with the following procedure. The procedure is applicable for all plastic materials including those listed in paragraphs 4.1 - 4.5.

1. Obtain the sample mass density  $\rho$ , in kg/m<sup>3</sup>.
2. Obtain the following from ASTM E 1354:
  - a) The average specimen mass loss rate per unit area for an incident heat flux of 40 kW/m<sup>2</sup> ( $\dot{m}_{40}$ ).
  - b) The average specific extinction area for an incident heat flux of 40 kW/m<sup>2</sup> ( $\sigma_{m,40}$ ).
  - c) The average effective sample heat of combustion for an incident heat flux of 40 kW/m<sup>2</sup> ( $\Delta H_{C,40}$ ).

3. Calculate the material's smoke production factor (SP):

$$SP = \sigma_{m,40} \cdot \dot{m}_{40}$$

4. Using Figure A-1 and the appropriate values of SP and  $V_C$ , estimate the value of  $A_1$ .
5. The initial corrected allowable area of a combustible sign facing ( $A_2$ ) based on the thickness of the material shall be calculated using the following formulas:

$$A_2 = \frac{600}{t_b} \cdot A_1$$

where  $t_b$  is determined by the following formula:

$$t_b = 0.0254 \cdot \frac{\rho \cdot t}{\dot{m}_{40}}$$

**Exception:** If  $t_b$  is greater than 600, then a corrected area is not required, i.e.,  $A_2 = A_1$ .

6. The final allowable area of a combustible sign facing ( $A_S$ ) based on the heat release rate properties of the combustible materials shall be calculated using the following formula:



7. Allowable facing area of composite sign materials shall be determined in the same fashion as signs with single materials. Material properties of the composite sign ( $n_{40}$ ,  $\sigma_m$ ,  $\Delta H_c$ ,  $\rho$ ) shall be a weighted average of each component mass material. For example, material properties of a composite with two materials shall be determined via where 1 and 2 refer to materials number

$$n_{40} = \frac{\text{mass } 1}{\text{mass total}} \cdot n_{40,1} + \frac{\text{mass } 2}{\text{mass total}} \cdot n_{40,2}$$

$$\sigma_m = \frac{\text{mass } 1}{\text{mass total}} \cdot \sigma_{m,1} + \frac{\text{mass } 2}{\text{mass total}} \cdot \sigma_{m,2}$$

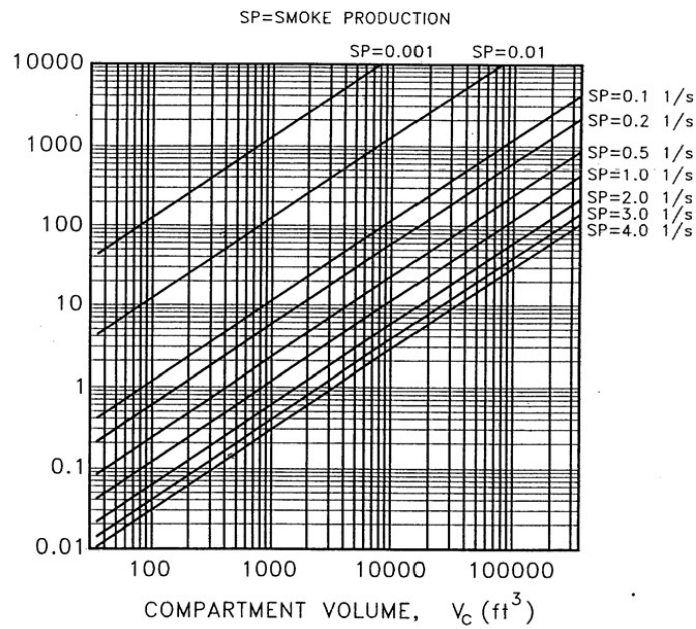
$$\Delta H_c = \frac{\text{mass } 1}{\text{mass total}} \cdot \Delta H_{c,1} + \frac{\text{mass } 2}{\text{mass total}} \cdot \Delta H_{c,2}$$

$$\rho = \frac{\text{mass } 1}{\text{mass total}} \cdot \rho_1 + \frac{\text{mass } 2}{\text{mass total}} \cdot \rho_2$$

one and two.

$$A_s = \frac{452}{n_{40} \cdot \Delta H_{c,40}} \cdot A_2$$

Exception: If  $n_{40} \cdot \Delta H_{c,40}$  is less than 452.0 kW/m<sup>2</sup>, a corrected area is



**Figure A-1**

Allowable Sign Area as a Function of the Smoke Production and Room Volume

not required, i.e.,  $A_s = A_2$ .