

Immix Expansion Project

4-30-2013

One World Trade Center, Portland OR

ACOUSTICAL PANEL CEILINGS 095113 - 1 SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and material Samples.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

B. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:

1. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings - Seismic Zones 0-2."

2. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies - Seismic Zones 3 & 4."

3. UBC Standard 25-2, "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings."

2.2 ACOUSTICAL PANELS ACP1

A. Products:

1. Armstrong Cirrus Second Look 513.

B. Classification: As follows, per ASTM E 1264:

1. Type and Form: Type III, Form 1.

2. Pattern: ASTM E 1264 pattern designation E 1 K.

3. Color: White.

4. Light Reflectance (LR) Coefficient: Not less than 0.85.

5. Noise Reduction Coefficient (NRC): Not less than 0.65.

6. Ceiling Attenuation Class (CAC): Not less than 35.

C. Surface-Burning Characteristics: ASTM E 1264, Class A materials, tested per ASTM E 84.

D. Edge Detail: Beveled tegular.

E. Thickness: 3/4 inch.

F. Modular Size: 24 by 48 inches. ZGF No. P71825.00

2.3 ACOUSTICAL PANELS ACP2

A. Products:

1. ACP2: Armstrong Dune 1775??,

B. Classification: As follows, per ASTM E 1264:

1. Type and Form: Type III, Form 2.
2. Pattern: CE (perforated, small holes and lightly textured).
3. Color: .White.
4. Light Reflectance (LR) Coefficient: Not less than 0.83.
5. Noise Reduction Coefficient (NRC): Not less than 0.50.
6. Ceiling Attenuation Class (CAC): Not less than 35.

C. Surface-Burning Characteristics: ASTM E 1264, Class A materials, tested per ASTM E 84.

D. Edge Detail: Angled Tegular.

E. Thickness: 5/8 inch (15 mm).

F. Modular Size: 24 by 24 inches (610 by 610 mm).

G.

2.4 CEILING SUSPENSION SYSTEM ACP1.

A. Wide-face, direct-hung system; ASTM C 635, heavy-duty structural classification.

1. Products:

a. Armstrong Prelude XL.

2. Color: White.

B. Attachment Devices: Sized for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated. Comply with seismic design requirements.

C. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

1. Size: Provide yield strength at least 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung), but not less than 0.106-inch- (2.69-mm) diameter wire.

D. Seismic Struts: Manufacturer's standard product designed to accommodate seismic forces.

E. Seismic Clips: Manufacturer's standard seismic clips designed to secure panels in place.

F. Hold-Down Clips: Manufacturer's standard product; spaced 24 inches (610 mm) o.c. on all cross tees. ZGF No. P71825.00

PART 3 - EXECUTION

3.1 INSTALLATION

A. Ceiling Suspension System Installation: Comply with [ASTM C 636] [UBC Standard 25-2] and CISCA's "Ceiling Systems Handbook."

B. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

C. Fit acoustical suspension grid and panels tightly to partition heads.

1. Cut surface of panels coped to gypsum board finish at partition head and repaint exposed edge with manufacturer's standard repair product.

2. Acoustically-seal ceiling suspension and panels to partition heads. Fill voids using

END OF SECTION 095113

SEISMIC RX® Code Compliant Solution

Suspension Systems ICC-ESR-1308

Key Selection Attributes

Armstrong Seismic Rx Suspension System Saves Time and Money

IBC Category C:

- Easier to square the system by installing tight to adjacent walls
- Tighter, more secure installation
- Eliminate stabilizer bars

IBC Category D, E, F:

- Reduce material costs by using 7/8" molding
- Eliminate stabilizer bars
- Eliminate installation hassles from 2" wall molding

ICC-ES Recognizes the Armstrong Seismic Rx Suspension System as a Code Compliant Solution

The independent and expert evaluation and confirmation by ICC-ES provides the code official with proven evidence supporting the Armstrong Seismic Rx Suspension System as a code-compliant alternative design to current IBC requirements.

ESR-1308 Lists Specific Components and Method of Installation

The performance of the Armstrong Seismic Rx Suspension System is based on a specific combination of components and method of installation. Other manufacturers' components and installation methods were not tested and are not covered in this evaluation. Substitution of other components puts the system at risk and is not allowed by this ESR report.

Components:

Select a component from each section (A, B and C).

A. Suspension Systems

- PRELUDE® XL 15/16" Exposed Tee System
- PRELUDE XL Fire Guard™ 15/16" Exposed Tee System
- PRELUDE XL 15/16" Environmental Tee System
- SILHOUETTE® XL 1/4" Reveal 9/16" Bolt Slot System
- SILHOUETTE XL 1/8" Reveal 9/16" Bolt Slot System
- SUPRAFINE® XL 9/16" Exposed Tee System
- SUPRAFINE XL Fire Guard 9/16" Exposed Tee System
- INTERLUDE® XL 9/16" Dimensional Tee System
- AL PRELUDE PLUS XL 15/16" Environmental Tee System
- SONATA™ 9/16" Dimensional Tee System
- SS PRELUDE PLUS XL 15/16" Environmental Tee System

Design Categories D, E and F

- Heavy-duty

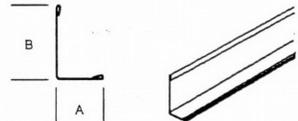
Design Category C

- Intermediate-duty

All Design Categories:

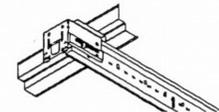
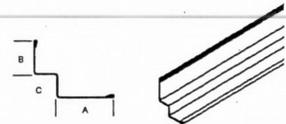
B. Components:

1. Angle molding: hemmed with prefinished exposed flanges
- | Item # | Length | (A) Flange | (B) Height |
|--|--------|------------|------------|
| <input type="checkbox"/> 7800 | 144" | 7/8" | 7/8" |
| <input type="checkbox"/> 7802 | 120" | 7/8" | 7/8" |
| <input type="checkbox"/> 7803 | 144" | 7/8" | 7/8" |
| <input checked="" type="checkbox"/> 7809 | 144" | 15/16" | 15/16" |
| <input type="checkbox"/> HD7801 | 120" | 7/8" | 7/8" |
| <input type="checkbox"/> 780036 | 144" | 7/8" | 7/8" |



- 2a. Shadow molding: hemmed with prefinished exposed flanges
- | Item # | Length | (A) Flange | (B) Height | (C) |
|-------------------------------|--------|------------|------------|------|
| <input type="checkbox"/> 7823 | 120" | 2" | 1-1/4" | 3/4" |

- 2b. Shadow Molding (Compatible with BERCC and BERCC 2)
- | | | | | |
|-------------------------------|------|--------|--------|------|
| <input type="checkbox"/> 7877 | 120" | 15/16" | 15/16" | 1/4" |
| <input type="checkbox"/> 7878 | 120" | 15/16" | 15/16" | 3/8" |
| <input type="checkbox"/> 7897 | 120" | 15/16" | 15/16" | 1/2" |

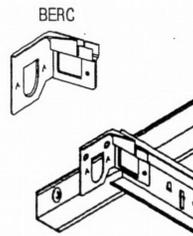


Note: Shadow molding can be rotated to be used with either flange

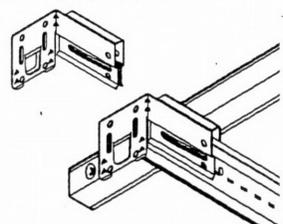
C. Accessories:

3. Beam End Retaining Clip joins main beam or cross tee to wall molding and web of grid with no visible pop rivets

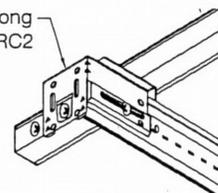
- BERCC
- BERCC2
- AL BERCC2



BERCC2, AL BERCC2



Armstrong AL BERCC2

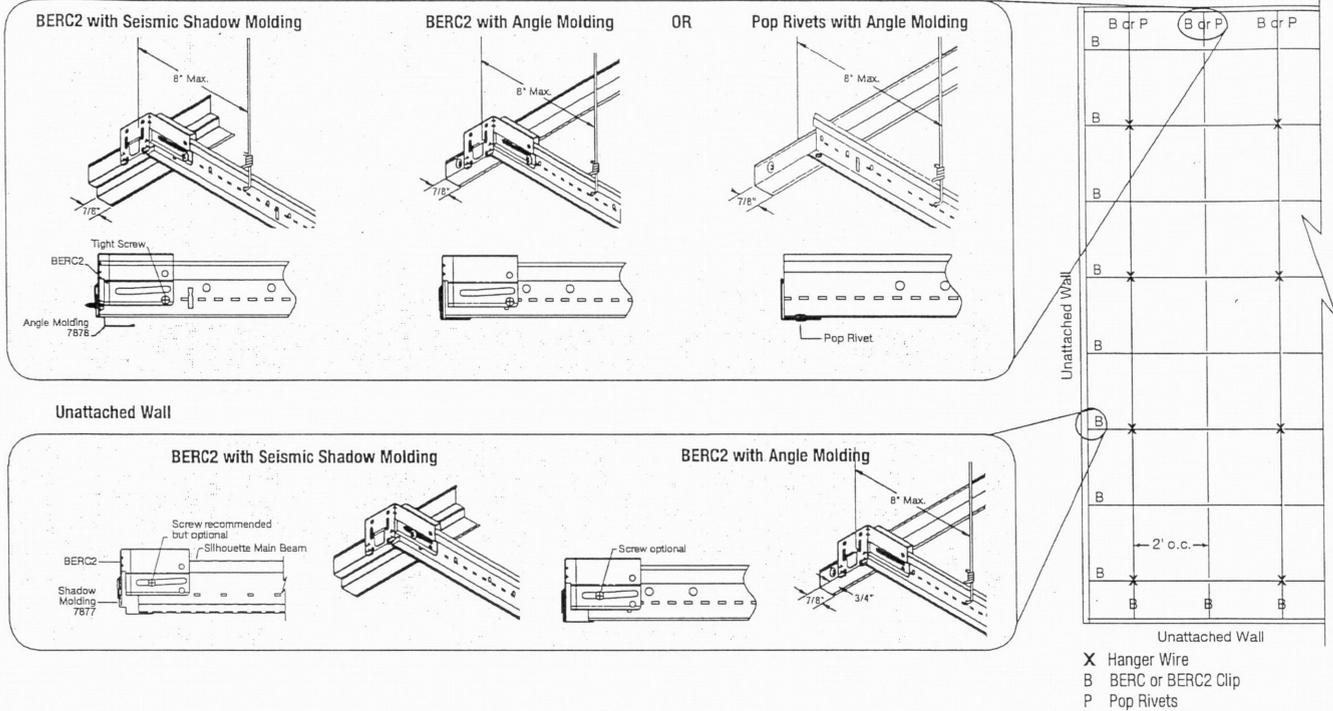


NOTE: It is REQUIRED to attach a screw through the ALBERCC2 into the wall molding as shown.

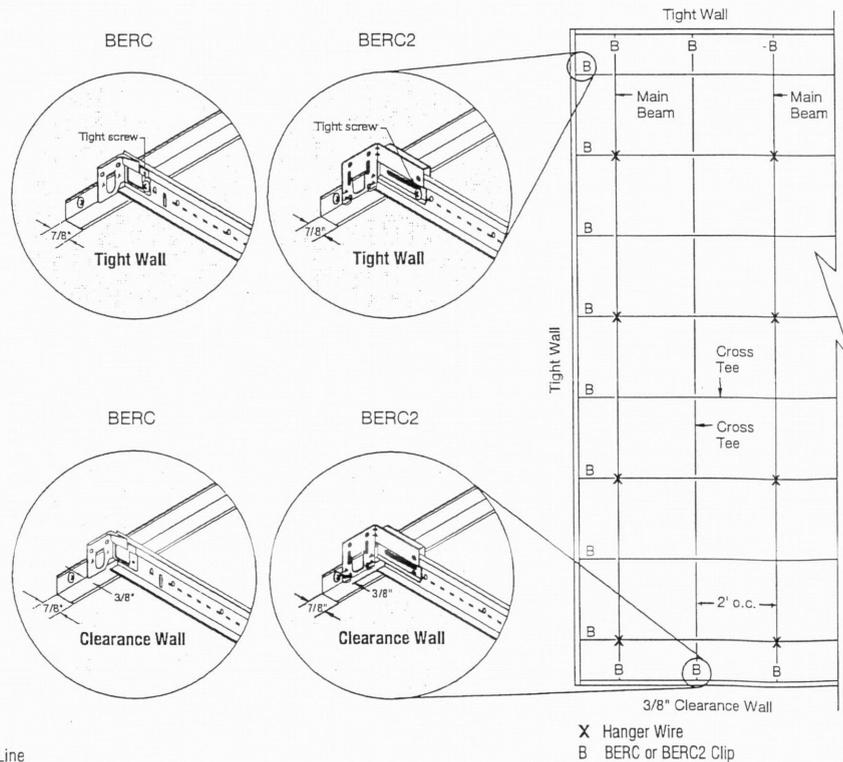
SEISMIC RX® Code Compliant Solution

Suspension Systems ICC-ESR-1308

Category D, E, F
Attached Wall



Category C



To download CAD drawing details go to armstrong.com/seismic
 NOTE: For complete seismic installation requirements contact TechLine

DUNE™

Square Lay-in & Tegular

fine texture



Recycled Content: Up to 53%

armstrong.com/greengenie

LEED® Credits

Energy	Waste Mgmt	Recycled Content	Local Materials	Renewable Materials	Daylight & Views
✓	✓	✓	✓	✓	✓

Location Dependent

LEED for Schools

Acoustics	Low Emitting or CHPS
✓	✓

The post-consumer recycled content of these items is from reclaimed ceilings

35% Pre-consumer; 18% Post-consumer

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Visual Selection

Performance Selection

Dots represent highest level of performance.

Edge Profile	Grid Drawings Cat. pgs. 226-228 or armstrong.com/catdwg	Item No.	Dimensions	UL Classified		Fire Rating	Light Reflect	Sag Resist	Anti-Microbial	Durable	Recycle Program
				Acoustics NRC	CAC						
DUNE Square Lay-in											
	1	1772 1772M	2' x 2' x 5/8" 600 x 600 x 15mm	□	0.50 30	Class A	0.83	HumiGuard+	BioBlock+	Scratch	Yes
	1	1850 1850M	2' x 2' x 5/8" 600 x 600 x 15mm	□	0.50 35	Fire Guard	0.83	.	.	.	.
	1	1773 1773M	2' x 4' x 5/8" 600 x 1200 x 15mm	□	0.50 33	Class A	0.83	.	.	.	.
	1	1851 1851M	2' x 4' x 5/8" 600 x 1200 x 15mm	□	0.50 35	Fire Guard	0.83	.	.	.	.
	1	1796 1796M	20" x 5' x 3/4" 500 x 1500 x 19mm	□	0.50 35	Class A	0.83	Standard	.	.	.
	1	1798 1798M	30" x 30" x 3/4" 750 x 750 x 19mm	□	0.50 35	Class A	0.83	Standard	.	.	.

DUNE Tegular

	31-34, 54	1775 1775M 1775HRC	2' x 2' x 5/8" 600 x 600 x 15mm 2' x 2' x 5/8"	□	0.50 35	Class A	0.83	.	.	.	.
	31	1852	2' x 2' x 5/8" 600 x 600 x 15mm	□	0.50 35	Fire Guard	0.83	.	.	.	.
	31-34, 54	1777 1777M 1777HRC	2' x 4' x 5/8" 600 x 1200 x 15mm 2' x 4' x 5/8"	□	0.50 35	Class A	0.83	.	.	.	.
	6	1774 1774M 1774HRC	2' x 2' x 5/8" 600 x 600 x 15mm 2' x 2' x 5/8"	□	0.50 35	Class A	0.83	.	.	.	.
	6	1853	2' x 2' x 5/8" 600 x 600 x 15mm	□	0.50 35	Fire Guard	0.83	.	.	.	.
	6	1776 1776M 1776HRC	2' x 4' x 5/8" 600 x 1200 x 15mm 2' x 4' x 5/8"	□	0.50 35	Class A	0.83	.	.	.	.

Suspension Systems

15/16"		9/16"						
	Prelude® Prelude XL® Fire Guard		Interlude®	Silhouette® Bolt-Slot	Sonata®	Suprafine®	Trimlok® Screw-Slot	Suprafine XL Fire Guard

Item 1775-CAC 33 on 9/16" Interlude, Sonata, Suprafine

Physical Data

Material
Wet-formed mineral fiber

Surface Finish
Factory-applied latex paint

Fire Performance
ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less. (UL labeled) Fire Guard™: A fire resistive ceiling when used in applicable UL assemblies

ASTM E1264 Classification
Type III, Form 2, Pattern C E
Fire Class A

Sag Resistance
HumiGuard® Plus – superior resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.

VOC/Formaldehyde Emissions
Meets CA Dept. of Health Services Standard Practice for the testing of VOC Emissions and is listed on CHPS High Performance Products Database for Low-Emitting Materials.

Anti Mold/Mildew & Bacteria
BioBlock® Plus contains an anti-microbial treatment and provides guaranteed resistance against growth of mold/mildew and Gram-positive and Gram-negative odor/stain-causing bacteria for 30 years.

Insulation Value
R Factor – 1.6 (BTU units)
R Factor – 0.28 (Watts units)

30-Year Performance Guarantee & Warranty Information
Details in back of catalog or at armstrong.com/warranty

Weight; Square Feet/Carton
1772 – 0.94 lbs/SF; 64 SF/ctn
1773 – 0.88 lbs/SF; 80 SF/ctn
1796 – 1.33 lbs/SF; 67 SF/ctn
1798 – 1.14 lbs/SF; 50 SF/ctn
1850 – 1.19 lbs/SF; 48 SF/ctn
1851 – 1.22 lbs/SF; 64 SF/ctn
1774, 1775 – 0.75 lbs/SF; 64 SF/ctn
1776, 1777 – 0.75 lbs/SF; 80 SF/ctn
1852, 1853 – 1.20 lbs/SF; 48 SF/ctn

DUNE™

Square Lay-in & Tegular
fine texture

APC2



Items 1772, 1773, 1774, 1775 & 1776

HOWARD S. WRIGHT CONSTRUCTORS	
Submittal No. 095113-01	Spec Section
To Arch 01-25-13	From Arch
To Jody G.	By Dan Z.
<input type="checkbox"/> Corrections Noted	<input type="checkbox"/> Revise & Resubmit
This submittal REVIEW shall not be construed as a complete check and indicates only that information presented conforms generally with the Contract Documents. In no case is Subcontractor or Supplier relieved of responsibility for adherence to the Contract Documents and satisfactory	
HOWARD S. WRIGHT CONSTRUCTORS LICENSE # 164711	

Dune with Prelude® XL® 15/16" Exposed Tee grid (Pg. 215);
Axiom® Classic Trim (Pg. 236)

Dune with Interlude® 9/16" Dimensional Tee grid (Pg. 211);
Axiom® Classic Trim (Pg. 236)

Key Selection Attributes

- Upgrade look at a modest price
- Ceiling-2-Ceiling™ Post-consumer Recycled Content options: Items 1774HRC, 1775HRC, 1776HRC, 1777HRC. 35% Pre-consumer; 18% Post-consumer
- Durable Scratch-resistant
- Non-directional visual reduces installation time and scrap
- 30-Year Limited System Warranty against visible sag (excludes items 1796 and 1798), mold/mildew, and bacterial growth

Typical Applications

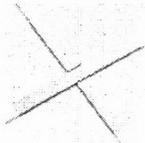
- Offices
- Corridors
- Retail
- Hospitality
- Classrooms

Detail (Other Suspension Systems compatible. Refer to listing on page 156.)

Color



Dune



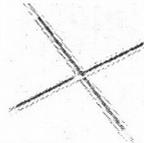
Dune Square Lay-in with Prelude 15/16" Exposed Tee grid



Dune Tegular with Suprafine® 9/16" Exposed Tee grid



Dune Tegular with Interlude XL® 9/16" Dimensional Tee grid



Dune Tegular with Silhouette® 9/16" Bolt-Slot grid 1/4" Reveal



White (WH)



FEATURES & SPECIFICATIONS

INTENDED USE — The AL combines clean, fine lines with a unique design that complements any space. The completely luminous optical system provides a concave visual appearance while providing high fixture performance and even illumination. AL is also available with a number of control options thus providing the ability to dim or control the lighting providing the ability to save energy and operate with multiple control systems including daylight or occupancy sensors.

CONSTRUCTION — Rugged, one-piece cold-rolled steel reflector assembly with embossed steel for increased structural integrity and strength. Polyester powder-paint after fabrication.

Hinged doorframe assembly retains optical assembly and easy access to electrical components. End plates include integral T-bar clips.

OPTICS — Luminous optical system consists of a unique blend of high performance transmittance diffuser coupled with a concave, clear, ribbed refractor for a unique multi-step appearance. To improve fixture performance and eliminate pixilation the diffuser uses a unique blend of high molecular weight polymer beads with unrelated refractive index.

ELECTRICAL — Long-life LEDs, coupled with high-efficiency drivers, provide superior quantity and quality of illumination for extended service life. AL is rated to deliver L80 performance for 50,000 hours.

nLight® embedded controls make each luminaire addressable - allowing it to digitally communicate with other nLight enabled controls such as dimmers, switches, occupancy sensors and photocontrols. Simply connect all the nLight enabled control devices and the AL luminaires using standard Cat-5 cabling. Unique plug-and-play convenience as devices and luminaires automatically discover each other and self-commission.

Lumen Management: Unique lumen management system (option N80) provides onboard intelligence that actively manages the LED light source so that constant lumen output is maintained over the system life, preventing the energy waste created by the traditional practice of over-lighting.

Bi-level dimming option allows system to be switched to 50% power for compliance with common energy codes while maintaining fixture appearance.

LED AccuDrive™ driver delivers full-range dimming from 0-10V control signal. 5% - 100% dimming range.

Driver disconnect provided where required to comply with US and Canadian codes

INSTALLATION — Lightweight and easy to install in any standard T-Bar system.

Maintenance: LED boards include plug-in connectors for easy replacement or servicing.

LISTINGS — CSA Certified to meet U.S. and Canadian standards.

DLC Certified. Tested to LM80 standards.

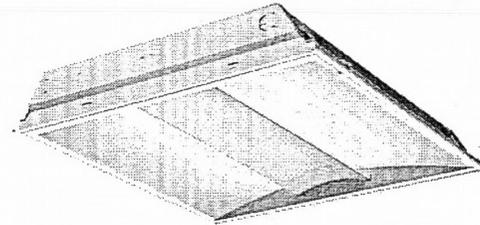
WARRANTY — 5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Specifications subject to change without notice.

Catalog Number
Notes
Type

AL SERIES

2ALL



2' X 2'
LED

DESIGNLIGHTS
CONSORTIUM



Patents Pending

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: 2ALL2 37L D37 LP835 N80

Series	Lumens	Voltage	Wattage	Color temperature	Controls	Options
2ALL2 ALL LED	37L 3700 lumens ¹	(blank) MVOLT 347 347V ²	D37 37W ³	LP835 82 CRI, 3500 Kelvin LP840 82 CRI, 4000 Kelvin LP850 82 CRI, 5000 Kelvin	NX Dimming, no nlight BLD Bi-level dimming N80 nLight with 80% (L80) lumen management N80EMG nLight with 80% (L80) lumen management for use with generator supply EM power N100 nLight without lumen management N100EMG nLight without lumen management for use with generator supply EM power	EL14L 1400 lumen battery pack

nLight® Control Accessories:

Order as separate catalog number. Visit www.sensorswitch.com/nLight for complete listing of nLight controls.

WallPod stations	Model number	Occupancy sensors	Model number
On/Off	nPODM [color]	Standard range 360°, ceiling (PIR / dual tech)	nCM 9 / nCM PDT 9
On/Off & Raise/Lower	nPODM DX [color]	Extended range 360°, ceiling (PIR / dual tech)	nCM 10 / nCM PDT 10
Graphic Touchscreen	nPOD GFX	Wide view (PIR / dual tech)	nWV 16 / nWV PDT 16
Photocell controls	Model number	Cat-5 cable bundles (plenum rated)	Model number
Continuous dimming	nCM ADC	10', CAT5 10FT	CAT5 10FT J1
On/Off & Dimming	nCM PC ADC	15', CAT5 15FT	CAT5 15FT J1

Accessories: Order as separate catalog number.

DGA22 Drywall ceiling adaptor, unit installation

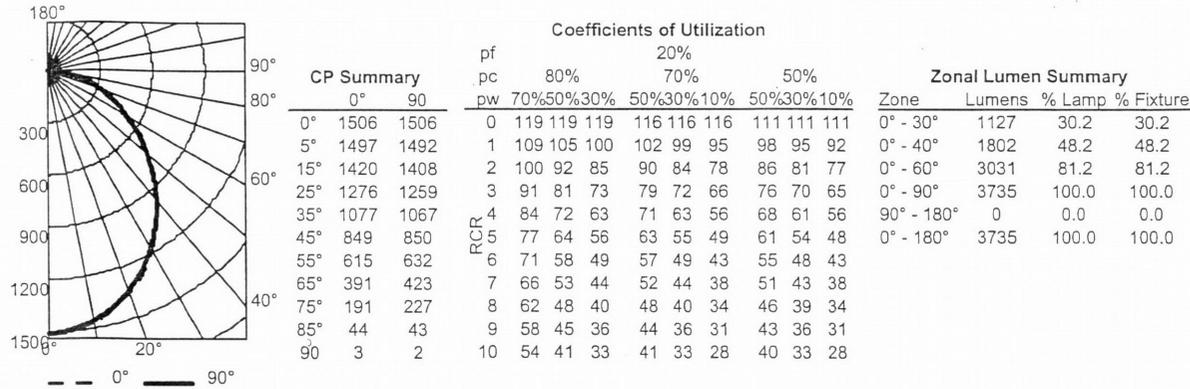
Notes

1. Approximate lumen output.
2. Not available with EL battery pack or BLD controls
3. Actual wattage may differ by +/- 5% when operating between 120-270V +/- 10%.

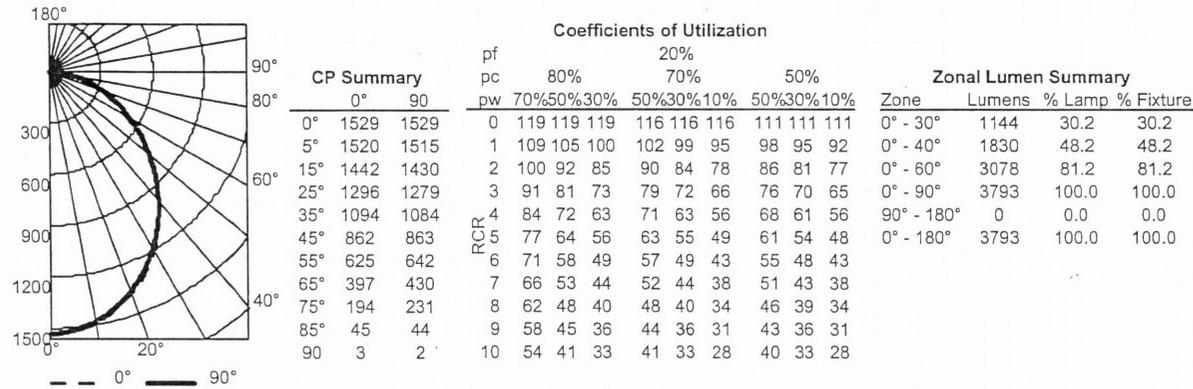
2ALL2 Architectural Lighting 2'x2'

PHOTOMETRICS

2ALL2 37L D37 LP835, 3,735 delivered lumens, test no. LTL 21781, tested in accordance to IESNA LM-79.



2ALL2 37L D37 LP840, 3,793 delivered lumens, test no. LTL 21788P, tested in accordance to IESNA LM-79.



T5/T8 Energy Comparison to LED				
System	Lamp type	Ballast factor	Input watts	Watts saved by using LED
LED-N100	LED	1.0	37	—
LED-N80 ¹	LED	0.80	30	—
Two-lamp T8	F32T8U	0.88	58	21
Two-lamp T5	F24T5HO	1.0	54	17

Dimensions

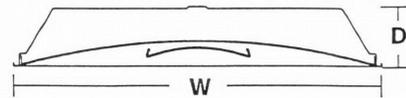
All dimensions are inches (centimeters) unless otherwise specified.

Specifications

Length: 24 (61.0)

Width: 24 (61.0)

Depth: 3-3/4 (9.5)

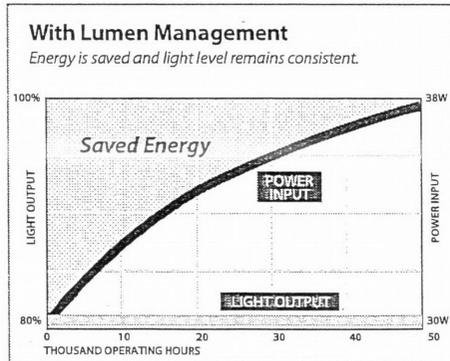
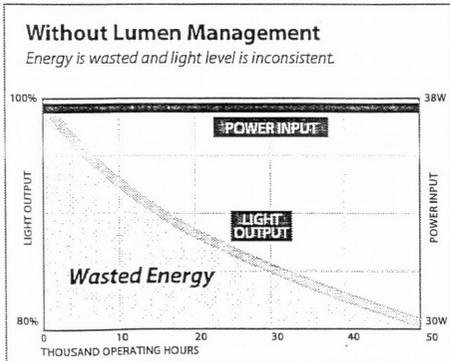


Note

- 1 With night 80% lumen management input watts start at 30 and gradually increasing to 37 at 50,000 hrs.

Constant Lumen Management

Enabled by the embedded nLight control, the RTLED actively tracks its run-time and manages its light source such that constant lumen output is maintained over the system life. Referred to as lumen management, this feature eliminates the energy waste created by the traditional practice of over-lighting.



2ALL-2X2

WORLD TRADE CENTER TENANT IMPROVEMENTS
MECHANICAL MASTER SPECIFICATION

DIVISION 15 - MECHANICAL

SECTION 15000 - SCOPE OF MECHANICAL WORK

- A. This outline specification is intended as a guide for design TI Projects in the areas of heating, air conditioning, ventilation, plumbing, fire protection, controls, and testing, adjusting and balancing of systems. It is not a comprehensive specification.

Contractor design should note:

- a) Maximum of 1,000 square feet per HVAC zone.
- b) Separate existing zoning of existing HVAC systems where new demising walls occur to prevent one zone serving 2 separate tenants.
- c) Conference Rooms for more than 6 people need to have their own zone / vav box.

B. INDEX OF MECHANICAL SPECIFICATIONS

<u>Section Number</u>	<u>Title</u>
15010	Basic Mechanical Requirements
15050	Basic Mechanical Materials and Methods
15060	Piping
15240	Mechanical Sound, Vibration, and Seismic Control
15250	Mechanical Insulation
15400	Plumbing
15780	Packaged HVAC Equipment
15835	Terminal Heat Transfer Equipment
15850	Air Handling Equipment
15880	Air Distribution
15885	Air Distribution Systems Cleaning
15900	Controls – General
15940	Direct Digital Controls
15990	Testing, Adjusting, and Balancing (TAB) Work

SECTION 15010 - BASIC MECHANICAL REQUIREMENTS

- A. Provide materials, equipment, labor, supervision, tools and items necessary for the construction, connection, testing and operation of mechanical work.
- B. Provide mechanical work in conformance with the Uniform Building Code, Uniform Mechanical Code, Uniform Plumbing Code, NFPA, National Electrical Code, Oregon Energy Code and other applicable state and local codes, ordinances and standards.
- C. Perform work in accordance with state and local safety regulations.
- D. Provide material information and shop drawings. Work with owner in as building existing conditions and owners input in regards to system deficiencies or needs. Submit for approval within 10 days after contract execution. Copies will be submitted for Owner review and acceptance along with engineering review.

WORLD TRADE CENTER TENANT IMPROVEMENTS
MECHANICAL MASTER SPECIFICATION

- E. Provide as-built drawings. Use Owner furnished backgrounds of existing system to document new work and as-built conditions. Furnish 2 hard copies and one electronic copy to Owner.
- F. Provide complete operating and maintenance manuals, with descriptions of operation of each mechanical system, schematic diagrams, equipment operating and maintenance instructions, control drawings, and spare parts lists. Provide 2 copies in 3-ring binders or in an electronic format.
- G. Provide operating and maintenance instruction periods for Owner's representatives.

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

- A. Provide electric motors, mounting accessories, painting, identification of equipment and piping and miscellaneous basic materials.
- B. Provide electric motors conforming to requirements of NEMA MG-1 and a manufacturer's standard commercial product.
- C. Provide expansion shells and bolts, steel channels, sleeves and concrete bases for equipment.
- D. Provide equipment nameplates, valve tags, and identification of piping.
- E. Provide paint for equipment, piping, sheet metal work and supports in equipment rooms.

SECTION 15051 - MECHANICAL DEMOLITION

- A. Selective demolition of existing mechanical work.
- B. Materials to Owner: Owner may want materials that will be removed.
- C. Disposal of Demolished Materials: Remove demolished materials from the site. Most materials should be recycled.

SECTION 15060 - PIPING

- A. Steel Piping, General: 125 psig working pressure, Schedule 40 black steel, with screwed fittings for sizes 2 inch and smaller, and welded fittings for sizes 2-1/2 inch and larger.
- B. Copper Piping, General: 125 psig working pressure Type L hard drawn copper tubing with wrought copper solder fittings in the building and Type K underground. Use 95/5 solder.
- C. Provide piping, supports, hangers, and miscellaneous system accessories.
- D. Provide brass unions between each connection of dissimilar metals.

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- E. If shutoff valve does not exist on heating water supply or return main to area being remodeled, provide new shutoff valve as part of the work.
- F. Coordinate installation and clearances of piping work with the air distribution and electrical work to avoid interferences.
- G. Flush and pressure test piping. Test pressure 1-1/2 times the design working pressure, but not less than 50 psig. Clean and test gas piping in accordance with local requirements.

SECTION 15240 - MECHANICAL SOUND, VIBRATION AND SEISMIC CONTROL

- A. Vibration Isolation: Provide seismically restrained spring isolators for mechanical equipment located on slabs above grade and suspended mechanical equipment.
- B. Seismic Bracing: Provide seismic bracing of equipment piping and ductwork required by UBC "Earthquake Design" requirements. Conform to requirements of SMACNA "Seismic Restraint Manual; Guidelines for Mechanical System". Comply with requirements for Seismic Hazard Level (SHL) B.
- C. Sound Transmission Between Rooms: Supply air boots should on the perimeter air bar need to be placed adjacent to partition walls. This is to prevent sound coming from one room to the other through the air bar.

SECTION 15250 - INSULATION

- A. Insulation Thickness: Conform to requirements of the Oregon State Energy Code.
- B. Pipe Insulation: Fiberglass with all service jacket. Insulate domestic hot, cold, and hot water circulating water piping, heating and chilled water piping.
- C. Duct and Equipment Insulation: Fiberglass, flexible type for concealed applications, rigid board for exposed applications; vapor barrier jacket. Exhaust ducts and factory insulated equipment not insulated.
- D. Provide additional insulation for internally lined ducts if required by Energy Code.

SECTION 15400 - PLUMBING

- A. Potable and Non-Potable Water Piping: Type L copper with 95/5 soldered joints for all sizes.
- B. Sanitary Waste and Vent Piping: Cast iron no-hub with heavy stainless steel clamps.
- C. Natural Gas Piping: Schedule 40 black steel with screwed fittings for sizes 2 inch and smaller, and welded joint fittings for sizes 2-1/2 inch and larger.

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SECTION 15780 - PACKAGED HVAC EQUIPMENT

- A. Split System DX Air-conditioning Unit:

SECTION 15835 – TERMINAL HEAT TRANSFER EQUIPMENT

- A. Cabinet Heaters, Electric: Exposed or recessed, vertical mounting with direct drive fan, coil, filter, and insulated galvanized steel cabinet with factory baked enamel finish.
- B. Cabinet Heaters, Hot Water: Exposed or recessed, vertical or horizontal mounting with direct drive fan, coil, filter, and insulated galvanized steel cabinet with factory baked enamel finish.
- C. VAV Boxes: Titus pneumatic single duct terminal unit if pneumatic controls are being retained or digital if controls are being replaced with DDC system. Provide reheat coil in all perimeter boxes (interior zones to have nominal heating capacity for warmup will be specified by owner). Install boxes in locations that allow easy access without working over furniture or equipment.

SECTION 15850 - AIR HANDLING EQUIPMENT

- A. Exhaust Fans: Factory assembled, belt or direct driven fan, aluminum backward inclined centrifugal fan wheel; Greenheck, Cook JennFan, Penn, Carnes, or approved.
- B. Fan Drives: Variable pitch for 10 hp and smaller, fixed pitch for 15 hp and larger.

SECTION 15880 - AIR DISTRIBUTION

- A. General: Galvanized steel fabricated and installed in accordance with SMACNA HVAC Duct Construction Standards, with full radius elbows or double- thickness turning vanes. Fiberglass duct board is not allowed.
- B. Shop Drawings: Provide detailed shop drawings of ductwork installation, minimum scale 1/8-inch to the foot.
- C. Pressure Classification:
 - 1. Low pressure, 2 inch water gage, supply air ducts, return air ducts, exhaust air ducts, outside air ducts; Seal Class A.
- D. Fire Dampers: UL listed, blades recessed out of air stream for 100 percent free area.
- E. Combination Fire/Smoke Dampers: UL listed for dynamic systems, Leakage Class 1, minimum 90 percent free area. Electric actuator rated for energized hold open position of 6 months or more.

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- F. Flexible Ducts: Factory insulated with vapor barrier, 1 inch thick fiberglass insulation, steel spring helix reinforcement. Limited to 5 feet length.
- G. Ceiling Diffusers: Square face, modular type with adjustable throw direction. Provide frame to match existing ceiling type.
- H. Supply Grilles: Double deflection with front blades horizontal.
- I. Return, Exhaust, and Transfer Grilles: 40 degrees fixed deflection.
- J. Provide flexible ducts for supply air connections to ceiling diffusers.
- K. Provide duct accessories, including volume dampers, gravity backdraft dampers, turning vanes, and access panels.

SECTION 15885 – AIR DISTRIBUTION SYSTEMS CLEANING

- A. General: Clean the interior of air distribution systems including air supply, return, and exhaust systems. If owner makes it a requirement for the project.
- B. Performed by an independent industrial ventilation and air conditioning system cleaning contractor that is a certified member of National Air Duct Cleaners Association and having a minimum of 5 years experience.
- C. Cleaning contractor furnishes particulate collection equipment, source removal cleaning equipment, vacuum cleaning equipment, and biocidal agents and coatings.
- D. Cleaning contractor prepares and submits report at the completion of the cleaning work.

SECTION 15900 – CONTROLS - PNEUMATIC

- A. General: Building was originally constructed with Siemens pneumatic controls. If pneumatic controls are to be retained, note that zone thermostats are reverse acting.
- B. Shop Drawings: Provide detailed schematic diagrams, floor plans, sequences of operation, and wiring diagrams.
- C. Thermostats: Wall mounted room type are preferred. In open office configuration where no wall provides reasonable location, pendent ceiling mount is acceptable.
- D. When working on pneumatic system, take care to plug all control air lines being demolished or abandoned.

SECTION 15940 – DIRECT DIGITAL CONTROLS

- A. General: Where controls are being upgraded to Direct Digital Control (DDC), system designed and installed by the local office or authorized representative of the controls manufacturer; Siemens Building Technologies.

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- B. Shop Drawings: In addition to the requirements of Section 15900, include details of surge protection, power wiring, DDC panel layouts and schematics, DDC software data, and DDC point list.
- C. Operator Work Station: Update graphics and data base at host computer to reflect complete scope of work at all operator work stations.

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SECTION 15990 - TESTING, ADJUSTING, AND BALANCING (TAB) WORK

- A. TAB performed by an independent contractor not affiliated with mechanical contractor, NEBB certified, with minimum 5 years experience on similar projects.
- B. Mechanical contractor responsible for systems operation, inspection and set-up prior to TAB work; provides drive changes as directed by TAB contractor.
- C. TAB work performed in accordance with NEBB or SMACNA. Adjusts quantities to within percent of design values as follows:
 - 1. Supply air fans and outlets 0 to plus 10 percent
 - 2. Return and exhaust air fans and inlets 0 to minus 10 percent
- D. TAB contractor prepares and submits balancing report.

TEC Standards

(Terminal Equipment Controller)

Perimeter box W/Reheat

1. TEC Controller 550-405
2. Electronic Room Sensor 540-68FB= White, FA=Desert Beige
3. Hot Water Valve 254-01108 N/C valve body
4. Duct sensor 536-811 100k ohm thermistor
5. Sensor cable 588-100A= 25FT B=50Ft C=100FT

Interior Box

1. Controller TEC will not need DO 550-400
2. Electronic Room Sensor 540-68FB= White, FA=Desert Beige
3. D Sensor cable 588-100A= 50FT B=50Ft C=100FT
4. Duct sensor 536-811 100k ohm thermistor

When retro fitting older Tuttle Baily boxes we will need to install a pressure transducer.

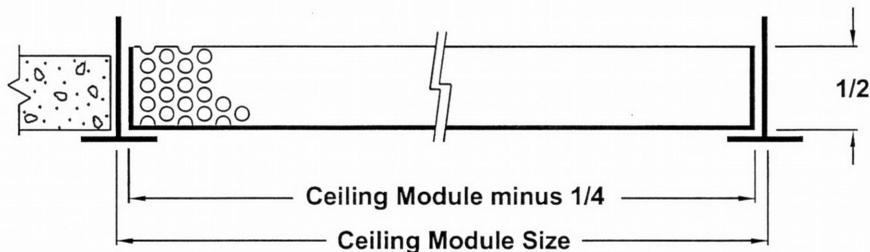
WIRE Anixter Inc. (847) 390-4700

1. 24V power- Part # H-2C14-CL3P Description YM48515 013 H-2C14-CL3P 14-2C STR BC PRPVC DK BLU PRPVC JKT CL3P 75C NORTHFLEX

2. -FLN- PART # H-F-TSP24LC-CMP-BOX Description H-F-TSP24LC-CMP-BOX 24-1P STR TC FFEP FOIL SHD ORG BLU STRIPE PRPVC JKT CMP LOCAP

Perforated Ceiling Diffusers Steel • Flush Face

Model: PXP • Return Panel

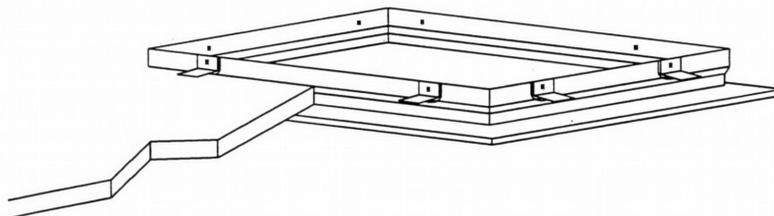


Nominal Ceiling Module Sizes Available: 12 x 12, 16 x 16, 20 x 20, 24 x 12, 24 x 24, 48 x 24

Accessories (Optional)

Check if provided

TRM TITUS Rapid Mount Frame



For Surface Mounting Border Type 3

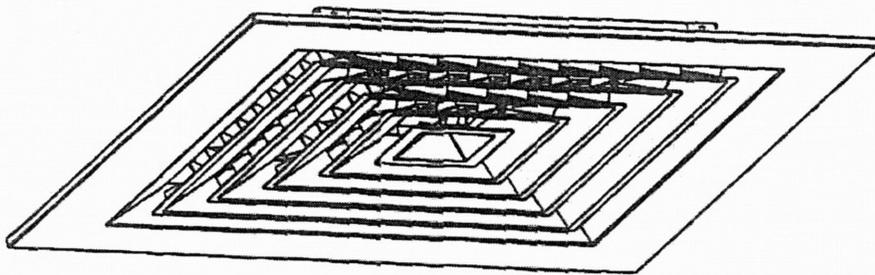
Standard Finish: #26 White

General Description

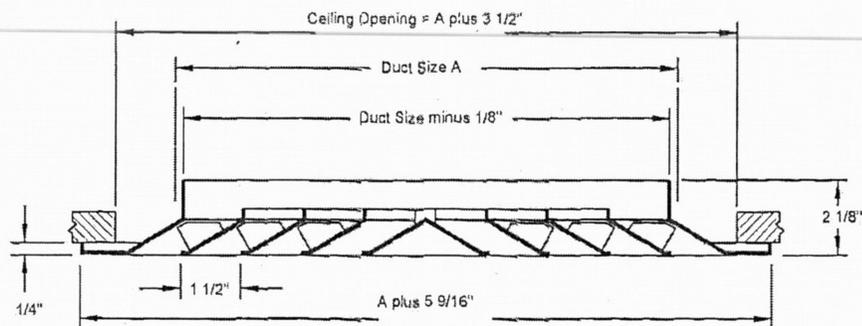
- Model PXP perforated panels are designed for return or exhaust applications.
- Panels match Model PAS supply diffusers in appearance after installation.
- Installed by laying between T-bars.
- Perforated face has $\frac{3}{16}$ " diameter holes on $\frac{1}{4}$ " staggered centers.
- Material is heavy gauge steel.

Square and Rectangular Ceiling Diffusers Steel • Louvered Face • Induction Vanes

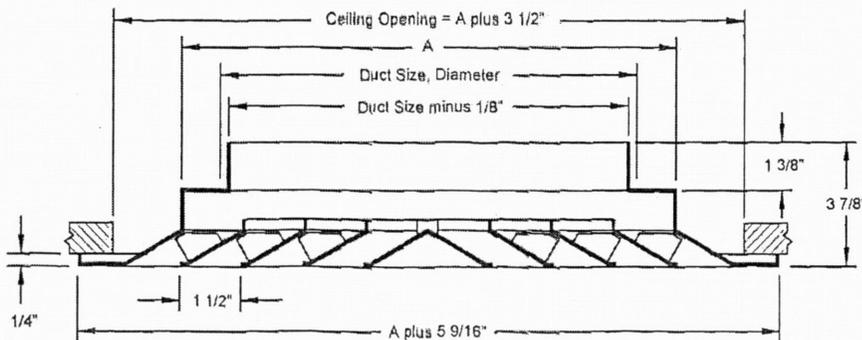
Model: TDV • Square, Rectangle or Round Neck



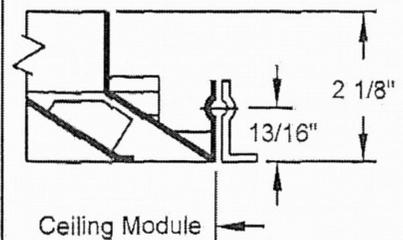
Border Type 1 (Surface Mount) Square or Rectangular Neck



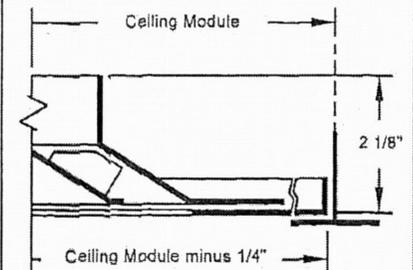
Border Type 1 (Surface Mount) Round Neck



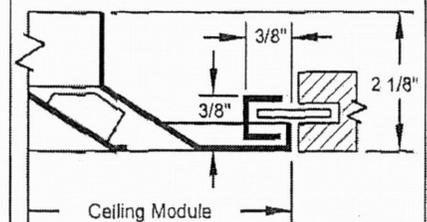
Border Type 2 (Snap-In)



Border Type 3 (Lay-In)



Border Type 4 (Spline)



For Dimensions "A" see table on next page.

Dimensions are in inches.

(Please see reverse side).

D-44.0-S