TENANT DESIGN & CONSTRUCTION MANUAL

609 MAIN AT TEXAS | Hines

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I. INTRODUCTION

This manual shall serve as a guide to Tenants and their design consultants who will be involved in the design and construction of leasehold improvements at 609 Main at Texas, located in Houston, Texas.

The information presented in this manual is not intended to alter the Tenant's Lease Agreement in any way, and in the case of a conflict between this manual and the lease, the lease shall supersede.

The Landlord urges all individuals involved in this process to become familiar with the contents of this manual and review relevant Exhibits to the Lease Agreement. The significance of well defined working relationships between the Tenant, the Landlord, the Tenant's Architect/engineer, and the Landlord's architect/engineer cannot be overemphasized. The Tenant and Tenant's consultants are required to make every effort to meet the schedules provided herein. It cannot be assumed that time lost in one activity can be made up in another part of the process, as all activity phases are individually planned for maximum efficiency.

The Landlord also encourages Tenants to become familiar with the issues presented in Section IV, Item 3, Phase IX, "Items for Tenant's Consideration." The Tenant is advised to plan thoroughly during the design phase in order to minimize the need for changes during construction. Late changes will likely cause delays in the completion of the Leasehold Improvements as well as increase the cost of construction. This section also deals with the significance of the Tenant's role in managing the work for which it contracts directly which may include construction, telephone/data communication equipment, furniture and filing systems, and security. The Tenant's design team is encouraged to field-verify existing conditions whenever possible.

The concepts presented in Section V, Item 4, "Tenant Improvement Cost Considerations," highlight areas of potential cost savings related to the architectural, mechanical, electrical, and plumbing portions of the Leasehold Improvements. The Landlord recommends that Tenants read this section carefully and be aware of these considerations and their impact on the design and construction of the Leasehold Improvements.

Landlord has provided a guide to construction of sustainable interior space, should Tenant have this desire. Tenant, at Tenant's discretion, may construct Tenant's space in accordance with the LEED-Commercial Interior (CI) standards; please reference the guide in Appendix G for additional information.

II. PROJECT DIRECTORY

The directory for 609 Main at Texas base building consultants is listed below. The Tenant should provide the Landlord with a similar directory that lists the names, phone numbers, addresses and e-mail addresses of the Tenant's representatives, the Tenant's designer and other consultants.

To ensure consistency, the Tenant will assign one person to be the point of contact for all correspondence, submittals, cost changes, planning and approvals. A Tenant Construction Representative is named in Exhibit E-1, Article I of the Lease Agreement. This Tenant Construction Representative should attend all meetings related to the Leasehold Improvements and should have the authority to act on behalf of the Tenant. Landlords' Tenant Construction Manager shall be the main point of contact for the Tenant. Tenant shall not contact any of the Core & Shell design and or construction firms below, without prior Landlord approval.

Landlord	**HCG Block 69 LLC** Attn. John Mooz 811 Main Street Suite 4100 Houston, Texas 77002 713-237-5668
Landlord's Representative for Tenant Construction Matters	Philip Croker 811 Main Street Suite 4100 Houston, Texas 77002 Philip.Croker@hines.com 713-237-5674
Production Architect	Kendall/Heaton Associates, Inc. 3050 Post Oak Blvd., Suite1000 Houston, Texas 77056 713-877-1192 Contacts: Pat Ankney Ben Fleener Matthew Upchurch

Structural Engineer	Cardno Haynes Whaley 3700 W. Sam Houston Pkwy South Suite 100 Houston, Texas 77042 713-868-1591
Mechanical, Electrical & Plumbing Engineer (Recommended Engineer)	ME Engineers 10055 West 43rd Avenue Wheat Ridge, Colorado 70033 Contacts: Lyle Hayes (Mechanical) Art Smith (Electrical)
General Contractor, Base Building	D. E. Harvey Builders 3630 Westchase Houston, TX 77042 713-783-8710 Contacts: Kelly Hall Scott Clarke

Electrical Contractor	FSG Electric 5115 Steadmont Houston, TX 77040 713.690.6301 Contact: Gary Roy gary.roy@fsgi.com
Fire Protection **(Base Building Subcontractor)** **(Recommended – Not Required)**	Casteel Automatic Fire Protection 2836 Delafield Houston, TX 77023 713.907.9485 Contact: Ron Adkins ron@casteelsprinklers.com
Security Contractor **(Base Building Subcontractor)** **(Recommended – Not Required)**	MCS Fire & Security 10624 Rockley Road Houston, TX 77099 832.327.7070 Contact: Mark Collier mcollier@mcsfiresecurity.com
Fire Alarm Contractor **(Required Subcontractor)**	Firetron Inc. 10101A Stafford Centre Dr. Stafford, TX 77477 281.499.1500 Contact: Tom Ballou tballou@firetron.com
Controls Contractor **(Required Subcontractor)**	Climatec 7240 Brittmoore, Suite #119 Houston, TX 77041 713.983.6500 Contact: David Clarke David.clarke@Climatec.com
Raised Access Flooring Contractor **(Approved Subcontractors)**	Hudson Building Systems, Inc. 10412 Rockley Road Houston, TX 77099 281.933.9354 Contact: Wes Hudson Allied Interiors 15925 Morales Rd., Suite 100 Houston, TX 77032 281.227.0523 Contact: Mickey Gibson mgibson@alliedinteriors.com

	ARCCON Access Flooring 701 Holmes Road Houston, TX 77045 713.665.4321 Contact: Michael Volle mlvolle@arccon.com
	Evans Interiors 13211 Stafford Rd., Suite 400 Missouri City, TX 77489 281.403.3300 Contact Jeri-Lynn Turner
	Prestige Interiors 730 Industrial Blvd. Sugar Land, TX 77478 281.313.9292 Contact: Scott Chambers schambers@raisedaccessfloors.com
Test and Balance Contractor (Required Subcontractor)	Mesah Commissioning 5920 Allday Dr. Houston, TX 77036 713.785.9021 Contact: Racheal Pucharich Racheal.mesah@yahoo.com
Telecom Riser Contractor (Required Subcontractor)	Summit Riser Systems, Inc. 15245 Alton Parkway, Ste.200 Irvine, CA 92618 866.778.6648 Ext. 103 Contact: T. Michael Basciano mbasciano@summitrisersystems.com

III. CONSTRUCTION REQUIREMENTS

Before commencement of **ANY** Tenant Improvement work at 609 Main at Texas, Hines must have the following checklist of items completed by the Tenant, Tenant's Architect and Tenant's Contractor. Tenant should review the Lease for definitions of Tenant's Work and Landlord's Work before reading this manual. For purposes of this Manual, Owner shall also be referred to as Hines, Landlord and/or the Building Management Office. Owner may require additional information during the design and construction process.

1. PRE-CONSTRUCTION REQUIREMENTS

Signature Sheets

a. Tenant, Tenant's Architect, Tenant's MEP Engineer and Tenant's contractor must acknowledge their understanding and acceptance of the Tenant Design & Construction Manual at 609 Main at Texas by signing the attached Tenant Design Manual Signature Page labeled "Exhibit A" and returning an executed copy to Hines. This form must also be signed before commencement of Landlord's Work.
b. The Tenant's contractor must sign the Indemnity Agreement labeled "Exhibit B" of this section before construction of Tenant's Work and Landlord's work begins.

Insurance

Acceptable and complete certificates of insurance must be received for:

a. Tenant
b. Tenant must forward to Landlord its Architect's proof of insurance for both general and professional liability. Required insurance amounts are $1,000,000 general liability, $1,000,000 professional liability (Errors and Omissions).
c. Tenant's General Contractor and/or subcontractors.
d. Any other company / entity that is hired by Tenant and entering the 609 Main at Texas premises.

Please see the attached "Exhibit C" of this section for insurance requirements. Insurance Certificates must be submitted to the Landlord prior to start of Construction.

Construction Drawings

a. A complete set of construction drawings approved by Owner and Permitted by the City of Houston is required before construction on Tenant's leasehold improvements can begin. This

includes architectural, structural, mechanical, electrical, plumbing and any other drawing required by the City of Houston.

2. TENANT'S CONTRACTOR/ARCHITECT REQUIREMENTS

Requirements

a. A complete list of all proposed Contractors, Subcontractors, and Suppliers. Owner must approve all contractors, subcontractors, and suppliers prior to commencement of on-site work.
b. An executed agreement between Tenant and Tenant's contractor.
c. The Tenant's Architect must be licensed in the State of Texas or have an associate architect that is licensed to seal drawings for each project. A licensed Architect must seal all Contract Documents, including drawings and specifications issued for construction.
d. The name and phone number, including emergency phone numbers, of persons authorized to represent the Tenant, Tenant's Contractor, Subcontractors, and/or Suppliers in regards to the Tenant Improvement Work.
e. Material Safety Data Sheets (MSDS) for <u>any</u> and <u>all</u> chemicals / products used on-site, as part of or relating to, the Tenant Improvement Work.
f. Safety Program / Hazard Communication Program as required by authorities having jurisdiction.
g. Insurance Certificate per Exhibit C of this section for each of Tenant's Contractors and/or Subcontractors.

EXHIBIT A – TENANT DESIGN MANUAL SIGNATURE PAGE

Tenant, Tenant's Architect and Tenant's Contractor hereby acknowledge receipt of the Tenant Design and Construction Manual at 609 Main at Texas and agree to the provisions contained therein. The Tenant Design and Construction Manual may be updated periodically by the owner. Any revisions to the manual will be forwarded to Tenant.

TENANT:

Company Name: _____

Acknowledged and Agreed by: _____
(Print or type Name)

_____
(Signature)

_____
(Title)

Date: _____

TENANT'S CONTRACTOR:

Company Name: _____

Acknowledged and Agreed by: _____
(Print or type Name)

_____
(Signature)

_____
(Title)

Date: _____

TENANT'S ARCHITECT:

Company Name: _____

Acknowledged and Agreed by: _____
(Print or type Name)

_____
(Signature)

_____
(Title)

Date: _____

TENANT'S MEP ENGINEER:

Company Name: _____

Acknowledged and Agreed by: _____
(Print or type Name)

_____
(Signature)

_____
(Title)

Date: _____

EXHIBIT B – INDEMNITY AGREEMENT

1. To the fullest extent permitted by law, Tenant Contractor will indemnify and hold the Owner (HCG Block 69 LLC, a Delaware limited liability company) and its officers. agents, employees and contractors (including Owner's building contractor) (the "**Indemnified Parties**") harmless from and against liability claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of, resulting from, or in any way related to the performance of work pursuant to Tenant Contractor's contract with Tenant or the presence of Tenant Contractor, its subcontractors and agents, or persons directly or indirectly employed by any of them on or about the project site, provided that such liability, claim, damage, loss or expense is attributable to bodily injury sickness, disease or death of any person (including Tenant Contractor's employees), or injury to or destruction of tangible property, including the loss of use resulting therefrom. Tenant Contractor's aforesaid indemnity and hold harmless agreement shall apply to any acts or omission, willful misconduct, or negligent conduct, whether active or passive, including Tenant's Contractor's agents, subcontractors, or employees, except that said agreement shall not be applicable to injury, death, or damage to property arising from the sole negligence or willful misconduct of the Indemnified Parties. Tenant Contractor's aforesaid indemnity and hold harmless agreement shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph 1.

2. In any and all claims against any Indemnified Party by any employee of Tenant Contractor, any of its subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation set forth in Paragraph 1 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Tenant Contractor or any of its subcontractors under workers' or workman's compensation acts, disability benefits acts, or other employees benefit acts.

3. Tenant Contractor will name the Owner as an additional insured on Tenant Contractor's bodily injury and property damage liability insurance policy or policies and will also require that each of its subcontractors also name the Owner as an additional insured on their bodily injury and property damage liability insurance policies. All such liability insurance policies shall include the further provision that such insurance as is afforded by those policies shall be primary insurance as respects the interest of the Owner and that any other insurance in force for the Owner shall not be required to contribute with such insurance.

Accepted: _____

Name: _____

Title: _____

Signature: _____

EXHIBIT C – CERTIFICATE OF INSURANCE REQUIREMENTS

Prior to inception of all operations, all General Contractors and Subcontractors performing work in 609 Main at Texas must supply a vendor's certificate of insurance with the following criteria as a minimum:

COVERAGE	**LIMIT OF LIABILITY**
Commercial General Liability	$1,000,000 per occurrence combined, Single limit bodily injury and property damage and $2,000,000 general aggregate.
Commercial Auto Liability	$1,000,000 per occurrence combined, Single limit bodily injury and property damage.
Worker's Compensation	Minimum required by law
Employer's Liability	$500,000 per accident

NAMED AS ADDITIONAL INSURED:

HCG Block 69 LLC and Hines Interests Limited Partnership

Wording to be used on certificate: "HCG Block 69 LLC and Hines Interests Limited Partnership are additional insureds as their interests may appear with respect to general liability".

CERTIFICATE HOLDER:

Hines Interests Limited Partnership/
HCG Block 69 LLC
811 Main Street, Suite 4100
Houston, Texas 77002
(713) 237-5600
FAX (713) 237-5657

Should you have any questions regarding these requirements, please contact the Hines Property Management Office at (832) 390.3457.

Please note that this policy may not be canceled or changed so as to affect insurance described by the Certificate until thirty (30) days after written notice of such cancellation or change has been delivered to the Hines Management Office.

IV. TENANT PLANNING PROCESS

1. PROJECT ORGANIZATION

The coordination of the Leasehold Improvements design and construction is critical to the success of the project. Often, the Landlord will be acting as Tenant's Construction Manager (TCM) throughout the process. If the Tenant has elected not to use the Landlord as TCM, then Tenant and Tenant's consultants must properly divide these responsibilities among the appropriate parties and assign a Tenant representative. In the event the Tenant chooses to manage their own construction process, the Tenant's contractor and representative will be required to coordinate their activities with the Landlord, Landlord consultants, and Landlord base building contractor. The Tenant and Tenant's consultants should clearly understand the stages of Tenant development as described herein and the areas of responsibility.

Tenant Construction Manager (TCM)

The Tenant may engage the services of the Landlord to act as TCM at an additional fee. Their experience with the building and its Tenants will serve as a resource for pricing information, contractor and subcontractor negotiations and references, and previous design solutions to typical building conditions. The Landlord's familiarity with the base building systems and specifications will allow a thorough integration of the Leased Premises with the existing base building. As construction manager for the base building, the Landlord can additionally provide an earlier start to Tenant finishes by working within the general contractor's base building schedule, as well as by providing additional means of site access.

Regardless of whether the Tenant selects Landlord to be the TCM, or chooses a third party, the TCM will manage the Tenant's build-out for the Tenant, reviewing not only the construction progress and budget, but the design team as well. The Tenant is expected to contract directly for architectural and engineering design services. It is the responsibility of the TCM to assist the Tenant in requesting and reviewing design services proposals. If Tenant does not select Landlord to act as TCM, Landlord may still be involved in reviewing the Tenant's design and construction process and may be involved in Tenant's request and review of design services proposals. Please reference Appendix D for a complete list of pre-approved contractors. At present, these are the only approved design firms and contractors permitted to work in the building. If Landlord is selected to be the TCM, the Landlord will contract directly with the Tenant construction contractor.

2. A TYPICAL SCHEDULE FOR LEASEHOLD IMPROVEMENTS

Scheduling Guidelines

The following exhibit is an example of a typical schedule of progress depicting the phases of design and construction outlined in this manual. This schedule has been included for information only and will vary depending on the size of the Leased Premises, the level of detail and finishes, and the contracting method selected.

By presenting this schedule, it is the Landlord's intent to suggest, for early planning purposes only, possible durations and a sequence of work for each of the phases. We encourage the Tenant, TCM, and Tenant's Architect to review and agree upon a schedule with target dates for a timely completion of the project.

Additionally, a guideline is included to aid the Tenant in identifying critical dates and durations used in the development of its own project schedule. The Tenant should use this guide in conjunction with the Tenant's lease to identify and develop these critical milestone dates.

The Tenant is encouraged to thoroughly pre-plan and organize the Tenant design and construction process. To this end, the Tenant should recognize six common sources of Tenant Delay to leasehold improvements:

1. Failure to develop and maintain a realistic schedule.
2. Improper coordination of the Tenant's consultants regarding budget, design and schedule.
3. Failure to include sufficient time for the inclusion of long lead-time items (see Long Lead Items, Section IV, Phase IX).
4. Major changes to the plans and specifications during the construction period.
5. Failure to provide for adequate time frames for Landlord review of Conceptual Plans and Contract Documents.
6. Improper or incomplete submittal to the Building Department for the permits.

The Landlord's construction representative and/or TCM can assist the Tenant in helping to minimize the risk from these six items with good communication and periodic review during the design period.

TENANT DESIGN AND CONSTRUCTION SCHEDULE GUIDE

ACTIVITY	SCHEDULED DATE	ACTUAL DATE
Lease Signed		
Orientation Meeting		
Space Plan Submittal for Landlord Review & Approval		
Engineering Information: Package Submittal for Landlord Review & Approval		
Tenant Working Drawings Submittal for Landlord Review		
Tenant Space Plan Budget		
Landlord Approval of Tenant Working Drawings		
Revisions to Plans as Required		
Landlord Approval of Tenant Working Drawings		
Tenant Contract for Telephone/Data Systems		
Permit Submission		
Construction Pricing for Tenant Review		
Tenant Approval of Construction Pricing		
Floor Ready Date		
Notice to Proceed		
Construction Commencement		
Substantial Completion		
Punch List		
Furniture Installation/Move-in		
Term Commencement Date		

3. PRINCIPAL STAGES OF TENANT DESIGN & CONSTRUCTION

Summary Outline of the Tenant Improvement Process

The following "Principal Stages of Tenant Design and Construction" is provided for information and should be used by the Tenant as a step-by-step guideline. This guideline is intended to identify major activities and responsibilities which are significant to the development of the Tenant space and leasehold improvements.

Phase	Description	Responsibility
Phase I	Pre-Planning Coordination	Tenant/TCM
Phase II	Tenant Space Plan Preparation	Tenant/Architect
Phase III	Tenant Space Plan Review	Tenant/Landlord/TCM
Phase IV	Tenant Conceptual Budget Review	Tenant/Landlord/TCM
Phase V	Tenant Contract Documents Preparation	Tenant/Architect/TCM
Phase VI	Bid Process	Tenant/TCM
Phase VII	Construction of Leasehold Improvements	TCM
Phase VIII	Move-In and Tenant Occupancy	Tenant/Landlord
Phase IX	Items for Tenant Consideration	Tenant/TCM

The above stages are set forth as guidelines and should be followed throughout the project. The balance of this manual shall review each step in detail. Appropriate parties should be notified when additional information or coordination is required.

PHASE I - PRE-PLANNING COORDINATION

Documents Provided by the Landlord

The following information will be furnished to the Tenant (or Tenant's Architect) by the Landlord for use in the development of the Space Plans:

a. One CADD diskette containing the proposed Leased Premises floor plans.

b. One electronic print each of various base building architectural, structural, mechanical, electrical, and plumbing drawings as required to define and describe the basic relevant characteristics of the building. A complete set of building drawings and specifications will be made available for review by the Landlord.

c. One copy of the Tenant Design and Construction Manual, including the Landlord's Project Work Rules for 609 Main at Texas (Appendix E).

d. It is important to note that due to construction conditions encountered by the Landlord's base building contractor that certain details may have changed. With this in mind, it is imperative for the Tenant's Architect to have its contractor survey the Leased Premises.

Information Requested by the Tenant

The Tenant may request additional base building information in writing from the Landlord as may be deemed necessary for the preparation of the Tenant Space Plans or Contract Documents.

Initial Meeting Organized by the Tenant

The Landlord encourages regular meetings with the Tenant, TCM, and Tenant's Architect to review matters relating to the development of the Leased Premises such as:

a. Review of information contained in this manual and/or building plans and specifications affecting the Tenant's space.
b. Development of a project schedule, identification of pertinent project dates, and review of base building schedule and access.
c. Development and review of project budgets.

Landlord suggests at a minimum one meeting every month during the design phase and one meeting every week during the construction phase.

PHASE II – TENANT SPACE PLAN PREPARATION

Space Plan Prepared by Tenant

The Tenant's Architect will develop a Space Plan describing all the proposed leasehold improvements, including layout of all partitions, doors and room identification. This Space Plan should include, but not be limited to, the information outlined in the Lease and the following list:

a. Location and type of all partitions
b. Location and type of all doors
c. Location and type of glass partitions, windows and doors and framing
d. Location of telephone equipment room
e. Location of all outlets, switches, telephone outlets and lights
f. Location and type of all non-building standard electrical items including lighting and security system
g. Location and type of equipment that will require special electrical requirements
h. Location, weight per square foot and description of any exceptionally heavy equipment or filing system exceeding 50 psf live load (Reference Typical Floor Loading Diagrams in Appendix H)
i. Requirements for special air conditioning or ventilation
j. A general description specifying the level of all floor finishes, wall finishes, etc.
k. Location and type of plumbing, including special sprinkling requirements
l. Location and type of kitchen equipment
m. General description of millwork
n. Details of corridor entrances
o. Special data or communications systems
p. Long lead items that may be pre-purchased
q. Location and size of any major floor penetrations.

Pertinent information and design criteria for the interface between the Tenant Space Plan and the base building are included under Section V, “Tenant’s Design Team.”

PHASE III – TENANT SPACE PLAN REVIEW

Space Plan Review by Landlord

Upon receipt of the Tenant Space Plan, the Landlord will review the Tenant Space Plan for any potential conflicts between proposed leasehold improvements and the base building systems. Additionally, the Landlord will identify deficient information and seek clarifications from the Tenant.

Space Plan Review by TCM

The TCM will develop a budget breakdown for the Space Plan, and the Tenant should formally approve the preliminary budget. Based on this preliminary budget, the TCM will identify areas for value engineering consideration.

The TCM will assist the Tenant in identifying long lead items at this time. Long lead items have important lease commencement implications and must be addressed by the Tenant and architect at this time.

Additionally, the TCM will review the project schedule based on the scope of the Space Plan. The TCM shall identify potential scheduling conflicts with base building access.

Following this review, the TCM will either return the Tenant Space Plan approved or request in writing that additional information and/or revisions be incorporated.

Upon completion of the Space Plan and prior to commencement of architectural and engineering contract documents, the Tenant must formally submit Space Plan and any specifications to the Landlord for approval.

PHASE IV – TENANT CONCEPTUAL BUDGET REVIEW

Leased Premises Budget Review by Tenant

The Landlord recommends that the Tenant identify "Tenant’s Budget" prior to the completion of the conceptual Space Plan. At the Tenant’s request, the TCM will assist the Tenant in evaluating the cost-effectiveness of proposed methods for design and construction of the Leasehold Improvements. TCM will request a schematic set of design documents from the Tenant architect to identify the initial anticipated costs for the Leasehold Improvements.

PHASE V – TENANT CONTRACT DOCUMENTS PREPARATION

Based on the approved Tenant Space Plan, the Tenant's design team will complete the Tenant plans and specifications, which consist of a complete and coordinated package of architectural and engineering drawings, specifications, and all other information necessary to price and construct the Leasehold Improvements and to obtain necessary building permits. It is the responsibility of Tenant's Architect to ensure that the Tenant plans are in compliance with all governing building and life safety codes. **In addition, the Tenant specifications must comply with base building specifications.**

Tenant Working Drawings Submitted by Tenant

According to the terms of the particular Lease agreement, the Tenant may have defined dates for submission of complete working drawings, plans, and specifications to the Landlord for review and approval.

Tenant Working Drawings submitted to the Landlord will be considered approved by the Tenant. The Tenant must advise the Landlord of major scope changes to the Tenant Working Drawings represented in the approved Tenant Space Plan and working drawings.

The Tenant Working Drawings should clearly indicate any items of work that the Tenant wishes to perform directly with an outside contractor. Any such items of work shall be indicated as "NIC" (Not in Contract) or "By Tenant." The Tenant should give careful consideration to the effects that using an outside contractor may have on scheduling, coordination, and responsibility. The Tenant shall submit for the Landlord's approval, any contractor not already listed on the Pre-qualified list for 609 Main at Texas (See Appendix D).

Selection of Design Engineers

The Landlord recommends that the Tenant contract with the Landlord's MEP engineer to prepare the mechanical, electrical, and plumbing engineering portions of the Tenant plans. These consultants are most knowledgeable with the extensive systems within the base building and can work most efficiently to develop Tenant schemes. Because of its importance, Tenant must submit for Landlord's approval the proposed MEP Engineer. In any event, Landlord's MEP engineer must review Tenant's design at Tenant's expense, according to the terms of the Lease. Tenant's MEP engineer must comply with the base building specifications summarized in Appendix A-2.

Any structural engineering consulting or drawings required must be prepared for Tenant by a professional engineer registered in the State of Texas and reviewed by the Landlord's structural engineer, at Tenant's expense, according to the terms of the lease.

Landlord Review of Tenant Working Drawings

The Tenant Working Drawings will be reviewed by the Landlord and the Landlord's engineers at the Tenant's expense for compliance with the requirements of the Lease agreement, the approved Tenant Space Plans, base building improvements, and base building specifications and standards. Additionally, the TCM and Landlord shall review the Leased Premises budget estimate and schedule to confirm that the revised scope of work shown on the working drawings is still within the original parameters.

Following this review, the Landlord shall either return the Tenant plans approved, or shall request in writing that additional information and/or revisions be incorporated. Tenant shall incorporate revisions and obtain approval from Landlord by the dates set forth in the Lease.

PHASE VI – BID PROCESS

General Contractor Selection by TCM

Refer to Appendix D for a list of pre-approved Tenant improvement general contractors. All general contractors working in the building must be approved in writing by the Landlord, prior to soliciting bids. The Landlord requires the Tenant to identify major subcontractors as well as general contractors with whom the Tenant and Tenant's Architect would prefer working. In addition to insurance requirements indicated in Appendix E (Project Work Rules), all general contractors shall be bonded in the amount of the total contract value for the Tenant work, as deemed appropriate by Landlord. **General Contractor shall have Landlord-approved payment and performance bonds recorded at the Harris County Records Room, complete with construction contract attached which shall include legal description of the project.**

All outside vendors contracted directly by the Tenant (i.e. furniture, telecommunications, etc.) for additional work must also be identified at this time for the Landlord, including a description of the scope of work to be performed.

Upon approval of the Tenant's plans by the Landlord, the TCM will distribute copies of the bid documents to each bidding general contractor. All costs incurred for printing shall be borne by the Tenant. Distribution should include a complete drawing set of contract documents and Building Rules and Regulations. During the bid process, the Landlord will make available for review by the contractors, a complete set of base building drawings and specifications. Additionally, the TCM must schedule all contractor site walk-throughs. The TCM should schedule a pre-bid meeting to orient contractors to the base building, site access, and the job rules and regulations prior to submitting their proposals.

The Tenant and TCM shall set the bidding period as required, depending on the scope of work involved and the target completion date.

In the event Tenant manages its own construction, Tenant will furnish one copy of the proposed and executed contract for Landlord review and approval, as well as all required insurance certificates and bonds.

Upon receipt of bids, the Tenant shall assist the TCM in selecting a general contractor for construction.

Subcontractor Selection by TCM

Due to the importance of consistency among Landlord's base building contractor and Tenant contractor for certain vital systems, Landlord requires that these base building contractors be used for Tenant work in the following trades:

a. Fire Alarm –

Firetron, Inc.
10101A Stafford Centre Dr.
Stafford, TX 77477
Tom Ballou
281.499.1500

b. Controls –

Climatec
7240 Brittmoore Suite 119
Houston, TX 77041
David Clark
713.983.6500

c. Raised Access Flooring –

Hudson Building Systems, Inc. (Haworth Certified)
10412 Rockley Road
Houston, TX 77099
Wes Hudson
281.933.9354

Allied Interiors (Haworth Certified)
15925 Morales Rd., Suite 100
Houston, TX 77032
Mickey Gibson
281.227.0523
mgibson@alliedinteriors.com

ARCCON Access Flooring
701 Holmes Road
Houston, TX 77045
713.665.4321
Michael Volle
mlvolle@arccon.com

Evans Interiors
13211 Stafford Rd., Suite 400
Missouri City, TX 77489
Jeri-Lynn Turner
281.403.3300

Prestige Interiors
730 Industrial Blvd.
Sugar Land, TX 77478
281.313.9292
Scott Chambers
schambers@raisedaccessfloors.com

f. Telecom Riser Subcontractor	Summit Riser Systems, Inc. 15245 Alton Parkway, Ste.200 Irvine, CA 92618 866.778.6648 Ext. 103 T. Michael Basciano mbasciano@summitrisersystems.com
g. Test and Balance	Mesah Commissioning 5920 Allday Dr. Houston, TX 77036 713.785.9021 Racheal Pucharich Racheal.mesah@yahoo.com

Additional company information regarding subcontractors appears in Appendix D.

PHASE VII – CONSTRUCTION OF LEASEHOLD IMPROVEMENTS

Execution of Construction Contract by Tenant

The TCM shall prepare a contract for construction services. **The tenant construction agreement is a typical construction contract between the contractor and the Tenant which defines the scope of the work, the cost of the work, the time of completion, and the responsibilities of the Tenant and contractor. The tenant construction agreement also addresses certain aspects of the construction process such as schedules, changes, overtime and progress payments**. It is the responsibility of the TCM to work with the Tenant in the development of the construction contract. The TCM will track utility usage during construction to bill Tenant.

Upon Landlord approval, the Tenant should execute and return to the TCM the tenant construction agreement. With Landlord approval of the contractor bonds, insurance, contract and tenant construction documents, Tenant may give contractor authorization to proceed with construction.

In the case that the Landlord serves as TCM, Landlord will facilitate its typical construction contract ("Agreement between Owner and Contractor") with the selected contractor.

Construction Administration by the TCM

Upon receipt of the signed, Landlord-approved tenant construction agreement and Landlord approval of tenant drawings, the TCM will issue a "Notice to Proceed" to the general contractor on behalf of the Tenant. The contractor shall then proceed with the work. Upon completion of the working drawings, the Tenant's Architect or contractor should immediately apply for the building permit. The contractor must submit a copy of the building permit to the Landlord prior to beginning any portion of the work.

A detailed construction schedule will be developed by the Tenant's contractor and reviewed by the Tenant, TCM and Tenant's Architect. Periodic construction meetings will be held as agreed upon by the Tenant, architect, TCM and contractor(s). The purpose of these meetings will be to review the progress of construction with the contractor(s); to verify that the work is proceeding within budget, on schedule, and as required by the Tenant Working Drawings. The Tenant's Architect and engineer shall attend these meetings as required.

The TCM may from time to time require additional information or clarifications with respect to the Tenant Working Drawings. The TCM should establish procedures with the architect and engineer for responding to these items as well as reviewing and approving shop drawings and submittals. It is critical that these items be responded to promptly so that construction may proceed as smoothly as possible. Tenant will be notified if its architect, engineer, consultants or vendors are causing delay to the schedule and potential delay to occupancy.

PHASE VIII – MOVE-IN AND TENANT OCCUPANCY

Notice of Substantial Completion by TCM

The Tenant will be notified by the TCM and the Tenant's Architect when the leasehold improvements are substantially completed and ready for review. At this time, individuals designated by the Tenant and TCM will mutually review the leasehold area and prepare a list ("punchlist") of outstanding and deficient work to be issued to the contractor. The Tenant should forward the punchlist to the Landlord in its final written form.

If Tenant is managing its own Leasehold Improvements, it will notify the Landlord when the leasehold improvements are substantially complete for Landlord's review and approval. The Tenant will also furnish a copy of the City of Houston Certificate of Occupancy.

Upon issuance of the punchlist, the TCM and the Tenant's Architect should prepare a "Certificate of Substantial Completion" to be attached to the punchlist. The Certificate of Substantial Completion signifies that as of the punchlist date, the Leased Premises is ready to be occupied by the Tenant.

Moving and Delivery Procedures for the Tenant

The Tenant should give careful consideration to planning his move into the building. Such planning must include coordination with the Landlord to insure the relocation proceeds before the lease commencement date. Access to and up the building during construction is often complex, and requires significant management coordination.

Information from the Tenant

The Tenant should submit to the Landlord a written request, at least six weeks prior to move-in, for building access cards, door keys, corridor graphics and directory board signage.

Information from Landlord

For your use, a Tenant Move-In Manual will be made available by property management. The Tenant should consult this manual prior to move-in for express directions regarding, but not limited to, the following:

- Moving Procedures

- Tenant Directories and Graphics
- Building Access
- Maintenance Services
- Keying
- Utilities

PHASE IX – ITEMS FOR TENANT CONSIDERATION

The following is a list of items pertaining to the design and construction of the Leasehold Improvements:

Lease Terms

The Tenant is encouraged to review thoroughly the terms and conditions for Tenant construction as set forth in the lease. These may include critical dates, building shell definitions, responsibilities of each party, etc. The Lease Agreement takes precedence over this Tenant Design & Construction Manual.

Long Lead Items

In the development of the design for Leasehold Improvements, Tenant and Tenant's consultants should be conscious of any long lead time items that could adversely affect the schedule for construction of the Leasehold Improvements. Long lead items typically include millwork, marble, granite, certain mechanical and electrical equipment, hardware, glass doors, wood doors, certain wall coverings and certain flooring materials and carpeting.

Change Orders

Any changes made to the Tenant's plans after approval of the Tenant Construction Agreement must be coordinated through the TCM. All such changes must be authorized in writing by the Tenant and reviewed and approved by the TCM before the contractor will be instructed to proceed with the change. The TCM will record proposed and accepted changes and the revised contract amount.

In the event Tenant manages its own construction, Tenant will notify Landlord or Landlord representative of all changes to the approved drawings.

Please note that numerous and/or substantial changes will likely cause delays in the timely completion of Leasehold Improvements and should be carefully considered and reviewed with the TCM to minimize delays.

Tenant Direct Contracts

Please be aware that items such as communication equipment, direct furniture systems, and intra-suite security devices, are typically supplied and installed by Tenant independent of the Leasehold Improvements supplied and installed by the contractor. The Tenant should provide to TCM scheduling information necessary to guide these outside contractors. However, neither the TCM nor the contractor can be responsible for coordinating the installation of these "Not in Contract" items of work. Efforts will be made to assist the Tenant and Tenant's contractors/consultants in coordinating such work with the base building contractor and contractor's work given sufficient advance notice

and information from the Tenant. Tenant's contractor/consultants/direct vendors will be responsible for complying with the rules and regulations of the site for Tenant work.

Telephone/Data Communication System

Given the numerous sophisticated telecommunications alternatives from which the Tenant may choose the telephone selection decision can be extremely difficult and time-consuming. The selection of telephone and data communication equipment will impact the design of the leasehold improvements in terms of allocation of space for that equipment and corresponding mechanical, electrical, structural and fire-protection considerations. Tenants should begin this analysis and selection process immediately so those special requirements can be incorporated into Tenant Space Plan and Tenant Working Drawings. All of the Tenant's equipment must be located within the lease premises. The Tenant shall be responsible for the delivery and installation of telephone and data communications systems. The timely procurement and coordinated installation of these systems is critical. The Landlord does require that all vertical telecommunication risers located in the base building "Telephone" rooms be installed by the Landlords approved Telecom Riser Subcontractor. The TCM will assist the Tenant in coordination with the base building infrastructure.

Floor Levelness

At times the specifications for the installation of millwork, furniture, file systems and the like, exceed the base building's floor levelness specifications as noted below. In these cases, it is recommended that a floor filling allowance be carried in the Tenant's budget for such conditions.

Specifications for slabs and other horizontal surfaces are indicated in the Base Building Specifications.

Site Visits

During construction, visits to the site or the leased premises by the Tenant personnel (other than the Tenant's representative) should be limited and coordinated through the TCM. Proper safety regulations must be adhered to.

Prior to substantial completion of the base building, all access to the building will be controlled and granted by Landlord's base building contractor.

Keying Schedule

The schedule of all keying requirements should be prepared by Tenant's designer and indicated on Tenant's plans and coordinated with the TCM and property manager for implementation. Hines will prepare all keys at Tenant's expense.

Elevator Lobby

Full floor Tenants are responsible for the design and construction of the elevator lobbies on their floors. The Tenant's Architect will review and coordinate with the TCM and base building mechanical engineer to maintain the base building design for life safety, fire alarm, stair pressurization and smoke containment.

If the Tenant's premises are located on a multi-tenant corridor, Tenant shall comply with the standard tenant entry design or storefront entry. Landlord approval will be required for non-standard tenant entry configurations. Tenant's MEP engineer must review design to insure design does not hinder functionality of under-floor air distribution system.

Permit Process

Unless otherwise specifically requested by the Tenant, the Tenant's general contractor or Tenant's Architect will be responsible for obtaining the required building and occupancy permits for the Leasehold Improvements, provided that contractor receives necessary documents from the Tenant and Tenant's Architect in a timely manner. The cost of all permits required for the installation of work by the contractor shall be included in the contractor's pricing proposal.

Move In

The establishment of move-in date(s) and reservation of the loading dock and freight elevator must be coordinated with the Landlord and base building contractor well in advance of the intended Tenant move-in date(s).

V. TENANT'S DESIGN TEAM

1. BASE BUILDING STANDARDS

The building shell, as is typically defined in the Tenant leases, shall include the following:

1. The structure of the building is watertight (except for hoistways) through the floor above the leased premises.
2. The concrete slabs for the leased premise are complete and broom clean. Raised access flooring (RAF) will be stocked on the floor per the engineer approved stocking plan. Tenant is responsible for layout, sealing concrete and installing RAF as part of tenant interiors. Base building standard cutouts are provided at the corner of RAF panels sized with an 8.4" rough opening for both HVAC and Electrical cutouts.
3. Each typical office floor is served by two custom variable air volume dual path air handlers serving an under-floor air distribution system (UFAD) with a 12" high raised floor plenum (installed by Tenant Contractor) and zoned overhead ducts serving perimeter slot diffusers to account for the building envelope loads. The core and shell system provides overhead perimeter zone ductwork, electric heating coil, and perimeter slot diffusers to serve the building envelope loads.
4. Code-compliant core and shell fire protection system.
5. Electric power distribution is installed to transformers and panels in each electrical closet located on the floor(s) on which the leased premises are located. Each floor has approximately 60 spare circuit breakers in the 120/208v panels and approximately 36 spare circuit breakers in the 277/480v panels. All spares are 20A single pole.
6. Plumbing risers are installed with waste, vent and domestic water stack with Tenant taps provided on the floor(s) on which the leased premises are located for Tenant's use.
7. Building standard window coverings are installed on the floors of the Leased Premises.
8. Building shell shall not include any:
   a. Telephone cables
   b. Supply or installation of lights (except emergency lighting required by code for an unoccupied space)
   c. Supply or installation of ceiling tile
   d. Supply or installation of ceiling grid, power and lighting grids, fire alarm devices (except those fire alarm devices required by code for an unoccupied space)
   e. Exit signs and equipment (except those signs and equipment required by code for an unoccupied space)
   f. Code items required of Tenant for completion of the Leasehold Improvements.
   g. No secondary duct work or diffusers are provided for interior zones. See #3.
   h. Layout, concrete sealer, or installation of Raised Access Flooring (except as required at core and shell conditions)

Both the Tenant and Tenant's Architect should refer to the lease terms for exact shell definitions and variations of the above.

2. PROFESSIONAL SERVICES

General Communications

During the course of construction, all communication to the Tenant's contractor should be directed through the TCM or the Tenant's Architect.

Shop Drawings and Samples

Any required shop drawings and samples to be provided by the Tenant's contractor will be submitted directly to the Tenant's Architect, with copies of the transmittal going to the TCM. All returned shop drawings and samples (approved, approved as noted, or disapproved) will be directed by the Tenant's Architect to the Tenant's contractor with a record copy of the drawings sent to the TCM. All shop drawings should be returned by the Tenant's Architect within 5 working days.

Tenant Record Drawings

Tenant will be asked to require the Tenant's Architect and engineers to keep Tenant Working Drawings up to date with the progress of Tenant construction. During construction many coordination issues can arise, the solutions of which should be documented in the drawings. Once construction is complete and all the working drawings have been revised, the Tenant should have at least two sets of record drawings documents printed one for the Landlord's records and the other for Tenant's record files. The Landlord will organize record drawings for all Tenants occupying the building for use by the Landlord's property management team in maintaining the building. Landlord will require (1) Floor plan on CADD for record only.

Asbestos and PCB Usage

Tenants are required to direct the Tenant's Architects and engineers to include the following language in the working drawings: "Provide written certifications from installer that all products, materials, and processes installed in the leasehold improvements contain no Asbestos or PCB." Tenant's Architect and engineer are required to enforce this requirement during the administration of Tenant construction. The TCM shall be responsible for obtaining asbestos and PCB certifications from the Tenant's contractor and delivering same to Landlord. This requirement has been established to insure the long-term safety of all building occupants.

Field Observation

The Tenant's Architect and Tenant's engineer will be responsible for periodic field observation of the construction. The Tenant should ensure that this responsibility is included in the scope of services contracted for with the architect and engineer. All questions or comments regarding the construction of the Leasehold Improvements should be directed to the TCM. No instruction should be issued by Tenant or Tenant's Architect directly to the contractor (or his subcontractors).

Architectural Field Reports

Upon Substantial Completion of the construction, and prior to Tenant's occupancy, a single list of unsatisfactory or incomplete construction items will be prepared jointly by Tenant, Tenant's Architect, and the TCM. This list, called the architectural punchlist, will be prepared only once, and should then be submitted to the contractor for timely response and completion.

Upon issuance of the punchlist and engineering Field Report (as described below), the Tenant's Architect should prepare a Certificate of Substantial Completion to be attached to the punchlist. This Certificate signifies that as of the date of the punchlist, the Leased Premises is ready to be occupied by the Tenant.

Engineering Field Reports

Prior to the substantial completion of the premises (which will be documented by the above-mentioned architectural punchlist), but following the completion of the mechanical, electrical, and plumbing work, the Tenant's engineer will develop a punchlist from field observations. This punchlist will document unsatisfactory or incomplete mechanical, electrical, and plumbing items, or work not in accordance with the Tenant plans. This list is known as the engineering Field Report. Subsequent reviews by the Tenant's engineer for corrective work verification will be documented in this engineering Field Report format, until satisfactory completion has been achieved by the contractor. The Field Report will also be attached to the Certificate of Substantial Completion.

Scheduling and Coordination

The TCM shall review and monitor the construction scheduling information as mutually agreed upon by the Tenant's contractor, and the Tenant.

Subcontractors

Due to the critical nature and complexity of the base building systems, the Landlord requires that the base building subcontractors be used for the following disciplines:

a. Fire Protection System
b. Fire Alarm System (cross-connecting at base building Fire Alarm System locations only)
c. Building Automation System (controls)
d. Security
e. Approved Raised Access Flooring
f. Telecom Riser Subcontractor
g. Testing and Balancing Subcontractor

Base building subcontractor information for these trades are listed in Appendix D.

Air Balance Report

The requirement for **an independent**, certified air balance report must be specified in the Tenant plans. This document will be generated by Landlord-approved, independent air balancing subcontractor and certified by three parties: the air balance subcontractor performing the work, the mechanical subcontractor, and the contractor. Final review and approval for compliance with the original mechanical design criteria will be by the Tenant's engineer.

Operating and Maintenance Manuals

The requirement for submission of an electronic copy of complete operating and maintenance manuals for mechanical and electrical equipment and special architectural fixtures installed in accordance with the Tenant plans must be specified in the Tenant plans. Prior to acceptance by Landlord, the manuals will be reviewed and approved by the Tenant's consultants for compliance with the Tenant plans. Accepted electronic copy of these manuals will then be turned over to the Landlord and issued to Tenant for the Tenant's convenience and the commencement of the maintenance program.

Warranties

All contractors should submit the appropriate Guarantees or Warranties as specified in the contract Documents. By these warranties, the contractors and Suppliers agree to repair or replace to the satisfaction of the Tenant, Tenant's Architect, and TCM, any and all work that proves defective within a period stipulated in the specifications. Repairs should include any associated work damaged as a result of the deficient equipment, material, workmanship, removal or replacement.

Tenant Electrical Panels

The Tenant's engineer will be asked to provide a typed panel schedule for every panel that services a Tenant circuit. This panel schedule must include, at a minimum, the circuit number, name, and size, the connected phase(s), the design load, the connected load and the applicable diversity factor.

Building Control System

The Tenant's specification must include a requirement for the Tenant's contractor to arrange and pay for the programming **and installation** of Tenant equipment into the base building control system by the base building control subcontractor.

Occupancy Permit

Upon Substantial Completion and prior to move-in, the TCM and/or general contractor must apply for an Occupancy Permit from the City Inspector. The Tenant must submit a copy of the Occupancy Permit to the Landlord prior to occupancy.

Final Completion

Upon completion of all punchlist items, the submission of Operating and Maintenance Manuals, Air Balance Reports, Asbestos /PCB Certifications; and Record Drawings to the Landlord and Tenant and, the receipt of an Occupancy Permit from all appropriate city inspectors, the TCM should issue to all parties a Notice of Final Completion signifying the completion of the construction contract.

3. DRAWING GUIDELINES

The drafting standards described below are to be used as guidelines in preparing the Tenant Working Drawings. Since contractors will be simultaneously pricing and constructing leasehold improvements for many Tenant spaces, the use of uniform drafting standards and designations is helpful in obtaining timely and accurate pricing.

Standard Drawing Sheet Size and Tide Block Information

Sheet Size: architectural and engineering drawings for Tenant leasehold improvements should be prepared on 30" x 42" sheets.

Title Block Information: Individual Tenant's Architects preparing leasehold improvement construction Documents may use their own title block designs, provided the following information is included:

1. Identification of the Project: 609 Main at Texas.
2. Identification of the Tenant by name, floor, and suite number.
3. Identification of each individual drawing sheet by generic description.
4. Drawing number prominently displayed in the lower right hand corner of each sheet.
5. Date of issue with space for future issues. Each issue should be documented in this area by number of issue (in sequential order for that sheet), date of issue and name of issue. All issues that revise information on the drawings should have a cloud around what was changed with a number in a triangle corresponding to the number in the title block.

Standard Suite Numbering System

The Tenant's Architect must meet with Landlord to assign and review suite-numbering sequence for multi-Tenant floors. These assignments must occur prior to submission of the Tenant Space Plan.

Minimum Requirements for Construction Documents

As a minimum, Tenant Construction Documents must include the following:

- Key plan (if Tenant is not a full floor Tenant)
- Architectural plan for each floor showing partition types and dimensions and identifying each space within the plan.
- Finish plan or Schedule. This may be part of a written specification but in either case, the finish materials used must be submitted to Landlord prior to completion.
- Hardware, Door and Frame Schedule
- Detail Sheets
- Reflected Ceiling plan which has been coordinated with the light electrical fixture layout
- HVAC plan and details
- Plumbing Plan
- Plumbing Riser Diagram
- Electrical Power Plan
- Electrical Lighting Plan
- Electrical Single Line Diagram
- Telephone Plan
- Fire Sprinkler Plan (this plan may be submitted by the sprinkler contractor)
- Fire Alarm Plan (this plan may be submitted by the fire alarm contractor)
- Tenant Egress Plan

Structural Frame Modifications

Tenants proposing equipment, libraries, filing requirements, or other exceptionally heavy equipment in excess of the building's structural design criteria or modifications to the floor slab due to connecting stairways or vertical conveyance systems, should have schematic plans and details prepared by the Tenant's Architect and engineer and submitted to the Landlord for review by the Landlord's architect and engineer. The Landlord's architect and engineer will provide services, at Tenant's cost, for review of revisions to base building drawings to accommodate structural frame modifications.

Tenant's Architect and engineer will be responsible for providing specific loading zones and requirements to the Landlord's architect and engineer.

The Tenant and Tenant's Architect and engineer will be responsible for checking their working drawings to insure their accuracy and compliance with local codes. This should be accomplished prior to submission to the Landlord.

Specifications

Tenant specifications need to be consistent with and specifically reference the base building plans and specifications. In fact, the Tenant's Architect and engineer should only prepare specifications for those items not already included in the base building specifications. All other items should be referenced to the base building specifications.

The Tenant's Architect and Tenant's engineer should carefully review the General Conditions to verify that no conflict exists between these documents and requirements included in the Tenant plans. The Tenant will be responsible for any additional costs related to its additional requirements.

Coordination Drawings Specification

Landlord strongly recommends the inclusion of the following language to ensure that adequate coordination is implemented during construction, requiring contractor to prepare and submit coordination drawings for above-ceiling work. This language should be included in both the architectural and engineering Tenant specifications.

Prepare composite working drawings ("Coordination Drawings") at a suitable scale not less than ¼-inch equals one foot, clearly showing how the work of Divisions 21, 22, 23, 25, 26 and 28 is to be installed in relation to the work of all other trades. Any work installed in conflict with the work of other trades shall be corrected at no additional cost to the Tenant.

The contractor and all subcontractors shall prepare a complete set of coordination drawings indicating the actual equipment to be furnished and installed under this contract, and the location and/or exact routing for all items including, but not limited to, light fixtures, conduit, piping, ductwork, and related above ceiling items. Coordination drawings shall also include locations of all slab penetrations. The coordination drawings shall be submitted to the architect and Landlord as specified. The sheet metal drawings shall be prepared in an electronic format and shall serve as the base drawings. The other subcontractors and the general contractor shall sign off each coordination drawing. If the contractor allows one trade to install his work before coordinating with work of other trades, the contractor shall make necessary changes to correct the condition without extra change.

This requirement for coordination drawing shall not be construed as authorization for the contractor or subcontractor to make any unauthorized changes to the contract drawings. The contractor may, however, subject to acceptance of the architect and without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades, or for the proper execution of the work.

All space allocations on the coordination drawings shall be maintained, such as ceiling height, chase walls, and equipment room size, unless prior written authorization is received from the architect to change them. Prior to final acceptance of the work, the contractor shall transmit an electronic copy of the approved coordination drawings to the Landlord.

4. TENANT IMPROVEMENT COST CONSIDERATIONS

The following ideas are presented for the Tenants review and consideration. These concepts have been developed from prior projects and are offered by the Landlord as a means to reduce the Tenant's expenses.

Partitions

The building Tenant standard partition is a continuous, raised access floor-to-ceiling partition utilizing 90 degree corners. The use of wing walls requiring end treatment, partitions to structure, less then full height walls (either low walls or fascia treatments), corners other than 90 degree, or nonstandard partition treatments (such as file cabinet niches or chase walls) will involve additional cost. Note that the use of slab to slab partitions will require provisions for supply air below raised floor plenum and return air from the above ceiling plenum spaces and in some instances, vertical expansion and contraction.

Building Standard Hardware

The building standard hardware set is included in this document. The goal is to have an efficient keying management system, including keys and/or access cards, for the entire building, which is best accomplished by using the same hardware throughout.

Finishes

The repetitive use of typical details and finishes can significantly minimize additional costs. This includes limiting the number of door and frame types, wallcovering and carpet selections and casework and millwork styles.

Millwork

When utilizing millwork paneling or millwork applied to walls, careful consideration should be given to the structure. The Tenant's Architect should anticipate situations in which the floor and ceiling vary in elevation. In any event, the installation of millwork must be preceded by accurate field measurements of existing conditions.

Heavy Equipment Loads

r. No general provisions have been made for the support of special filing systems and equipment that have a weight greater than 50 pounds per square foot. Loads in excess of this amount may require additional structural support. Certain areas of the building are designed to support loads up to 100 pounds per square foot as more fully detailed in the design drawings. (Reference Typical Floor Loading Diagrams in Appendix H)

Structural Modifications

Structural modifications required for stairs, conveyance systems, heavy loading, or other purposes should be formulated and submitted to the Landlord as early as possible.

Mechanical

a. Heat Loads from Incandescent Lighting

The use of nonstandard lighting systems, particularly incandescent lighting, may require additional air conditioning and ventilation due to the increased heat load. Potentially significant additional mechanical costs can be expected for heat loads from special lighting

systems. Avoiding concentration of incandescent fixtures in any one area can minimize additional costs.

b. Heat Loads from Office Equipment

Special equipment, such as copiers, computers, word processing equipment, and telephone equipment may require additional air conditioning and ventilation. The Tenant's engineer should be provided with the equipment heat output and power requirements (manufacturer's specifications) and a statement concerning the anticipated usage of the equipment. With this information, the Tenant's engineer can provide an air conditioning and ventilation system which satisfies the Tenant's needs without costly over-design. This information should be submitted to the Landlord and may require review by the Landlord's engineer.

c. Air Conditioning

Condenser water is available twenty-four hours for supplemental cooling. Air handling units must be self-contained DX systems. The units must be designed for entering water temperatures varying between 40° F and 85° F. All systems shall be completely capable of standalone operations containing, condenser water booster pumps, strainers, pressure gauges and control valves rated for the system pressure. The controls for the system shall be provided by the building automation system manufacturer and authorized installer. All cost associated with operation and maintenance shall be borne by tenant.

d. Conference Room HVAC

Conference rooms often require special zoning air conditioning and ventilation. Additional costs can be anticipated for rooms where concentrations of people are expected. To minimize these additional costs, conference rooms should be located near base building duct lines. Additionally, care should be taken to not locate sound sensitive areas such as conference rooms next to base building equipment rooms.

e. Recessed Lighting Locations and Ductwork

The Tenant's designer should coordinate the location of recessed lighting with base building ductwork and other building shell conditions. If possible, recessed light fixtures should be located clear of ductwork in the eight-inch lighting zone between the ceiling grid and ductwork. Special attention should be focused on lighting located next to, or in the proximity of mechanical rooms, which have a heavier concentration of large ducts entering and exiting them.

Electrical

a. Dedicated Circuits

The use of special circuits and dedicated circuits may be required in cases where equipment, such as microwaves, refrigerators, copiers, coffee machines, etc., are used. These may require additional conduit, wire, junction boxes, and circuit breakers for each separate run from the outlet to the electrical panel.

b. Electrical Outlets at Exterior Walls and Columns

In order to preserve the integrity of the exterior vapor barrier, no outlets will be allowed on the interior face of the exterior wall. The column furring on the exterior columns may allow outlets to be placed within it. However, these outlets will be costly in comparison to the typical general service circuit in the typical drywall partition or raised access flooring.

c. Floor Outlet Locations

Floor outlets may be located within the raised access flooring system. The usage of traditional poke-through type floor outlets should not be required, and may only be used as coordinated and approved by base building structural engineer.

d. Incandescent Light Fixtures

Incandescent light fixtures require 120 volt power that must be fed from the 120 volt power panel as opposed to the more energy efficient 277 volt lighting panel. If an emergency light fixture is required in a group of incandescent fixtures, a separate transformer will be required to step down the 277—volt emergency lighting power to serve that fixture.

Plumbing

Special plumbing requirements such as sinks, washrooms, dishwashers, and icemakers should be located near base building plumbing risers, to minimize the length of service lines. Tenant taps for water, waste and vent, are installed in the plenum space on each floor where indicated on the base building drawings. The Tenant's engineer should coordinate the location of all floor penetrations with the base building structural drawings to avoid conflicts with beams and column drop heads. Special consideration needs to be considered as to Landlord's leak detection requirements.

Automatic Sprinkler System

The base building fire protection subcontractor will locate sprinkler heads based on an open plan as required by local codes. Sprinkler heads will be installed based on the Tenant's partitioning plan at Tenant's cost. Relocation or addition of sprinkler heads to this layout will result in additional Tenant costs. Centering of sprinkler heads in ceiling tile and special alignment within rooms will also result in additional Tenant costs.

Handicap Access Requirements

The Tenant's Architect should be knowledgeable of the city's requirements for handicap access within a Tenant space. Careful attention should be given to clearances, hardware types and raised flooring. The Landlord encourages a barrier-free design and solicits Tenant's and Tenant's Architect's support.

All portions of the Tenant improvement work must comply with the requirements set forth in the Federal Government's most recent issue of the American Disability Act (ADA). The Landlord will take no responsibility for evaluating requirements contained within this document relative to the Tenant improvement work.

VI. APPENDICES

Appendix A-1 – Base Building Systems Overview

Appendix A-2 – Base Building MEP Systems Overview

Appendix B – Tenant Work Summary Checklist

Appendix C – Glossary of Terms

Appendix D – Pre-Qualified Contractors

Appendix E-1 – Project Work Rules

Appendix E-2 – Safety Addendum

Appendix F – Tenant Improvement Standards

- **Tab F1** – MEP Tenant Design Improvement Standards
- **Tab F2** – Tenant Improvement Standard Summary
- **Tab F3** – Tenant Standard Details
- **Tab F4** – Tenant Standard Cutsheets

Appendix G – Sustainable Tenant Guideline Manual

Appendix H – Typical Floor Loading Diagrams

APPENDIX A-1 - BASE BUILDING SYSTEMS OVERVIEW
(SEE EXHIBIT E-3 TO LEASE)

APPENDIX A-2 - BASE BUILDING MEP SYSTEMS OVERVIEW

I. DESCRIPTION OF BASE BUILDING MEP SYSTEMS

A. MECHANICAL SYSTEM

1. Condenser Water System:

a. The condenser water for the building is provided by induced-draft cooling towers located at the roof. The cooling towers serve water cooled centrifugal chillers in the Level 1 chiller plant. The 4-cell cooling tower fans utilize variable speed drives for capacity control. Four condenser water pumps with variable speed drives (VSD) are located in the Level 1 chiller plant.
b. The condenser water system is designed for 15ºF temperature differential (101ºF - 86ºF).
c. The cooling tower have the capacity to accommodate additional cooling loads of 10-tons per office floor Levels 13-48 and an additional 20-tons on Level 12. Tenant 24-hour air conditioning equipment shall utilize water cooled self-contained packaged equipment with a dedicated pump for each unit. Pump shall be sized to circulate condenser water all system pressure losses to pump the tenant's loop to the cooling towers. 2" condenser water taps are provided at each office floor (2.5" on Level 12) on the condenser water risers the condenser water risers within the floor by floor mechanical room at the west end of the building core.
d. The cooling towers have the capacity to provide cooling to the retail spaces as follows:

   Retail 106: 15-tons
   Retail 107: 20-tons
   Retail 124: 40-tons

   Retail air conditioning equipment shall utilize water cooled self-contained packaged equipment with a dedicated pump for each retail space. Pump shall be sized to circulate condenser water all system pressure losses to pump the tenant's loop to the cooling towers.

2. Chilled Water System:

a. The chilled water system for the building is provided by three 1100-ton and one 400-ton centrifugal water cooled chillers with VSDs in the Level 1 chiller plant. The chilled water system is arranged in a variable primary pumping configuration with five chilled water pumps with variable speed drives.
b. The chilled water system is designed for 16ºF temperature differential (56ºF - 40ºF).

3. Typical Office Floor Air Handling Units

a. Each typical office floor is served by two custom variable air volume dual path air handlers serving an under-floor air distribution system (UFAD) with a 12" high raised floor plenum and zoned overhead ducts serving perimeter slot diffusers to account for the building envelope loads. The core and shell system provides overhead perimeter zone ductwork, electric heating coil, and perimeter slot diffusers to serve the building envelope loads.
b. The underfloor air system shall serve the office tenant's interior heat gain loads. The lower section of the dual path AHUs provides 63ºF to the raised floor plenum.
c. Each AHU consists of MERV 11 filters, supply fan array equipped with VSD, and DDC controls. The units are manufactured by Temtrol.
d. Ventilation air is provided to each air handling unit through a common shaft ducted to dedicated outside air units located in Level 11 and Level 49. Each AHU OA connection is provided with a VAV box for control of OA to each typical AHU. The box is balanced to a preset ventilation rate based on expected occupancy. CO2 sensors at the return air section of the unit are provided to reset the VAV box damper when CO2 levels are below or above the operator adjustable setpoint. The dedicated outside air AHU supply fan serving the common OA duct has a VSD for capacity control.
e. Relief air for a typical floor is accounted for via an exhaust air VAV box tied to a relief air shaft and relief fans on Level 11 and Level 49. The relief fans serving the common relief air shafts has a VSD for capacity control. The relief VAV box modulates based on a BMCS signal to maintain space pressure.
f. The ceiling plenum is utilized for the return air path. The AHU room walls are "Z" wall construction and provide for the return air path from above the office area ceiling to the AHU room.

4. Toilet Exhaust:

a. Inline centrifugal exhaust fans are provide on Level 11 and Level 49 to serve the office level toilet rooms.
b. Transfer air is provided from above ceiling transfer boot and transfer air slot above the lavatories.
c. A supply air to the toilet rooms is provided via sidewall grilles connect to the underfloor air plenum.
d. An exhaust air VAV box is provided in each core restroom to allow for the exhaust system to be shut-down on individual floors based on occupancy. The exhaust fan serving the common exhaust air shaft has a VSD for capacity control.

5. Electric Room Ventilation System:

a. The electrical room on each office floor is air conditioned via an underfloor air floor grilles in the raised access flooring system.

6. **Multi-Tenant Corridor and Elevator Lobbies:**

    a. The elevator lobbies and tenant corridors on multi-tenant floors will be air conditioned via underfloor air grilles in the raised access flooring system. Ceiling return grilles and transfer air openings are provided for the return air path back to the floor AHUs.

7. **Elevator Machine Rooms and Back of House Areas:**

    a. Elevator machine rooms are served by self-contained condenser water-cooled systems.
    b. Back of house spaces are served with self-contained condenser water-cooled units.

8. **Emergency Generator Room Ventilation:**

    a. Space provisions are made for future tenant-installed emergency generator located adjacent to the Life Safety Generator on Level 1. All emergency generator provisions are subject to lease approval.

9. **Stair Pressurization System:**

    a. The base building includes a stair pressurization system as required by code. Operation of the stair pressurization system is controlled automatically by the fire alarm system.

10. **Automatic Temperature and Building Control Systems:**

    a. The building is equipped with Direct Digital Control (DDC) Building Management Control System (BMCS). The web based system allows PC and remote Internet access to monitor, control and optimize the operation of the heating, ventilation, and air conditioning systems. A PC for building engineer use is located in the engineering offices in the back of house Level 2 office.
    b. All major HVAC components such as chillers, cooling towers, AHU's, pumps, and fans are controlled through the BMCS.

11. **Electric Motors:**

    a. All electric motors will be premium efficiency type and suitable for use on invertor drive systems where applicable.

12. **Pipe and Fittings**

    a. Chilled and Condenser Water piping 3" and larger will be Schedule 40 black steel with welding fittings. Victaulic fittings in lieu of welded fittings are allowed. Piping 2-1/2" and smaller will be Schedule 40 black steel with screwed fittings or Type L copper.

13. Duct Systems

a. The air velocity in overhead ducts serving perimeter zones shall not to exceed 1500 feet per minute or 0.08"w.g. pressure drop per 100 feet of duct. Ductwork construction shall be in accordance with SMACNA Standard (1995 2nd Edition).
b. All ductwork shall be sealed to SMACNA Seal Class "A". Ductwork shall be protected after fabrication and the interior of all ductwork shall be kept clean and free of dust, debris and foreign materials prior to first use and at substantial completion.
c. Supply air to the occupied tenant spaces shall be filtered with replaceable media type filters in accordance with ASHRAE 62-2010 Standards with an average efficiency, or MERV ratings based on ASHRAE Test standard 52.2-2012. Outside air shall be filtered with media type pre-filters (MERV 8) and final filters (MERV 13); this includes the dedicated outside air units and interior air handlers with direct outside air connections. Additionally, the dedicated outside air units shall include UVc (ultra violet) lamps for additional filtration. The typical floor by floor units, which are served by the dedicated outside air units, shall be include media type filters (MERV 11).

14. Air Distribution Devices

Typical floor zone ductwork serving each perimeter zone shall be connected to one by-pass damper and one cold deck damper on the upper section of each unit. Each set of dampers shall be configured for variable flow. Each perimeter zone supply duct shall have an electric heating coil with SSR or SCR control. Perimeter zone supply shall utilize slot type down-blow diffusers sections. Perimeter slot diffusers are Nailor model 59BSR with adjustable vertical discharge and integral returns for overhead cooling and heating.

The perimeter zones of the Level 12 bump-out and Level 47 two story space are served by zone ductwork routed through the raised access floor to serve perimeter floor floors. Floor grilles are Nailor model 4900 with plenum box for duct connection to floor diffuser.

Under floor supply shall be through 8" diameter in-floor "swirl" diffusers sized to fit 8.4" rough opening in raised access flooring panels. Each diffuser shall have a capacity of approximately 80 CFM. Swirl diffusers are Nailor model ANFD with PFG.

15. Insulation

a. Piping and ductwork insulation, materials, and thickness will comply with the requirements of ASHRAE 90.1. Insulation will be finished with all-purpose jacket where it is within mechanical rooms, service rooms, shafts and ceiling spaces (i.e.,

where concealed from public view). Insulation shall be installed to prevent condensation forming on all piping and ductwork. Where exposed to public view, insulation shall have an additional UL approved fabric jacket over the all-purpose jacket with pre-molded PVC covers over fittings. Piping located outside shall be heat traced and have an aluminum jacket.

b. Duct Insulation:
   1) Supply Air Ducts are insulated with 2.2" flexible fiberglass duct wrap with foil-scrim-kraft facing. Facing shall be UL 25/50 rated. Minimum insulation installed R-value is 5.0.
   2) Outside Air Ducts within the building envelope are insulated with 2.2" flexible fiberglass duct wrap with foil-scrim-kraft facing. Facing shall be UL 25/50 rated. Minimum insulation installed R-value is 5.0.

c. Piping and Equipment
   1) Chilled Water Piping, Valves and Fittings (interior to envelope):
      a) Insulate all chilled water piping, valves and fittings with fiberglass pipe insulation with UL approved, flame resistant, white, all service jacket. Insulate fittings with glass fiber blanket insulation and pre-molded PVC covers.

Pipes Size	Insulation Thickness
½"-2"	1"
2-1/2"-10"	1-1/2"
12"-24"	2"

   2) Chilled Water Piping, Valves and Fittings (exposed):
      a) Insulate all exposed chilled water piping, valves and fittings with polyisocyanurate foam insulation with UL approved, flame resistant, aluminum, all service jacketed, insulation. Insulate fittings with glass fiber blanket insulation and pre-molded PVC covers.

Pipes Size	Insulation Thickness
All	2"

3) Condenser Water – None.
4) Condensate Drain Pipe and Fittings: Insulate with UL approved, flame resistant, white, vapor barrier jacketed, fiberglass pipe insulation 1" thick. Insulate valves and fittings with fiberglass blanket insulation and premolded PVC cover.
5) Domestic Cold Water Pipe, Valves, and Fittings:
   a) Insulate with UL approved, flame resistant, white, vapor barrier jacketed, fiberglass pipe insulation 1" thick. Insulate valves and fittings with fiberglass blanket insulation and premolded PVC cover. All piping outside of building envelope shall be jacketed with smooth aluminum jacket.
6) Domestic Hot Water Pipe and Fittings:
   a) Insulate all domestic hot water supply lines and circulating water lines with UL approved, flame resistant, white, vapor barrier jacketed, fiberglass pipe insulation 1" thick. Insulate valves and fittings with fiberglass blanket insulation and premolded PVC cover. All piping outside of building envelope shall be jacketed with smooth aluminum jacket.
7) Horizontal Storm, Underside of Roof and Areaway Drains:
   a) Insulate all domestic hot water supply lines and circulating water lines with UL approved, flame resistant, white, vapor barrier jacketed, fiberglass pipe insulation 2" thick.

B. PLUMBING SYSTEM

1. Domestic Water

a. A triplex domestic water booster pump is provided in the Level 1 water tank/pump room and supplies the domestic water riser serving the building. Pressure reducing valves (PRV) are provided to serve domestic water pressures zones for every six office floors. Water pressure will be limited to a maximum of 80 psi downstream of each PRV.
b. A PRV is provided to serve the Level 1 retail spaces and garage levels
c. Size domestic water system using a maximum of 3 PSI pressure drop per 100 feet of pipe and a maximum velocity of 8.0 feet per second.
d. Water piping inside the building 2" and smaller shall be Type "L" hard drawn copper (ASTM B88) and wright copper fittings (ANSI B16.22), joined with 95-5 tin-antimony solder.
   1) An electric water heater is provided for each pressure zone to provide domestic hot water to all core restrooms lavatories and mop service basins. The water heaters are located in a core air handling unit room.
   2) Domestic hot water is not provide to the Level 1 retail spaces.

2. Sanitary Sewer Waste and Vent

a. All above ground waste and vent stacks shall be Tyler "No-Hub" service weight cast iron joined with Tyler "No-Hub" heavy duty stainless steel drawbands. Service weight cast iron pipe and fittings (ANSI A.112.5.2) with Tyler Ty-Seal positive sealing neoprene elastomeric compression type gasket. Elastomer

3. Office Areas

a. Domestic hot and cold water system will be connected to plumbing fixtures. No galvanized or plastic piping will be permitted to be used on the domestic water system. Copper or stainless steel piping only shall be used for the domestic water piping system.
b. Domestic hot water will be supplied from an electric water heater per pressure zone. Each water heater system has a hot water circulating pump.
c. Gas service is not provided for the office tenants.
d. Wet stacks will be provided in two locations on each floor. Each wet stack shall be a 4 inch soil stack with a 4 inch plugged outlet on each floor and a 4 inch vent stack with a 3 inch capped outlet on each floor.
e. Cold water riser with 1-1/2" valved and capped outlet to be provided at each mechanical room at each floor.

4. Retail Areas:

a. Domestic cold water is provided to each retail space. A sub-meter will be provided by the owner at cost to the tenant. Tenant to extend domestic water from meter to tenant space. Meter will communicate with BMS system for electronic data collection.
b. Sanitary WYE fittings are provided for tenant connection to core and shell sanitary system.
c. No grease waste is provided under core and shell. A future grease interceptor location has been coordinated with the base building structural system. Tenant shall provide grease interceptor and associated grease waste piping as required.
d. Gas service is available at the building for extension by retail tenant. Tenant is responsible for gas meter and piping extension from meter location in basement along Main Street to tenant space. Tenant shall contact Centerpoint Energy to arrange for gas service.

C. FIRE PROTECTION SYSTEM

1. Water Supply

a. Fire main will be connected to the water distribution system.
b. Double check backflow preventor is installed on the fire service entrance.
c. A fire water suction break tank is provide.
d. A low zone and high zone fire pump is provided.

2. Building Fire Protection

a. The building is protected by a hydraulically calculated Combination Fire Standpipe/Sprinkler system. Two (2) electric fire pumps will serve the standpipe and sprinkler systems. One 1000 gpm electric fire pump supplies parking garage and up to Level 27. A 750 gpm electric fire pump supplies Level 28 and up. Emergency power is provided to each pump. Each floor is considered as a separate sprinkler zone with its own sprinkler control valve assembly consisting of a supervised valve, flow switch, and drain valve.
b. All sprinkler systems shall be hydraulically calculated. In the event design criteria information from the project fire insurance underwriter is unavailable at the time of initial design, the following minimum criteria shall be used:
   1) Light Hazard: Offices, data processing, restaurant seating area, and corridor areas. Piping systems shall be sized to deliver 0.10 GPM/sq. ft. over an area of 1500 sq. ft. at the most remote location and 250 gpm for hose stream.
   2) Ordinary Hazard - Group 1: Parking, offices, data processing, restaurant service area, restaurant seating area, and corridors, piping shall be sized to deliver 0.16 GPM/sq. ft. over 1500 sq. ft. at the most remote location.
   3) Ordinary Hazard – Group 2: Retail areas, truck dock, storage areas and mechanical rooms, piping shall be sized to deliver 0.19 GPM/sq. ft. over an area of 2000 sq. ft. at most remote location.
c. A 2-1/2” fire hose valve will be provide within the stairwell at the intermediate landings as required by the City of Houston Fire Department. A dedicated 3” drain riser will be required with 2-1/2” capped outlets on a 45-dgree angle for testing the pressure regulating valves.
d. Sprinkler heads in finished area will be quick response type, chrome finish with white escutcheon.

D. ELECTRICAL SYSTEM

1. CenterPoint Transformer Vaults

a. The building falls within the boundaries of CenterPoint Energy’s service area. This service includes three incoming medium voltage 35kV 3 phase feeders for three power transformers. In the event of the loss of one of the three feeders the CenterPoint system will automatically roll-over to one of the other feeders and power will not be lost. The CenterPoint Energy transformers are at the northeast end of the ground level, outside of the building.

2. Main Electrical Service

a. The main switchboard room is located directly above the CenterPoint Energy transformer vault on the second level. Service is supplied at 12,470/7200V, 3 Phase, 4 wire.
b. Power is transformed from 12,470V to 480Y/277V in three main electrical rooms located as follows:

1) 2nd Floor main service electrical room (2) 2500 kVA, 12,470-480/277V transformers feeding general building loads and the retail distribution board.
2) 11th floor main electrical room (2) 2000 KVA, 12,470-480/277V transformers feeding base-building mechanical bus risers on lower tenant floors
3) 11th floor main electrical room (2) 2000 KVA, 12,470-480/277V transformers feeding lower tenant electrical bus risers for tenant power.
4) 48th floor main electrical room (2) 2000 KVA, 12,470-480/277V transformers feeding base-building mechanical bus risers on upper tenant floors
5) 48th floor main electrical room (2) 2000 KVA, 12,470-480/277V transformers feeding upper tenant electrical bus risers for tenant power.

3. Secondary Distribution

a. Electrical power is distributed at 277/480V, 3 Phase, 4 wire through bus duct risers in electrical riser closets.
b. Mechanical equipment on tenant floors are fed by one of the risers.
c. Tenant floor lighting and receptacle loads are fed by the other riser via a power panel. The power panel is labeled HDPXX and is used to feed a tenant lighting panel and a tenant receptacle. The HDPXX panel is also to be used for the connection of future tenant panels.
d. Each floor has approximately 60 spare circuit breakers in the 225A 120/208v receptacle panel and approximately 36 spare circuit breakers in the 100A, 277/480v panels. All spares are 20A single pole.
e. Buss risers are aluminum. Fused plug in units are provided to tap power from the bus riser on each floor.

4. Raceways

a. All wire and cable is installed in conduit.
b. Rigid Steel Conduit: Rigid conduit, heavy wall, hot dipped galvanized inside and out, threaded ends, with threaded type fittings. Rigid steel is used where exposed to physical damage, indoors where exposed to physical abuse and exposed outdoor installations.
c. Electrical Metallic Tubing (EMT): Continuous, seamless steel tubing, galvanized or terrorized on exterior, coated on interior with smooth hard finish of lacquer, varnish or enamel, with steel, set screw type fittings. EMT is used for general purpose feeders and branch circuits.
d. Flexible Steel Conduit: Single strip, continuous, flexible interlocked double-wrapped steel, hot dip galvanized inside and out forming smooth internal wiring channel, with steel, compression type fittings. Flexible steel conduit is used in dry locations only, for connections to lighting fixtures in suspended ceilings, connections to equipment installed above suspended ceilings, transformer connections, bus duct plug in units, and connections to equipment where vibration isolation is required, maximum length of 6 feet.

e. Liquid Tight Flexible Steel Conduit: Same as flexible steel conduit except with tough, inert, watertight plastic outer jacket. Fittings are cast malleable iron body and gland nut, cadmium plated with one-piece brass grounding bushings threaded to interior of conduit. Liquid tight flexible steel is used same as flexible steel conduit in damp or wet locations and at motor connections.
f. Rigid Nonmetallic Conduit: Schedule 40 polyvinyl chloride with solvent cemented type fittings. PVC is used in underground duct banks, below slab on grade, or embedded in floor slabs. No other tenant applications are allowed.

5. Wire and Cable

a. 600V minimum insulation rating. Electrical grade, annealed copper, tinned if rubber insulated, THHN/THWN insulation. Stranded ASTM Class B, solid for sizes #10 and smaller. Minimum size number 12 for branch circuits; number 14 for control wiring.

6. Wiring Devices

a. Switches and receptacles are specification grade. All switches are silent acting fully rated 20 amperes. Multiple pole, 3 way, 4 way, and special purpose type switches are provided as required. Special purpose receptacles are provided as required by the equipment characteristics. Device cover plates are stainless steel.
b. Branch circuits utilize steel EMT, with flexible steel conduit at final equipment connections. Nonmetallic rigid conduit (PVC) embedded in floor slabs is provided where the structure allows. Mechanical equipment final connections are liquid tight flexible steel conduit.
c. General purpose duplex receptacles are provided for cleaning and maintenance purposes at a maximum spacing of 75 feet, in restrooms (GFI type) and within 25 feet of mechanical equipment.

7. Standby Power System

a. One radiator cooled, diesel fuel fired standby engine generator set rated 2000KW/2500KVA, 277/480V, 3 phase, 4 wire, 60 Hz, 1800 RPM is located on the Ground level to supply power to emergency loads. A signal from any automatic transfer switch will start the engine and supply power to the emergency distribution system in the event of failure of the normal power source.
b. The tenant shall not connect to the base building life safety generator. An additional space is available for a future tenant standby generator of up to equal size as base building life safety generator.

8. Lighting Fixtures, Lamps and Controls

a. Illumination will be in accordance with the recommendations of the Illuminating Engineering Society and International Energy Conservation Code.

b. Lighting systems should utilize high efficiency, low glare fixtures and high power factor electronic ballasts. Fluorescent fixtures with linear lamps shall be provided with integral disconnecting means to isolate the ballast.
c. Internally illuminated exit signs need to be provided for safe egress and as required by code. Exit signs are to be edge-lit, green letter on white backfield, with high efficiency LED sources. Refer to Section C – Product Data sheets for details on Base Building fixture.
d. A microprocessor based, relay type control system has been provided for control of building lighting. The system is controlled by the Energy Management System. Local override may be provided at each floor. Tenant to provide relays in the Base Building LCP.
e. In addition to the microprocessor based relay type control panel, all individual office, open offices and all other areas required by the International Energy Conservation Code, shall include dual level lighting, occupancy and daylighting controls.

9. Fire Alarm System

a. The fire management system is the addressable type with each initiating device annunciated as an individual zone. The Fire Alarm and Control Panel (FACP) provides centralized control. Graphic map with point lit LED annunciator indicates the individual fire alarm zones. Area smoke detectors are analog type to permit monitoring and calibration of smoke detector sensitivity from the FACP.
b. The fire alarm system is fully supervised and includes both manually and automatically actuated alarms consisting of:
    1) Connections to fire sprinkler system water flow and tamper switches.
    2) Area smoke detectors in each mechanical and elevator machine rooms as well as detectors in the elevator lobbies, at each stairwell door and in non-sprinklered areas in tenant spaces.
c. The activation of any sprinkler flow switch, smoke detection device operates the voice communication alarm system. The fire alarm panel provides indication of the floor of an alarm and the type of alarm, i.e., manual, sprinkler flow, or smoke. The fire alarm system is connected to an approved central monitoring service. A Firefighter's Smoke Control and Indicating Panel is provided for manual override of the smoke control systems.
d. Firefighter’s Telephone System (FTS) is provided to allow two way communications between the Fire Control Center and plug in phone jacks. Plug in phone jacks are located in each elevator cab and at each elevator lobby, stairwell entry location and stand pipe connection location. Permanent Warden Hand sets are located in the main electrical room, generator room, fire pump room and mechanical rooms with smoke control fans.
e. A Voice Communication System (VCS) provides evacuation signaling and selective paging to all areas of the building. Fire alarm speakers and visual alarm strobes shall be located all areas of the building.
f. The Fire Command Center is located on the ground level 1. Equipment located within the Fire Control Center are:
    1) Fire Alarm and Control Panel.

2) Voice Communication System.
3) Firefighter's Telephone System.
4) Smoke Control and Indicating Panel.
5) An Elevator Status and Control Panel is located nearby at the security desk.
6) Generator status and control panel
7) Keys and card access badges for firemen's use.
8) Telephone for outside communication.
9) Point Lit Graphic Annunciator Panel.

APPENDIX B - TENANT WORK SUMMARY CHECKLIST

1. Identify project team and an individual to serve as the point of contact.
2. Carefully review the lease provisions relating specifically to Tenant construction.
3. Thoroughly review the Tenant Design Construction Manual.
4. Plan an initial meeting with the Landlord.
    a. Identify project members and their roles. Develop a project directory.
    b. Discuss the desired distribution of information for all participants. Develop the distribution list.
    c. Discuss information or particular questions regarding information included in Tenant Design and Construction Manual.
    d. Prepare and discuss project schedule.
    e. Prepare and discuss project budget.
    f. Discuss and select construction management approach.
5. Work with TCM to develop a detailed project schedule (refer to Section III).
6. Work with TCM to develop an RFP for design services.
    a. Solicit proposals from design firms.
    b. Schedule interview with each responding firm.
    c. Select design firm/Tenant's Architect.
7. Receive basic drawing distribution package from Landlord.
8. Schedule initial Space Planning with TCM, Landlord and Tenant's Architect.
    a. Review lease requirements.
    b. Review Tenant Construction Manual requirements.
    c. Review Base Building Standards and design criteria.
    d. Forward Landlord's drawing set to Tenant's Architect.
    e. Review Space Plan requirements.
    f. Review schedule.
    g. Review initial budget.
9. Work with TCM to perform interim review of Space Plan.
10. Work with TCM, Tenant's Architect and Landlord to select mechanical/electrical/plumbing (MEP) design firm.
11. Work with TCM to perform final review of Space Plan.
    a. Forward final Space Plan to Landlord for review.
12. Plan Initial working drawings meeting.
    a. Review all comments on Space Plan.
    b. Sign off on final pace plan.
    c. Review working drawings requirements.
    d. Forward Engineering Information Package to consultants.

13. Work with Tenant's Architect and TCM to perform Interim Review of working drawings.
14. Work with Tenant's Architect, TCM and Landlord to prepare select list of bidding contractors.
    a. Request A.I.A. Qualification Form.
    b. Identify outside contractors (i.e. phone, graphics, furniture, etc.)
15. Finish Bid Documents.
    a. Sign off on working drawings.
    b. Finalize Specifications.
    c. Prepare Invitation to Bid.
    d. Schedule pre-bid meeting.
16. Put drawings out to bid.
    a. Identify means to solicit drawings.
    b. Attend pre-bid meeting.
    c. Issue any addenda.
    d. Forward bid set of documents to Landlord.
17. Review bids and select contractor.
    a. Submit contractor selection to Landlord.
18. Work with TCM to develop Tenant Construction Agreement.
    a. Review Tenant Construction Agreement with Landlord.
    b. Execute Tenant Construction Agreement with Tenant's contractor.
19. Plan a Pre-Construction Meeting.
    a. Walk through Leased Premises shell.
    b. Review scope of work.
    c. Review schedule for work.
    d. Review Landlord's rules and regulations
20. Construct Leased Premises.
    a. Attend weekly job meetings
21. Walk through constructed space with Tenant's Architect and TCM to develop punchlist.
    a. Collect Engineering Field Reports.
22. Review all final submittals.
    a. Record drawings.
    b. O&M Manuals.
    c. Balance reports.
23. Receive copy of Occupancy Permit.
24. Review Tenant information manual from the property management office.
25. Meet with property manager to discuss move-in.
26. Complete punch-list items.
27. Issue Notice of Final Completion.

APPENDIX C - GLOSSARY OF TERMS

Project definitions are intended to clarify terms used throughout this manual. **Consult the lease Agreement for legal definitions and implications.**

Air Balance Report is prepared by a certified air balancing contractor and records measurements of air and water temperature and flow rate to ensure proper heating/cooling of the Leased Premises.

Architectural Punchlist is prepared at Substantial Completion by the Tenant's consultants, in conjunction with, the Tenant's Representative, the Tenant's designer, the contractor and TCM, and shall consist of a list of unsatisfactory or incomplete construction items not in accordance with the contract documents.

Base Building is the entire building shell as described by the plans and specifications prepared by Kendall/Heaton Architects; Cardno Haynes Whaley; Walter P. Moore Engineers; and ME Engineers, including but not limited to: the building exterior, steel structure, electrical, plumbing, heating, ventilation, and air conditioning system, the fire protection/sprinkler system, life safety system, public and core space designs and finishes.

Base Building Systems refers to all building mechanical, electrical, plumbing, structural, life safety, fire protection, and access control systems in the entire 609 Main at Texas project.

Building's Contractor is the construction firm engaged by Landlord to construct the Leasehold Improvements per Tenant's plans at 609 Main at Texas.

Building standard improvements are those Leasehold Improvements specified in "Building standard improvements", base building drawings and in the lease.

Change Order is a means to record changes to the Tenant Construction Agreement including changes in scope, detail or duration.

Contractor is the construction firm engaged by Landlord (Building's Contractor) or by Tenant (Tenant's Contractor) to construct the Leasehold Improvements per Tenant's plans at 609 Main at Texas. Engaged by either Landlord or Tenant, the construction firm is directed by the Tenant Construction Manager on all construction and cost accounting related issues.

Field Report is prepared by Tenant's Engineer and shall consist of a list of unsatisfactory or incomplete mechanical, electrical or plumbing items not in accordance with the contract documents.

Final Completion is the date confirmed by the Landlord, Tenant and TCM when all items of the Work have been completed, including all items found on the punchlist.

Hines is the Landlord's representative.

Landlord shall refer to HCG Block 69 LLC and is represented by Hines.

Landlord's Engineer is the engineering firm(s) retained by Landlord to perform Tenant's mechanical, electrical and plumbing design services and reviews (Landlord's mechanical/electrical/plumbing engineer) or structural design services (Landlord's structural engineer).

Leasehold Improvements refer to all modifications and additions to the Leased Premises directed by the Tenant.

MEP refers to Mechanical, Electrical and Plumbing.

NRA is net rentable area.

Occupancy Permit is issued by the city of Houston Building Inspection Department upon completion of the work. The Occupancy Permit is required before any occupant makes use of the Leased Premises.

Operation and Maintenance (O&M) Manual is a document which describes in detail the operation and maintenance of a particular piece of equipment in the leasehold Space and includes detailed specifications of this equipment.

Outside Contractor (see Tenant's Contractors/Consultant).

Pre-Qualification is the process whereby contractors, suppliers, etc. are evaluated and selected for the purposes of bidding leasehold improvements.

Record Drawings Set is an original bid set of construction documents, including all addenda, which has been modified to show all field changes that developed during construction.

Substantial Completion is the date confirmed by Landlord, Tenant and TCM when construction is sufficiently complete, in accordance with the Tenant plans, so that Tenant may occupy or utilize the leased premises or a designed portion thereof for the use for which it is intended.

TCM is the abbreviation used throughout this document for Tenant Construction Manager (see below).

Tenant refers to the party defined in the lease as the Tenant or Tenant's authorized representative for matters pertaining to the design and construction for the Leasehold Improvements.

Tenant's Architect is the space planning/interior design or architectural firm retained by Tenant to design the Leasehold Improvements and to be responsible for preparation of the architectural portion of the Tenant plans and coordination of the architectural with the engineering portion of the documents. This firm typically will handle office space program layout, lighting, electrical and plumbing layout, finish schedules, any millwork, architectural design and detailing, furniture selection and placement, and field observation during construction.

Tenant's Budget is the anticipated cost of all construction, design services, fees, permits, etc. required to complete the work.

Tenant Construction Agreement describes and confirms costs for the Leasehold Improvements described by the Tenant plans as well as the terms and conditions of all work and is prepared by TCM based upon the pricing proposal submitted by contractor.

Tenant Construction Manager (TCM) refers to the representative assisting in the coordination and the design and construction of the Leasehold Improvements and occupancy of the Tenant.

Tenant's Contractor/Consultant is the firm engaged by Tenant to design, construct, supply or install any portion(s) of the Tenant's improvements including, but not limited to telephone/communications system, computer system, security system, audio/visual, furniture and artwork.

Tenant's Engineer is the firm retained by Tenant to design the mechanical, electrical, and plumbing portions of the Leasehold Improvements and to prepare Tenant plans for same.

Tenant Information Manual is a publication provided by the property manager outlining in detail all policies and procedures for proper Tenant move-in and building operation.

Tenant Plans are the detailed drawings and specifications produced by Tenant's designer and Tenant's engineer necessary to price and construct the Leasehold Improvements and to obtain the necessary building permits, as defined in the lease (consisting of space plans and Tenant working drawings).

Tenant Space Plan is the work prepared by Tenant's designer in developing the scope of the Leasehold Improvements and should contain at a minimum, the information required by the Tenant and Landlord to approve the floor layout and authorize preparation of the working drawings.

Tenant Working Drawings are the detailed drawings and specifications produced by Tenant's designer, and Tenant's engineer necessary to price and construct the Leasehold Improvements and to obtain the necessary building permits. Work drawings are prepared after completion and approval (by Tenant and Landlord), of Tenant Space Plans.

USF is Usable Square Feet of space.

APPENDIX D – PRE-QUALIFIED CONTRACTORS

Basic Builders
Balfour Beatty
D.E. Harvey Construction
JE Dunn Construction
O'Donnell/Snider
Scott-Reid
StructureTone
Trademark Hitt
Turner Construction

REQUIRED SUBCONTRACTORS

Fire Alarm –

Firetron, Inc.
10101A Stafford Centre Dr.
Stafford, TX 77477
281.499.1500
Tom Ballou

Controls –

Climatec
7240 Brittmoore, Suite #119
Houston, TX 77041
713.983.6500
David Clarke

Raised Access Flooring –

Hudson Building Systems, Inc. (Haworth Certified)
10412 Rockley Road
Houston, TX 77099
Wes Hudson
281.933.9354

Allied Interiors (Haworth Certified)
15925 Morales Rd., Suite 100
Houston, TX 77032
Mickey Gibson
281.227.0523
mgibson@alliedinteriors.com

ARCCON Access Flooring
701 Holmes Road
Houston, TX 77045
713.665.4321
Michael Volle
mlvolle@arccon.com

Evans Interiors
13211 Stafford Rd., Suite 400
Missouri City, TX 77489
Jeri-Lynn Turner
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APPENDIX E-1 – PROJECT WORK RULES

Coordination and clarification of the Tenant construction with the base building construction will be made during the pre-construction/bid meetings.

1. SAFETY AND DRUG AND ALCOHOL AWARENESS PROGRAMS

.1 The Program shall prohibit the unlawful possession, use or distribution of controlled substances and alcohol on the jobsite and shall prohibit employees from being under the influence of such controlled substances or alcohol on the jobsite. This Program shall also include advising employees of the danger of drugs or alcohol in the workplace and the availability of counseling, rehabilitation, employee assistance programs or other available benefits. Smoking will be prohibited within the building perimeter.

2. QUALITY MANAGEMENT

.1 Contractor and Subcontractor(s) shall be responsible for maintaining an acceptable level of quality for their Work.

.2 Subcontractor(s) shall monitor the quality of the work as it progresses and will report, in writing, to G.C.. The acceptable level of quality will be determined by the Landlord, the Architect, the Independent Testing Laboratory, the Contract Documents, and by sample construction. All work not meeting the acceptable level of quality will be corrected at the Subcontractor's expense.

3. EXAMINE CONTRACT DOCUMENTS AND VISIT SITE

.1 Before submitting a Bid Proposal, Bidders should carefully examine the Contract Documents; visit the site of the work; fully inform themselves as to all existing conditions and limitations, including those of labor; progress of work to date, if any, and shall include in the Bid Proposal a sum sufficient to cover the cost of all items contemplated by the Contract Documents. No consideration will be granted for any alleged misunderstanding of the material, article or piece of equipment to be furnished or work to be done; it being understood that the tender of a Bid Proposal carries with it the agreement to all items and conditions referred to herein or indicated in the Contract Documents.

4. SUPERINTENDENT

.1 The Contractor and Subcontractor(s) shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall be satisfactory to Landlord and shall not be changed except with the consent of Landlord, unless the superintendent proves to be unsatisfactory to the Contractor or Subcontractor(s) and ceases to be in their employ. The superintendent shall represent the Contractor or Subcontractor and all communications given to the superintendent shall be as binding as if given to them.

5. CONSTRUCTION SCHEDULE

.1 The Contractor shall, within ten (10) days after the Pre-construction Conference, assemble and provide all necessary information and data concerning its activities and the activities of its Subcontractor(s), vendors and suppliers, including durations and crew sizes, planned submission dates of required Shop Drawings, Product Data and Samples. The Contractor and Subcontractor(s) shall prepare and submit such information in the form required by Landlord.

.2 The Contractor and Subcontractor(s) shall complete their work in accordance with the Base Building Schedule.

.3 Weekly progress meetings shall be held at the job site. Field supervisors from each Subcontractor working "on site" shall attend all such meetings.

6. SAFETY PRECAUTIONS AND PROGRAMS

.1 The Contractor and Subcontractor(s) shall hold weekly safety tool box meetings with their employees on site and submit a copy of the minutes of each meeting to Landlord prior to the next meetings.

.2 The Contractor and Subcontractor(s) will comply with Building’s Contractor Safety Program (Exhibit 3A attached) as a project minimum.

7. CONTRACTOR’S INSURANCE

.1 The Contractor and Subcontractor(s) shall procure and maintain during the life of their contracts, insurance of the type and in an amount not less than specified in the Lease, in their contract(s), architect/engineer's general conditions, supplementary general conditions, special and other conditions, and as required by law.

If Contractor subcontracts any of the Work, Contractor shall require each Subcontractor to have the insurance coverage required by this Section, except for Excess Umbrella Liability which shall be no less than the amount as agreed to by Landlord and Contractor. Contractor shall furnish Landlord evidence thereof before each Subcontractor commences any of the Work. Contractor's obtaining of the insurance required by this Section shall in no manner lessen, diminish or affect Contractor's obligations set forth in any provisions of its contract. Contractor shall also carry such additional insurance as may be required by any law. All insurance policies required of Contractor and Subcontractors shall contain a waiver of subrogation clause wherein no insurance company shall have any right of recovery against Landlord, Tenant or Lender, or any of their consultants.

All insurance required in this Section shall be provided by financially responsible insurance carriers authorized to do business in the State of Texas and rated by A.M. Best Rating Service as A-, IX or better.

A. Comprehensive General Liability

Limits of Liability	
General Aggregate	$2,000,000
Products and Completed Operations Aggregate	$2,000,000
Personal & Advanced Injury Aggregate	$1,000,000
Each Occurrence Limit	$1,000,000

B. Worker's Compensation

Limits of Liability	
Worker's Compensation	statutory
Employer's Liability	
Each Accident	$500,000
Policy Limit-Disease	$500,000
Each Employee-Disease	$500,000

C. Business Automobile Liability

Limits of Liability	
Combined Single Limit (BI & PD)	$1,000,000 (per accident)

D. Umbrella Insurance

Limits of Liability	
Annual Aggregate	$4,000,000
Per Occurrence Limit	$4,000,000

.2 Certificates of Insurance shall be submitted by the Contractor and Subcontractor(s) to TCM no later than thirty (30) days prior to the commencement of their Work on site and shall name D.E. Harvey Builders, HCG Block 69 LLC., and Hines Interests Limited Partnership as additional insureds. No Contractor or Subcontractor(s) will be allowed to continue on site after the expiration of full insurance coverage. Contractor or Subcontractor(s) partial payments shall be withheld until current Certificates of Insurance are submitted to TCM.

8. FIELD OFFICES

.1 Subcontractor's shall be responsible for their own field offices, including telephone system and radio communication for exclusive use.

9. TEMPORARY STORAGE

.1 Temporary structures, sheds, trailers and material storage shall be arranged in a safe manner to avoid interfering with construction, public access or the Landlord's operations. All locations of temporary structures, sheds, trailers and material storage shall be approved in advance by Building's Contractor and Landlord. Contractor and Subcontractor(s) should assume that no storage space is available unless they have prior written approval.

.2 The Contractor and Subcontractor(s) shall relocate their temporary structures, sheds, trailers and materials in storage as often as required for construction progress as directed by TCM, Building's Contractor and Landlord.

.3 Only limited storage space is available, and will be allocated by TCM and Building's Contractor on a priority basis. Storage of materials outside the limits of construction but on the Landlord's property is strictly prohibited without written permission from the TCM, Landlord and Building's Contractor.

.4 All costs relating to temporary storage and protection shall be borne by the Contractor and/or Subcontractor(s) requiring such storage and protection. The Contractor and Subcontractor(s) shall retain full responsibility for any form of damage or deterioration to stored materials and any form of damage or deterioration caused by materials to surrounding surfaces.

.5 Upon completion of the work, or sooner if directed by TCM or Building's Contractor, the Contractor and Subcontractor(s) shall remove their temporary structures and sheds and remove all debris and rubbish and place the area in a clean and orderly condition.

10. WATCHMAN

.1 The services of a watchman will not be provided by the TCM, Landlord or Building's Contractor.

11. TEMPORARY WATER SUPPLY

.1 The base building Mechanical Subcontractor shall furnish, install, and maintain a temporary water supply system for use by Building's Contractor and all Subcontractors during the base building construction period. The base building Mechanical Subcontractor shall completely remove the temporary water system when directed to do so by Building's Contractor.

12. PARKING REQUIREMENTS

.1 The Contractor will provide his own parking at the daily parking rate.

13. TEMPORARY ELECTRICAL POWER AND LIGHTING

.1 The base building Electrical Subcontractor shall provide temporary power (using a temporary or the permanent riser) sufficient for Contractor's use at conveniently located tap location on each floor.

.2 The base building Electrical Subcontractor shall maintain the complete electrical system available for all Tenant and base building Subcontractor's use during normal Project working hours. Overtime work requiring standby electricians beyond normal Project working hours shall be at the expense of the Contractor and/or Subcontractor(s). Normal working hours are defined as 7:00 AM to 3:30 PM.

.3 Installation of temporary electrical power and lighting shall be as scheduled by Building's Contractor.

.4 All temporary electrical installations shall be in compliance with the latest National Electrical Code (N.E.C.) or OSHA, whichever is more stringent. Compliance with N.E.C. Section 210-8(b) shall be the responsibility of the Electrical Subcontractor. Assured grounding systems as defined in Exception Number 2 of N.E.C. Section 210-8(b) shall not be used in place of ground fault protection.

.5 Building's Contractor shall pay for all electrical energy consumed during the base building construction period except for energy consumed to provide power or lighting in excess of those listed in this Article.

.6 Any electrical requirements for power or lighting beyond those listed in this Article (including energy charges) shall be the responsibility of the Subcontractor requiring

the service.

14. ADJACENT STREETS

.1 The Contractor and Subcontractor(s) shall be responsible for the necessary cleaning and repairing of adjacent streets resulting from his operations.

15. PROTECTION OF EXISTING FACILITIES

.1 The Contractor and Subcontractor(s) shall provide and maintain proper shoring and bracing for existing underground utilities, sewers, and building foundations, encountered during his excavation work, to protect them from collapse or other type of damage until such time as they are to be removed, incorporated into the new work, or can be properly backfilled upon completion of new work.

.2 The Contractor shall provide and maintain protection during sitework for all existing lawns, trees, curbs, gutters, drives, walks, and buildings, not noted for removal. Damaged work shall be repaired or replaced, and damaged lawns shall be replaced with sod. Trees shall be protected until final grading has been completed.

16. TEMPORARY GUARDRAILS AND BARRICADES

.1 During and after completion of the concrete frame, Building's Contractor shall furnish, install, and maintain all necessary temporary guardrails and standard toe boards at all building floor and roof perimeters and openings. The temporary guardrails and toe boards shall be left in place for use of all other Subcontractors. Building's Contractor shall maintain and remove said guardrails and toe boards. All other protection and safety barricades, devices, covers, etc., including at all roof areas, shall be provided by the Contractor and Subcontractor(s) as it relates to the safe conduct of his work in accordance with all local, State and Federal regulations.

.2 Contractor and each Subcontractor shall be responsible for the cost of repairing guardrails, toe boards, safety barricades, devices, covers, etc. which are damaged during the performance of their work. Additionally, Contractor and each Subcontractor is responsible for the removal and replacement of guardrails, toe boards, safety barricades, devices, covers, etc. on a daily basis as required to access their work.

17. TEMPORARY HOIST

.1 Building's Contractor shall furnish, install, maintain, and operate the combination materials/man hoist(s) for all above grade levels of the new building. The hoist(s) shall be installed upon completion of the structural frame and removed after permanent elevator service is available.

.2 The hoist(s) shall be 6,000 lb. capacity and shall be furnished, free of charge, to the Contractor and Subcontractor(s) who will conform to a schedule established by Building's Contractor as scheduled during regular business hours.

.3 Hoisting requirements in excess of the capacity of the hoist(s) shall be provided by the Contractor and Subcontractor(s). The hoist(s) shall not be used for the placement of concrete or roofing materials.

.4 Hoisting requirements for materials of the size and shape which will not fit on a normal 6,000 lb. capacity hoist shall be provided by the Contractor and Subcontractor(s).

.5 The operating costs of all overtime hoisting shall be borne by the Tenant's Contractor and Subcontractor(s).

.6 Upon the removal of the hoist(s), the Contractor and Subcontractor(s) shall complete that portion of their work interrupted by the temporary openings, at no additional cost to Building's Contractor or Landlord.

.7 No additional cost to Building's Contractor or Landlord will be accepted due to downtime of the hoist or elevator provided Building's Contractor pursues the resolution of the downtime in good faith.

18. FIRE EXTINGUISHERS

.1 Building's Contractor shall furnish fire extinguishers except for cutting and welding in accordance with OSHA requirements for temporary fire protection during construction of the shell building. Contractor and/or each Subcontractor shall equip their employees who are welding or cutting with a fire extinguisher.

19. TEMPORARY FIRE PROTECTION

.1 Modifications to the base contract fire protection systems will need to be coordinated with Building's Contractor with detailed plans and durations required to make the modifications.

20. RATED WALL INSTALLATION

.1 All rated walls shall be completed prior to the installation of all Tenant's ductwork, piping, conduit, and all other Tenant's wall penetrations, where deemed necessary by Building's Contractor to achieve the rated assembly.

.2 Contractor or Subcontractor(s) will install sleeves, where required, of adequate diameter and length around his piping or conduit; length of sleeve should extend beyond both faces of rated wall. After installation of his ductwork, piping, conduit or other wall penetrations, the Contractor or Subcontractor installing the sleeve will fire caulk the inside of the sleeve and the Contractor or Subcontractor installing the fire taping or rated wall will seal the remainder.

.3 Fire caulking shall be in accordance with the Contract Documents.

21. RATED WALL AND CEILING INSPECTIONS

.1 Prior to interior wall and ceiling closure, each responsible Subcontractor shall complete a form provided by Building's Contractor confirming that all of his in wall and above ceiling installation has been complete. After all state and local inspections have been made and all violations corrected, the rated wall and ceiling Contractor or Subcontractor(s) shall complete all wall and ceiling closures.

22. FIELD MEASUREMENTS

.1 The Contractor and Subcontractor(s) shall be responsible for field measuring existing conditions prior to fabrication of materials and/or equipment which fit into restrictive spaces.

23. CLEANING UP

.1 Building's Contractor shall:

1. Oversee base building cleaning and insure that base building and grounds are maintained free from accumulations of waste materials, rubbish, and debris.

2. Prior to turnover to Tenant of Tenant's areas, remove all undefinable debris and prorate the cost of such removal to the Contractor or Subcontractor in proportion to the manpower employed during the time period.

.2 The Contractor or Subcontractor shall:

1. Clean up all waste materials, rubbish, and debris resulting from his own

operations at such frequencies as required by Building's Contractor and TCM.

2. Place waste materials, rubbish, and debris outside of building in Tenant trash containers provided by the Contractor or Subcontractor. Subject to space availability.

3. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from interior and exterior surfaces of fixtures, hardware, and equipment furnished as a part of its contract.

4. Repair, patch, and touch-up marred surfaces to match adjacent finishes damaged by his own operations.

5. Remove from the site those items regulated by the Hazard Communication Standard.

6. Cleanup of the base building shall be the responsibility of Building's Contractor. Cleanup of the Tenant Premises shall be the responsibility of the Contractor. Contractors shall only use those trash dumpsters specifically designated as "Tenant use only." Any use of base building trash dumpsters will be pro-rated to Contractor.

24. CUTTING AND PATCHING OF WORK

.1 Contractor and each Subcontractor shall be responsible for the cutting and patching of all holes and openings through walls, partitions, floors, ceilings, and roofs necessary for the installation of his work if this work was not installed in a timely manner prior to construction of those walls, partitions, floors, ceilings and roofs. If the location for a hole or opening is through a joist, beam, or column, the Contractor and/or Subcontractor(s) shall notify Building's Contractor and TCM who, after consultation with the Architect, will instruct them how to proceed.

.2 All cutting shall be carefully done to minimize repair. Core drill concrete for holes 6" in diameter and smaller; use of electrical or pneumatic hammers not permitted. For larger openings, saw-cut outline and break out; take care to prevent excessive spalling on reverse side.

.3 The Contractor or Subcontractor responsible for patching shall provide both the rough (substrate) and finish surfaces. He shall employ only qualified tradesmen to assure that all work is done in a neat and workmanlike manner. All patching shall match adjacent surfaces.

25. PERMANENT SERVICE ELVATOR USAGE

.1 Upon removal of the temporary hoist, the permanent service elevators shall be used for all hoisting requirements (both personnel and material). Permanent service elevators must have designated operators at all times. All costs for operators shall be at tenant expense. Passenger elevators are not available to any base building or tenant contractor's personnel or material at any time.

.2 The permanent service elevators have a 9,500 lb. and 7,000 lb. capacity and shall be furnished, free of charge (less costs of elevator operator), to the Contractor and Subcontractor(s) who will conform to a schedule established by Building's Contractor as scheduled during regular business hours. Following substantial completion of the base building, all scheduling will be maintained by property management of the building.

.3 Hoisting requirements for materials of the size and shape which will not fit on one of the permanent service elevators shall be provided by the Contractor and Subcontractor(s).

.5 The operating costs of all overtime hoisting shall be borne by the Tenant's Contractor and Subcontractor(s).

.6 No additional cost to Building's Contractor or Landlord will be accepted due to downtime of the permanent service elevator provided Building's Contractor pursues the resolution of the downtime in good faith.

26. LOADING DOCK USAGE

.1 Loading dock consists of three bays accessible from Texas Ave. to accommodate all deliveries and dumpsters for all tenants. Upon the occupancy of the building by tenants, property management may require that one bay be occupied by building trash compactor.

.2 Prior to substantial completion of base building, Building's Contractor will coordinate all scheduling of the loading dock for dumpster placement and delivery schedules. Following base building's substantial completion, the building's property management will assume all coordination of this space.

APPENDIX E-2 - SAFETY ADDENDUM

D.E. Harvey Builders General Safety Requirements

Orientation

- Workers that are new to a project are required to attend the "project orientation" before starting any type of work.
- After orientation, employees will receive a number to identify that he/she has been trained and understands the requirements of the project.

Work Force

- Is worker an employee of the subcontractor or hired from a labor force? Hired Labor is not allowed on the project site.
- What is the skill level of the worker? No workers with less than 6 months experience.
- What training has the worker received to insure that he can perform the work safely?

Parking

- Parking will be subcontractor's responsibility and will be off-site.

Entering Job Site

- Workers will enter the jobsite only through the designated entrances.

Drug Testing

- All individuals working on the project must have proof of successfully passing a drug-screening test within the last year.
- In the event of an accident, all individuals involved will be required to take a drug-screening test.
- Each individual working on this project may be subject to random screening.
- Any individual that fails drug screening will be removed immediately from the project.

JSA's (Job Safety Analysis)

- All workers onsite will attend a JSA meeting every morning before beginning work.
- Each foreman will give the JSA's to their employees.

Accidents

- All accidents must be reported immediately to DEHB/HCB supervision.

Job-Site Specific

- No firearms, drugs, alcohol, or fighting are allowed on the site.
- No radios or boom boxes allowed.
- Anyone whistling or cat-calling to pedestrians will be removed from jobsite.

Housekeeping

- All workers will clean up on a daily basis.
- A clean project makes a safe project.
- If housekeeping becomes a job-site issue, composite crews will be required to be formed as general contractor's discretion.

Excavations

- All excavations must be barricaded.
  All excavations five feet or more must be sloped, benched, or shored per OSHA requirements.
- All excavations must have ladder for access

Fire Protection

- Fire extinguishers must be within ten feet of all open flames.
- Fire extinguisher must be with in twenty feet of combustibles.

Signs, Barricades, Barriers

- Barricades such as leading edges, warning lines, handrails on the edge of an elevation six feet or higher, are not to be crossed without proper fall protection.
- Red barricade tape must never be crossed.
- Warning barriers, such as caution tape or orange fencing, are to be removed only after communicating with the foremen in charge of the work at the barrier.

Signs, Barricades, Barriers

- You must remove your barricade tape when the dangerous/hazardous task is complete.
- All signs must be observed and followed.

Personal Protection

- Hardhats and safety glasses w/ side-shields must to be worn properly at all times. Ball caps are not to be worn under hard hats.
- Work boots or sturdy hard-soled shoes are required, no sandals or tennis shoes are to be worn.
- Proper work clothing is to be worn - shorts or tank top type shirts are not permitted.
- Gloves are required for all crafts when handling sharp or pointed materials, using hand tools where the likelihood of injury to the hand could occur, or where the safety of the worker will be enhanced. Gloves are required to be on or within reach of the worker at all times during the performance of work
- Respiratory equipment is to be used when required by the MSDS of the product being used or when working conditions require it.
- Full arm protection must be worn when installing light fixtures in ceiling grid.
- Full arm protection while handing any types off glass and mirrors.

Equipment

- All crane operators must be certified.
- All forklift operators must be certified.
- No cell phone use while operating any equipment.
- All equipment must be inspected daily before use.

Ladders, Stilts & Scaffolds

- Standing on the top two steps of any ladder is not permitted.
- 4' ladders are not allowed on the job site. Ladders must be 5' or taller. Always use the correct sized ladder for the work being performed.
- Do not use a ladder, stilts or a rolling scaffold on an unstable flooring surface or in an area that is in need of housekeeping where a slip/trip/fall could occur.
- All scaffolds shall have handrails (minimum of three sides), mid rails and toe boards where appropriate.
- Systems scaffolds build on site must have a competent person representative for the contractor.

Fall Protection

- Personal fall protection is required for those working in an area where a fall of 6 feet or more is possible.
- Anyone working on elevated platforms, such as scissor lifts, JLG lifts, or scaffolds is required to have personal fall protection above six feet.
- Workers performing leading edge work, subject to a fall, must be 100% tied off at all times.

Holes and Penetrations

- All holes must be covered, secured, and clearly marked “HOLE”
- All holes two inches or larger must be covered.

Electrical

- Lock Out /Tag Out will take place at the source of power to the device. In the event that an electrical panel must be locked out, a locking device must be used in accordance with OSHA standards.
- All wire ends are to be taped unless they are hot (energized) at which time they will have the correct sized wire nuts installed. Wire ends hanging from a junction box are to be coiled up and placed inside the junction box.
- All BX cable ends shall be taped.
- Ground Fault Interrupters (GFI) / (GFCI) will be used on all electrical tools and equipment.
- All power tools and cords must be inspected daily and recorded monthly.
- All light fixtures must be secured when installed.

MSD Sheets

- MSD Sheets must be given to DEHB/HCB for all chemicals brought on each site.
- All MSD Sheets shall be at the site and available where the chemicals are being used.
- All containers containing the chemicals must be labeled properly.
- Empty containers shall be disposed of in their proper trash container according to MSDS. Unused chemicals or liquids should be removed from the site by the contractor.

Incentives

- Foremen and workers who recognize a hazard and take steps to eliminate the hazard will be rewarded with a safety award for their efforts.
- All crews will be able to participate in the "Safest Crew of the Week" incentive program.

Enforcement

- Each subcontractor is an independent contractor and is responsible for the actions of their own workers.
- Zero tolerance will be enforced on the project. Workers caught doing a willful violation will be subject to immediate removal from the project.
- If willful unsafe acts or conditions are committed by more than one employee of the same company, the supervisor will be subject to removal from the project.

APPENDIX F – TENANT IMPROVEMENT STANDARDS

Tab F1 – MEP Tenant Design Improvement Standards

Tab F2 – Tenant Improvement Standards Summary

Tab F3 – Tenant Standard Details

Tab F4 – Tenant Standard Cutsheets

APPENDIX F - TENANT IMPROVEMENT STANDARDS

TAB F1 - MEP TENANT DESIGN IMPROVEMENT STANDARDS

A. Codes and Standards

a. Mechanical, Electrical, Plumbing, and Fire Protection systems shall be designed in accordance with all current applicable Codes, Standards and Authorities having jurisdiction, the Underwriter's and in accordance with current engineering practices, including, but not limited to:

- International Building Code including City of Houston Amendments
- International Mechanical Code and City of Houston Amendments
- International Plumbing Code and City of Houston Amendments
- International Fire Code and City of Houston Amendments
- National Electric Code
- National Fire Protection Association and Local Amendments
- Underwriters Laboratories, Inc. (UL)
- National Electric Manufacturers Association (NEMA)
- American National Standards Institute (ANSI)
- National Fire Protection Association (NFPA).
- ASHRAE Ventilation Standard, 62.1-2007
- ASHRAE Energy Standard 90.1-2007
- ASHRAE Thermal Comfort Standard, 55-2004
- USGBC LEED Core and Shell Rating System, v2.0
- Underwriters Laboratories (UL)
- Standard for Electrical Safety in the Workplace (NFPA-70E)
- International Energy Conservation Code (IECC) with City of Houston Amendments
- Institute of Electrical and Electronics Engineers (IEEE)
- Illuminating Engineering Society of North America (IES)

B. Sustainable Design

a. The core and shell building has been designed to achieve a Platinum Rating under the U.S. Green Building Council LEED Core and Shell Rating System. Tenants are encouraged to pursue LEED Certification under the USGBC LEED CI rating program. Refer to Sustainable Tenant Guidelines for additional information.

C. MECHANICAL SYSTEM

a. The building air conditioning systems are designed for the following design conditions:

i. Outdoor Design Conditions:

Summer:	96°F dry bulb (ASHRAE 0.4%)
	80°F wet bulb (ASHRAE 0.4%)
Winter:	27°F dry bulb (ASHRAE 99.6%)

ii. Indoor Design Condition:

Occupied Space:
- Summer - 75°F
- Winter - 72°F

Machine Rooms and other Non-Occupied spaces:
- Summer - 85°F
- Winter - 60°F

iii. Office space interior loads:
1. Lighting: 1 watt / usable square foot (70% load to space)
2. Office Equipment: 3 watts / usable square foot
3. People: 7 person / 1000 square feet at 250 BTUH sensible and 250 BTHU latent heat gain

iv. Outside Air Ventilation:
1. The tenant design engineer will be responsible to provide to Hines the quantity of outside air needed based on their design and the approximate number of occupants.
2. Outside air ventilation shall be based on 130% of the minimum ventilation rate per ASHRAE Ventilation Standard, 62.1-2007.
3. Outside air will be filtered utilizing MERV 8 pre-filters and MERV 13 filters.
4. When occupant counts are unknown the minimum quantity will be based on 20 CFM/person with a minimum of 7 people/1000 rentable square feet.

v. Extended Hours of Operation:
1. Tenant shall request to Owner hours of operation for air handling unit system. Requests are subject to lease provisions.

vi. Acoustical Criteria:
1. NC-40 in tenant area within 15 feet of AHU rooms.

b. Tenant Return Air: Tenant design shall maintain ceiling plenum return air path to the AHU rooms. Special attention should be paid to the location of any walls to structure. Provide transfer air openings and boots as required to maintain return air to AHU room return air “Z”-wall.

c. Tenant Underfloor Air Distribution:

i. Each tenant floor is served with two air handling units supply the underfloor air plenum with 63°F leaving air temperature from the unit.
ii. Raised access floor clear height shall not be reduced around the AHU rooms for a minimum of 10' from the AHU room wall to prevent restriction in underfloor air plenum. Reduction of pedestal height to accommodate thicker floor finishes within Tenant space shall not be installed without Landlord approval.
iii. Perimeter zones are provided under the base building mechanical system described above. Perimeter zones are sized to for building envelope loads only. Thermostats serving perimeter zones must be installed in close proximity to perimeter of building. All interior space loads shall be conditioned via the underfloor air system. The perimeter zone ducts will be traversed for balancing to each perimeter zone under core and shell. The branch taps to each diffuser will need to be balanced by Tenant Contractor once tenant interior ceilings are installed. Sequencing of work shall be coordinated with Building Engineers.
iv. Tenant interior space loads are served by 8" diameter in-floor "swirl" diffusers. Each diffuser shall have a capacity of approximately 80 cfm at 0.05
v. Swirl diffusers may be manual control passive or automatic control as required by tenant application. Manual diffuser cutout has been cut to an 8.5" rough opening. Manual diffuser shall be either Nailor model ANFD PFG (8"), Price ARFID RPF (8"), and automatic control diffuser shall be Nailor model ANFD-VAV PFG (8").
vi. Raised floor air distribution plenum must be maintained throughout the Tenant Office space. Raised floor plenum dividers, large obstructions (i.e. conduit bundles; data racks; etc…), walls extending below raised access floor shall not be installed without Landlord approval. If allowed, transfer air boots will be required and sized appropriately to maintain raised floor plenum pressure.

d. Supplemental Air Conditioning
i. Tenants desiring to install for 24-hour air conditioning may arrange with Building Management for access to the building condenser water system.
1. Each office floor (13-48) is provided with 2" condenser water supply and return taps for miscellaneous tenant cooling loads. Level 12 is provide with 2-1/2" condenser water supply and return taps.
2. The condenser water system is sized to accommodate 20-tons of cooling on Levels 12 and 10-tons of cooling per tap on Levels 13-48.
ii. The following criteria apply to all tenant connections to the condenser water risers:
1. Building Management may require additional isolation valves at the riser taps for additional future connection in some conditions. These would be hot taps and require isolation valves shall be as close as possible to the riser isolation valve and upstream of new tenant isolation valve. Provide lockable stainless steel full port ball valve for future connection. (Coordinate requirements with building management during design.)
2. Provide type L copper branch lines on sizes 2 ½" and smaller.

3. Provide Hoffman air vents on the supply and return branch pipes within the tenant space.
4. Entering condenser water temperature will vary between 76 deg. F to 86 deg. F.
5. Tenant is required to passify and pre-treat all piping per the Base Building water treatment guidelines and building engineer's approval is required prior to opening system to the Base Building loop.
6. Tenant shall provide condenser water pump, piping system with all required accessories, isolation valves, control valves, self-contained water cooled units, controls and drain pans below equipment. Tenant system components and equipment shall be rated to conform to the base building operating system pressures and temperatures, and be capable of standalone operation without the utilization of base building pumps.
7. Tenant supplemental air conditioning shall be installed on electrically metered circuit.
8. Tenant supplemental air conditioning equipment shall also be installed with proper leak detection devices.

e. Fire/Smoke Rated Assembly Penetrations:

i. The tenant shall provide fire, smoke, or combination fire and smoke dampers as required by code at each duct penetration of a fire rated assembly within the tenant area. Smoke dampers and fire/smoke dampers shall be activated by duct mounted smoke detectors. Dampers shall include end switches for positive damper position indication.
ii. Dampers shall be UL 555 and UL 555S classified, Ultra-Low Leakage Class I damper with appropriate rating.
iii. All smoke detectors and damper end switches shall be tied into the Building Fire Alarm system by the Building Fire Alarm contractor at the tenant's cost.
iv. All fire dampers will be drop tested after installation is complete and Tenant's contractor will certify in writing that testing was performed. Access panels shall be provided as necessary to access damper including fusible link.

f. Retail Area Systems:

i. Retail areas will need to be designed based on the tenant needs and to meet code requirements.
ii. HVAC system shall consist of self-contained units to provide cooling and heating to the retail space. Supplemental electric heat may be necessary depending on tenant design. Units may be suspended from structure or floor mounted depending on the tenant space plan and system design.
iii. Condenser water capacity is provided to the retail areas for 150SF/ton at 3 gpm/ton. Condenser water taps are valved and capped within the retail areas for tenant connections.
iv. Refer to base building drawings for condenser water design temperatures and tap locations.

v. Louvers are provided for retail outside air, make-up air, and exhaust air terminations by the tenant.
vi. Retail area electrical service should be installed in such a manner that all electrical load is metered independently.

g. Controls:
i. All controls modifications shall be compatible with the base building BMCS. Work shall be preformed by Contractor that has been approved by Building Management.

h. All piping material, fittings, and valves shall match the Base Building systems standards outlined above. Base Building Specifications regarding valve types for specific applications and joint types for various applications will supersede any Tenant specification.

i. All piping insulation shall match the Base Building system standards. Base Building system standards will supersede any Tenant specification.

D. PLUMBING SYSTEM

a. Each tenant will be required to furnish drinking water as part of the build out of their tenant improvements.

b. Each tenant floor is provided with 4" waste and 3" vent capped stub-outs for tenant 4 connections at two locations on each floor. Locations are adjacent to the core air handing unit rooms. Tenant shall provide a full size a full sized wye fitting, capped for future connection, when connecting to the waste and vent stub-outs.

c. Each tenant floor is provided with 1-1/2" domestic water valved and capped stub-outs for tenant connections at two locations on each floor. Locations are inside each core air handing unit room. Tenant shall provide a 1-1/2" tap with valve and cap for future connection when connecting to the domestic water system stub-outs.

d. Approval of landlord is required when work is being preformed which requires disruption of supply water from risers or other lines.

e. Base building specifications regarding valve types for specific applications and joint types (sweated union, etc.) For various applications will supersede any tenant engineered specification.

f. Tenant plumbing requirements such as sinks, dishwashers, icemakers, toilet rooms, etc. should be located near base building plumbing risers, to minimize the length of service lines. The Tenant shall coordinate the location of all floor penetrations with the base building structural drawings to avoid conflicts with beams and column drop heads.

g. Tenant shall provide leak detection cables on structural floor slab below all new tenant plumbing fixtures. Cables shall be part of Tenant BMSC work. BMSC shall be alarmed about leak detection sensor activation.

E. FIRE PROTECTION SYSTEM

a. All tenant floors must be fully sprinklered. Floors must be provided with complete sprinkler coverage by the tenant.

b. Any modifications to existing sprinkler heads in the tenant space may require existing sprinkler heads to be removed and replaced with new sprinkler heads by the tenant.

c. All new sprinkler heads shall be quick response type sprinkler heads.

d. All new tenant development requiring modification of the existing fire sprinkler system shall be calculated utilizing a single supply riser for the most hydraulically remote area.

e. The sprinkler installation is design build. The sprinkler contractor shall determine the size of existing piping and proper sizing of new piping. Provide any hydraulic calculations required by local authority or agency having jurisdiction or Owner.

f. Any installation must comply with the current City of Houston requirements, NFPA 13, and be preformed by a licensed sprinkler contractor.

g. All approvals, inspections, examinations, and tests required by the authorities and/or agencies shall be arranged and paid for by the sprinkler contractor as necessary to obtain complete and final acceptance of the fire protection system. The sprinkler contractor shall deliver certificates of all such inspections to Owner.

h. Shutting and opening of valves must be supervised by Building Engineers. Contractor shall notify the local fire department and maintain all sprinkler systems operations in all other Building areas.

i. Replace all existing sprinklers heads with new heads as required. Adjustable sprinkler drops are not allowed.

Area (use)	Type	Escutcheon (color)	Orifice (in.)	K-factor	Temperature (°F)
Office	Quick Response	White	½	5.56	165

j. Restore entire sprinkler system to full operation at the end of work each day. At no time

will any area of the building be without working sprinkler coverage when tenant's contractor is not on site. At no time can contiguous floors can be drained simultaneously.

k. Coordinate location of sprinkler heads with all other trades. Install piping to best suite field conditions. Coordinate layout of piping with ductwork and existing piping, and offset piping as required.

l. Submit new calculations to Owner before commencement of the work when the sprinkler system changes are made that affect partial or entire system hydraulic calculations.

F. ELECTRICAL SYSTEM

a. Codes and Standards

- International Building Code with City of Houston Amendments
- International Fire Code with City of Houston Amendments
- National Electric Code (NEC)
- City of Houston Fire Marshal Requirements.
- International Energy Conservation Code (IECC) with City of Houston Amendments
- American National Standards Institute (ANSI)
- Institute of Electrical and Electronics Engineers (IEEE)
- Illuminating Engineering Society of North America (IES)
- National Fire Protection Association (NFPA)
- Standard for Electrical Safety in the Workplace (NFPA-70E)
- National Electrical Manufactures Association (NEMA)
- Underwriters Laboratories (UL)

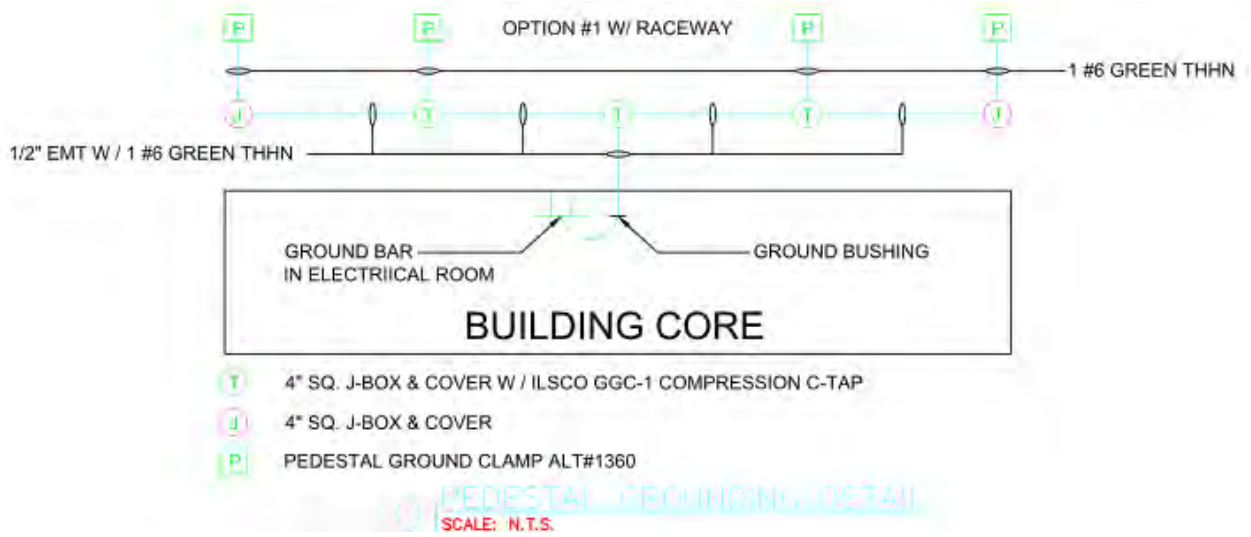
b. Sustainable Design Strategies:

i. Lighting control systems, including dual level switching and occupancy sensors
ii. High efficiency lamping of light fixtures

c. Metering

i. Tenant's electrical design shall include branch wiring requirements that maintain the separation of loads types into lighting and receptacle/appliance based on the current base building scheme. Base building equipment includes separate metering for base building mechanical, lighting and receptacle/appliance panels.
ii. Where new panels are added to the base building system, they shall be metered such that electrical load separation as listed in the paragraph above can be maintained. Provide meter and coordinate connection to base building metering system with building management.

d. Grounding/Bonding
- i. Providing grounding and bonding as required by the National electrical code.
- ii. Base building has provided grounding per the detail below:



e. Devices – Provide devices consistent with device requirements in the base building section. See attached cutsheets for additional information.

f. Outlet and Junction Boxes:
- i. Device boxes shall be galvanized steel.
- ii. Floor mounted boxes and devices shall be flush with the raised floor manufactured by either Communications Integrators Incorporated, Hubbell or Legrand sized to work with 8.4" rough opening cutout provided in raised access floor panel.

g. Conduit and Raceways
- i. All homeruns shall be in EMT.
- ii. AC cable is not permitted.
- iii. MC cable is permitted as follows: If agreeable to the authorities having jurisdiction, Type "MC" conductor cable may be used for conductors connecting receptacle and switch devices to lighting and power circuit junction boxes where concealed in the voids of hung ceilings and hollow partitions. The length of each "MC" cable shall be limited to twenty-five (25) feet. Type MC Cable shall not be used for homeruns or for connections between junction boxes. Type "MC" cable shall comply with the following requirements:
  1. Type "MC" cable shall be steel jacketed, consisting of one (1), two (2), three (3) or four (4) #12 AWG or larger copper "THW", "THHN" or

"THHN/THWN" insulated phase and neutral conductors and one #12 AWG or larger insulated ground conductor.

2. Type "MC" steel jacketed cable termination fittings shall be T&B #253, O-Z Gedney C5, Steel City Series XC-400 or approved equal clamp type, malleable iron fittings. Die cast fittings are not acceptable.

h. Panelboards

i. Connect new panelboards to the HDPXX panels located in each tenant floor electrical room.
ii. Panelboards to be Siemens or equal type P1, P2 or P3 panel. Engineer to include a short circuit study associated with the addition of all new panels.
iii. All new panels shall be metered. See the section above related to meters

i. Lighting Circuits

i. Lighting circuits shall be routed via the building lighting control system relays.
ii. Emergency lighting circuits shall be connected to 277V base building emergency panels
iii. A microprocessor based, relay type control system has been provided for control of base building lighting including core area lighting controls. The system is controlled by the energy management system. Tenants to provide independent lighting control in compliance with local building codes and energy codes which are to control lighting in each tenant space.

TAB F2 – TENANT IMPROVEMENTS STANDARDS

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08 11 13 HOLLOW METAL DOORS AND FRAMES

08 14 16 FLUSH WOOD DOORS

08 41 13 ALUMINUM FRAMED ENTRANCES

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12 24 13 ROLLER WINDOW SHADES

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21 00 10 GENERAL REQUIREMENTS

21 13 00 FIRE SUPPRESSION SPRINKLER SYSTMES

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22 00 10 GENERAL REQUIREMENTS

22 00 20 PLUMBING SCOPE OF WORK

22 05 07 DESIGN CONDITIONS

22 05 48 VIBRATION ISOLATION

22 05 50 ACCESS DOORS AND COLOR CODED IDENTIFICATION IN GENERAL CONSTRUCTION

22 05 93 TESTING, BALANCING, AND ADJUSTING

22 07 00 THERMAL INSULATION

22 10 00 DOMESTIC WATER SYSTEMS

22 13 00 SEWAGE AND DRAINAGE SYSTEM

22 30 00 PLUMBING EQUIPMENT

22 40 00 CLEAN-OUTS, DRAINS, AND PLUMBING FIXTURES

DIVISION 23 HEATING, VENTILATING, AND AIR-CONDITIONING

23 00 10 GENERAL REQUIREMENTS

23 00 20 HVAC SCOPE OF WORK

23 05 07 DESIGN CONDITIONS

23 05 13 MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

23 05 30 MISCELLANEOUS EQUIPMENT

23 05 48 VIBRATION ISOLATION

23 05 50 ACCESS DOORS AND COLOR CODED IDENTIFICATION

23 05 93 TEATING, BALANCING, AND ADJUSTING

23 07 00 THERMAL INSULATION

23 08 00 HVAC COMMISSIONING REQUIREMENTS

23 10 00 FACILITY FUEL SYSTEM

23 21 13 PIPES, VALVES, FITTINGS AND ACCESSORIES

23 21 23 PUMPS

23 31 00 DUCTWORK AND SHEET METAL

23 36 00 AIR TERMINAL UNITS

23 37 00 AIR DISTRIBUTION EQUIPMENT

23 40 00 AIR FILTERING

DIVISION 25 ELECTRONIC SAFETY AND SECURITY

25 01 00 BMCS SCOPE OF WORK

25 05 00 BMCS GENERAL REQUIREMENTS

25 06 00 BMCS DOCUMENTATION

25 07 00 BMCS TESTING AND INSPECTIONS

25 08 00 BMCS COMMISSIONING REQUIREMENTS

25 15 00 BMCS SOFTWARE

25 16 00 BMCS SOFTWARE INTERFACES

25 24 19 BMCS VALVES

25 30 10 BMCS FIELD DEVICES – ELECTRICAL

25 30 20 BMCS FIELD DEVICES – AIR

25 30 30 BMCS FIELD DEVICES – WATER

25 35 23 BMCS DAMPERS

25 80 00 BMCS SCHEDULES, DIAGRAMS, AND SEQUENCES

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26 00 10 GENERAL REQUIREMENTS

26 00 20 SCOPE OF WORK

26 05 11 ELECTRICAL SERVICE

26 05 13 ELECTRICAL CONDUCTORS – MEDIUM VOLTAGE

26 05 19 ELECTRICAL CONDUCTORS – VOLTS

26 05 23 MOTOR AND CONTROL WIRING SYSTEMS

26 05 26 GROUNDING AND BONDING

26 05 33 RACEWAYS AND BOXES

26 05 73 ELECTRICAL POWER SYSTEM STUDY

26 08 00 ELECTRICAL COMMISSIONING REQUIREMENTS

26 08 13 TESTING

26 08 13 ELECTRICAL POWER MONITORING – TENANT SUBMETERING

26 09 23 CONTACTORS

26 09 26 LIGHTING CONTROL RELAY PANELS

26 22 13 LOW-VOLTAGE DRY-TYPE DISTRIBUTION TRANSFORMERS

26 22 14 HARMONIC MITIGATING TRANSFORMERS (HMT)

26 24 13 SWITCHBOARDS – 600 VOLTS

26 24 16 PANELBOARDS

26 25 00 BUSWAYS

26 27 26 WIRING DEVICES

26 28 13 FUSES

26 28 16 ENCLOSED SWITCHES AND CIRCUIT BREAKERS

26 29 13 ENCLOSED CONTROLLERS

26 32 13 ENGINE GENERATORS

DIVISION 28 ELECTRONIC SAFETY AND SECURITY

TENANT IMPROVEMENTS STANDARD SUMMARY

TENANT IMPROVEMENTS STANDARDS

DIVISION 8 DOORS AND WINDOWS

08 11 13 HOLLOW METAL DOORS AND FRAMES

Steel Doors

Manufacturers: Hollow Metal Xpress (HMX)
Type: Continuously welded and ground smooth, seamless design, minimum 16 ga. thick cold-rolled steel sheet faces
Size: 1-3/4" thick, 3'-0" wide, 8' 10-1/2" tall (VIF)

Steel Frames

Manufacturers: Hollow Metal Xpress (HMX)
Type: Seamless design, concealed fastenings, minimum 16 ga. thick cold-rolled steel sheet constructed to ANSI/SDI 100
Size: 1-1/2" wide, 1" + partition thickness

08 14 16 FLUSH WOOD DOORS

Non-Rated

Manufacturer: Eggers
Type: "PARTICLEBOARD"
Face Veneers/Finish: (WD-2) Eucalyptus, quartered, unfigured
Size: 1-3/4" thick, 3'-0" wide, 8' 10-1/2" tall (VIF)

Fire-Rated

Manufacturer: Eggers
Type: "FIREGUARD PLUS"
Face Veneers/Finish: (WD-2) Eucalyptus, quartered, unfigured
Size: 1-3/4" thick, 3'-0" wide, 8' 10-1/2" tall (VIF)

Acoustical

Manufacturer: Eggers
Type: "ACOUSTICAL"
Face Veneers/Finish: (WD-2) Eucalyptus, quartered, unfigured
Size: 1-3/4" thick, 3'-0" wide, 8' 10-1/2" tall (VIF)

08 41 13 ALUMINUM FRAMED ENTRANCES

Materials & Components

Manufacture: Kawneer
Type: Aluminum and glass swing door, single glazing
Door Stiles: 3-1/2" sides, 3-9/16" top, 10" bottom
Glass Type/Color: 3/8" clear tempered glass
Size: 1-3/4" thick and as scheduled on drawings
Wall Thickness: 3/16" minimum

Hardware

Exit Device: Blumcraft H-100-F US32D
Closer: Rixson H2790° NHO extended spindle US26D
Intermediate Pivot: Rixson ML19 x 3/4"
Concealed Overhead Stop: Glynn-Johnson 100 Series US32D
Weather-stripping: By door manufacturer

08 41 26 ALL GLASS ENTRANCES

Materials & Components

Manufacturer: C.R. Laurence Co., Inc.
Finish: Stainless Steel ASTM A666 Type 304
Glass: 3/4" (19mm) thick, fully tempered
Accessory Fittings: Overhead doorstop & Center-housing lock.
Anchors and Fastenings: Concealed.
Weather Stripping: Sweep type.

Hardware

Push: Blumcraft Dummy DH-100 US32D
Pull: Blumcraft Dummy DH-130 US32D
Floor Closer: Dorma BTS 80
Transom Bar: Blumcraft B-1250 US32D
Mounting Block & Door Stop/Strike: Blumcraft S-100 US32D
Floor Stop: Ives FS439 US32D
Threshold: Custom Stainless Steel

08 71 00 DOOR HARDWARE

Hinges
Manufacturer: Stanley Hardware
Type: CB1960R
Finish US32D

Hinges Electrical
Manufacturer: Stanley Hardware
Type: CECB1960R
Finish US32D

Lockset
Manufacturer: Schlage Lock Co.
Type: L9080 x 07 x 630
Finish: US32D

Latchset
Manufacturer: Schlage Lock Co.
Type: L9010 x 07 x 630
Finish: US32D

Closer
Manufacturer: Norton
Type: CLP 8501 BF
Finish: US32D

Door Stop (Floor)
Manufacturer: Hagar
Type: 259 F
Finish: US32D

Door Stop (Wall)
Manufacturer: Trimco
Type: 1271 TB
Finish: US32D
Note: Height as required

Automatic Flush Bolts
Manufacturer: Ives
Type: FB31P or FB31P x DP1 Dustproof Strike
Finish: US32D
Note: 24" top bolt

Manual Flush Bolts
Manufacturer: Ives
Type: FB458 or FB358 x DP2 Dustproof Strike
Finish: US32D

Coordinator
Manufacturer: Ives
Type: COR Series USP with Filler Bar
Finish: Color to match door frame

Jamb/Head Gasket
Manufacturer: Pemko
Type: S88 D

Door Bottom
Manufacturer: Pemko
Type: 315 CN
Finish: Housing painted to match door color

Astragal
Manufacturer: Pemko
Type: 303 AS
Finish: Housing painted to match door color

DIVISION 9 FINISHES

09 00 20 STONE SCHEDULE

ST-1

Location: Lobby Floor
Type: Limestone
Name: Aurisina Granitelo
Country: Italy
Finish: Honed with field applied sealer to provide polished appearance with slip-resistance
Thickness: Minimum 3 cm

ST-2

Location: Lobby Floor Accent, Conference Lobby Floor
Type: Marble for high-traffic floors
Name: Lasa
Country: Italy
Finish: Honed with field applied sealer to provide polished appearance with slip-resistance
Thickness: Minimum 3 cm

ST-3

Location: Lobby Walls
Type: Limestone
Name: Mocha Creme
Country: Portugal
Finish: Honed, vein cut
Thickness: Minimum 2 cm

ST-4

Location: Lobby Desk
Type: Limestone
Name: Mocha Creme
Country: Portugal
Finish: Honed
Thickness: Minimum 2 cm

ST-5

Location: Passenger Elevator Cabs
Type: Marble (White)
Name: Calcite White Extra
Country: Brazil
Finish: Polished
Thickness: 8 mm on 8 mm honeycomb aluminum backer for stone in elevator cabs

ST-6A

Location: Lobby Level Fountain
Type: Cobble
Name: Beach Pebble Black
Country: Mexico
Finish: Smooth
Size: 3”-5”

ST-6B

Location: Beneath Conference Center Stair & Concourse Escalators
Type: Cobble
Name: Beach Pebble Grey
Country: Mexico
Finish: Smooth
Size: 3”-5”

06 40 23 WOOD VENEERS

WD-1

Location: Lobby Walls & Ceilings
Grade: Premium
Type: Eucalyptus, quartered, figured
Match: Slip match
Finish: Matte

WD-2

Location: Level 1 Elevator Lobbies; Solid Core Wood Doors; Restroom Doors
Grade: Premium
Type: Eucalyptus, quartered, unfigured
Match: Slip match
Finish: Matte

09 29 00 GYPSUM BOARD PARTITIONS

Base Building Fire Rated Partition (2 hour)

Studs: 4" (6" on Floor 1) wide, G40 hot dipped galvanized, 20 gauge steel, ASTM C645 meeting a maximum deflection of L/240 at 5 lbf per sq. ft. spaced at 24" o.c.
Gypsum Board: 5/8" type X - 2 layers on each side, ASTM C36
Insulation: 1 1/2" thick USG "Thermafiber SAFB" Sound Attenuation Fire Blankets conforming to the property requirements of ASTM C665, Type I
Height: Floor slab to underside of fire rated structural slab above
Note: Constructed in compliance with UL Design U419

Base Building Fire Rated Partition (1 hour)

Studs: 4" (6" on Floor 1) wide, G40 hot dipped galvanized, 20 gauge steel, ASTM C645 meeting a maximum deflection of L/240 at 5 lbf per sq. ft. spaced at 24" o.c.
Gypsum Board: 5/8" type X - single layer on each side, ASTM C36
Insulation: 1 1/2" thick USG "Thermafiber SAFB" Sound Attenuation Fire Blankets conforming to the property requirements of ASTM C665, Type I
Height: Floor slab to underside of fire rated structural slab above
Note: Constructed in compliance with U.L. Design No. U448

Base Building Standard Partition

Studs: 4" (6" on Floor 1) wide, G40 hot dipped galvanized, 25 gauge steel, ASTM C645 spaced at 24" o.c.
Gypsum Board: 5/8" type X - single layer on each side, ASTM C36
Height: Finish floor to underside of finished ceiling.

09 30 00 INTERIOR CERAMIC TILE

CT-1

Thin Set Toilet Room Floor Tile
Manufacturer: Daltile
Name: Exhibition
Style No.: EX0212241P
Color: EX02 GREY STD
Size: 24" x 48" x 5/16"
Joint Width: 1/8"
Finish: Unpolished

CT-2

Toilet Room Walls & Base
Manufacturer: Daltile
Name: Ever
Style No.: EV0112241P
Color: EV01 MOON STD
Size: 24" x 48" x 5/16" mesh back
Joint Width: 1/8"
Finish: Honed

CT-4A

Toilet Room Vanity Walls - Accent:
Manufacturer: Horizon Tile
Style No.: HIT 143 BC 2051
Color: Red
Size: 1" x 1" mesh back
Pattern: Mosaic

CT-4B

Toilet Room Vanity Walls - Accent:
Manufacturer: Horizon Tile
Style No.: HIT 143 BC 1001
Color: Blue
Size: 1" x 1" mesh back
Pattern: Mosaic

09 51 13 ACOUSTICAL PANEL CEILINGS

CLG-2

Type: Typical Acoustical Tile
Location: Typical tenant spaces and service areas
Type: Armstrong Lay-In-Tile, Optima Open Plan
Size: No. 3251, 24" x 24" x 1" square tegular edge
Suspension: Armstrong 9/16" wide square tegular with Peak Form Silhouette
Rating: Class A

CLG-3

Type: Acoustical Tile
Location: Multi-tenant Lobbies
Type: Armstrong Lay-In Tile, Optima Open Plan
Size: No. 3257, 24" x 48" x 1" square tegular edge
Suspension: Armstrong 9/16" wide square tegular with Peak Form Silhouette
Rating: Class A

09 65 19 RESILIENT TILE FLOORING

VCT-1

Manufacturer: Armstrong World Industries, Inc.
Type: "STONETEX", Standard Excelon Series
Class: 2 (through-pattern tile)
Wearing Surface: Smooth
Thickness: 0.125 inch (3.2 mm)
Size: 12 by 12 inches (3305 by 305 mm)
Color: 52127 "Stone White"

VCT-2

Manufacturer: Armstrong World Industries, Inc.
Type: "STONETEX", Standard Excelon Series
Class: 2 (through-pattern tile)
Wearing Surface: Smooth
Thickness: 0.125 inch (3.2 mm)
Size: 12 by 12 inches (3305 by 305 mm)
Color: Smokey Brown 51868
Style: Imperial Texture

Rubber Floor Tile

Manufacturer: Johnsonite Rubber Floor Tiles
Type: HRT – Hammered Surface Rubber Floor Tile
Thickness: .125"
Color: #48 Grey
Size: 24" x 24"

09 65 13 RESILIENT BASE

VB-1

Manufacturer: Armstrong
Type: Color Integrated Wall Base
Group: Manufacturing Method: 1 solid
Style: Straight.
Minimum Thickness: 0.125 Inch (3.2 mm)
Height: 4 inches (102 mm)
Surface: Smooth
Color: 23 Milk

09 68 13 TILE CARPETING

CPT-4

Location: Building Standard & Multi-Tenant Corridors
Manufacturer: Shaw
Collection: Homage
Style: Embellish
Construction: Multi-level Pattern Loop
Fiber: Eco Solution Q Nylon
Size: 2' x 2'
Color: Embossed, No. 71504
Total Thickness: 0.237

CPT-5

Location: Multi-Tenant Elevator Lobby Accent Carpet.
Manufacturer: Shaw
Collection: Homage
Style: Embellish
Construction: Multi-level Pattern Loop
Fiber: Eco Solution Q Nylon
Size: 2' x 2'
Color: Embossed, No. 71504
Total Thickness: 0.237

CPT-6

Location: Multi-Tenant Elevator Lobby Accent Carpet between Elevator Doors.
Manufacturer: Shaw.
Collection: Homage
Style: Embellish
Construction: Multi-level Pattern Loop
Fiber: Eco Solution Q Nylon
Size: 2' x 2'
Color: Embossed, No. 71504
Total Thickness: 0.237

09 69 00 ACCESS FLOORING

AF-1

Manufacturer: Haworth, Inc.
Type: TecCrete
Rating: 1250 psi

AF-2

Manufacturer: Haworth, Inc.
Type: TecCrete
Rating: 2500 psi

AF-3

Manufacturer: Haworth, Inc.
Type: TecCrete
Rating: 2000 psi

09 72 00 VINYL WALL COVERING

WC-1

Manufacturer: Knoll Textiles
Category: Knoll Panel, Environmental Screens
Name: Titanium
Design: Reflect, W884
Width: 67"
Weave: Dobby
Weight: 13.5 oz./lineal yard
Pattern Repeat: Nil
Rating: Class A

09 91 00 PAINTING

PT-1

Location: Walls and Fascias, Hollow Metal Doors and Frames
Manufacturer: Sherwin Williams
Primer: 1 ct. ProMar 200 Zero VOC Latex Primer, B28W2600
Finish Coats: 2 cts. ProMar 200 Latex Eggshell
Color: Match Benjamin Moore "Ice Mist".
Number: Color match Benjamin Moore "OC-67"

PT-2

Location: Gypsum Board Ceilings, (Main Lobby, Multitenant Elevator Lobby, Restrooms)
Manufacturer: Sherwin Williams
Primer: 1 ct. ProMar 200 Zero VOC Latex Primer, B28W2600
Finish Coats: 2 cts. ProMar 200 Zero VOC Latex Flat, B30W02651
Color: "Luminous White"
Number: SW1900

PT-6E

Location: Exposed Structural Steel Support for Specialty Glazing; Conference Center Stair
Manufacturer: Sherwin Williams
Primer: 1 ct. Shop Coat Primer must be approved in writing by fireproofing manufacturer
Intermediate Coat: 1 ct. Intermediate Coat Macropoxy 646-100 for All Exterior Steel
Finish Coats: 1 ct. Acrolon 218 HS Acrylic Polyurethane topcoat plus 1 ct. Diamond-Clad Clear Coat Urethane
Color: Sherwin Williams color to match Benjamin Moore "Iced Cube Silver"
Number: Color match Benjamin Moore #2121-50
Finish: Eggshell (Satin)

PT-7E

Location: Tower Crown
Manufacturer: Sherwin Williams
Primer: 1 ct. ProMar 200 Zero VOC Latex Primer B28W2600
Finish Coats: 2 cts. ProMar 200 Zero VOC Latex Flat, B30W02651
Color: Sherwin Williams color to match Benjamin Moore “Thundercloud Gray”
Number: Color match Benjamin Moore #2124-40
Finish: Eggshell (Satin)

DIVISION 10 SPECIALTIES

10 44 00 FIRE EXTINGUISHERS AND CABINETS

Recessed Cabinets

Type: J.L. Industries "EMBASSY" No. 5614S21 (cabinet size 24” H, 10-1/2” W) recessed trim-less fire extinguisher cabinet with flanged tub constructed of cold-rolled steel
Door: "Oversized" solid steel without vision panel, with concealed hinge and concealed handle
Finish: Factory-applied epoxy, corrosion and impact resistant
Color: Paint Color No. PT-1S to match adjacent wall finish
Letters: Die cut letters in to match Architect’s sample

Fire Extinguisher

Manufacturer: J.L. Industries "COSMIC 10E" multipurpose dry chemical type consisting of heavy-duty steel cylinder, rugged metal valve and siphon tube, replaceable molded valve stem seal, pull pin and upright squeeze-grip operation
Rating: UL 4A-60BC, 10 lbs. capacity, approved to -65°F, nontoxic
Color/Finish: Factory-applied red epoxy, corrosion and impact resistant

DIVISION 12 FURNISHINGS

Roller Window Shades

Manufacturer:	Architectural Fabrics
Fabric:	Shearweave – V03 Pewter/Chalk Fabric
Colors:	Exterior Facing Side Should be the Dark Gray. Interior Side should be White

DIVISION 21 FIRE SUPPRESSION

21 13 00 FIRE SUPPRESSION SPRINKLER SYSTEM

Sprinkler Heads – Finished Areas

Manufacturer:	Viking
Model:	Mirage Standard
Description:	Concealed pendant, white cover plate

Sprinkler Heads – Shell and Mechanical Areas

Manufacturer:	Viking
Model:	Microfast Quick Response
Description:	Upright, bronze

DIVISION 22 PLUMBING

22 40 00 CLEAN-OUTS, DRAINS, AND PLUMBING FIXTURES

Plumbing Fixtures

Lavatory

Manufacturer:	American Standard
Model:	0614.000 (Studio); 2506.175 (Moments Selectronic)
Description:	Undercounter sink; single-inlet, multi AC powered faucet

Water closet

Manufacturer:	American Standard
Model:	3351.528 (Afwall Millenium FloWise); 5905.100SS
Description:	Exposed top spud bowl; self-sustaining hinge; elongated heavy duty bowl open front seat

Urinal

Manufacturer:	American Standard
Model:	6890.525 (Washbrook FloWise); 6063.013.002 (Selectronic FloWise)
Description:	Exposed top spud urinal; flush valve

DIVISION 23 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 37 00 AIR DISTRIBUTION EQUIPMENT

Underfloor air swirl diffuser – passive
Manufacturer: Nailor
Model: ANFD PFG
Description: Aluminum floor swirl diffuser, size 8

Underfloor air swirl diffuser – passive
Manufacturer: Price Industries
Model: RAFTD RPF
Description: Aluminum floor swirl diffuser, size 8

Underfloor air swirl diffuser – active
Manufacturer: Nailor
Model: ANFD-VAV PFG
Description: Aluminum floor swirl diffuser with actuator, size 8

Perimeter slot diffuser
Manufacturer: Nailor
Model: 4360
Description: Flush face

DIVISION 25 ELECTRONIC SAFETY AND SECURITY

25 30 30 BMCS FIELD DEVICES - WATER
Leak Detection Sensor
Manufacturer: Liebert
Model: Liqui-tect 460

DIVISION 26 ELECTRICAL

26 09 13 ELECTRICAL POWER MONITORING – TENANT SUBMETERING
Tenant Submetering
Manufacturer: Siemens
Model: MD Model Power Meter

26 22 14 HARMONIC MITIGATING TRANSFORMERS
Harmonic Mitigating Transformers
Manufacturer: Siemens Series 3F3Y
Type: TP-1Rated, Electrostatic Shielded, Harmonic Mitigating Transformers.
KVA Rating: As required.
Phase Shift: 0º or 30º as required based on adjacent transformers.

26 24 16 PANELBOARDS
Panelboards
Manufacturer: Siemens Series 3F3Y
Description: Type P1, P2, P3

26 27 26 WIRING DEVICES
Line Voltage Switches
Manufacturer: Leviton (or equivalent)
Model: A1221-2W
Description: Extra heavy-duty, 20A, single-pole toggle switch

Manufacturer: Leviton (or equivalent)
Model: A1223-2W
Description: Extra heavy-duty, 20A, 3-way toggle switch

Plug Receptacles
Manufacturer: Leviton (or equivalent)
Model: 5362-W
Description: Heavy-duty industrial grade duplex receptacle

Manufacturer: Leviton (or equivalent)
Model: N7899-W
Description: GFCI 20A duplex receptacle

Coverplates
Manufacturer: Leviton (or equivalent)
Model: Decora Series
Finish: White

Wallbox Dimmers
Manufacturer: Lutron
Model: Nova T
Finish: White
Description: Series provides multiple offerings for dimming control compatible with multiple light source types

Underfloor Wire Distribution Box

Manufacturer: Hubbell (or equivalent by Communications Integrators Inc. or Legrand)
Model: CONNEXION Zone Distribution System
Description: Distribution box for underfloor power and data wiring distribution system. Floor box sized to fit 8.4" RO in RAF.
Notes: 1. All homeruns for underfloor wiring shall be in EMT conduit.
2. Daisychain connections for floorbox receptacles is not permitted.

26 55 13 ARCHITECTURAL LIGHTING FIXTURES
Lighting Fixtures

Recessed Architectural LED 2x4
Manufacturer: Lumenwerx
Type: NOV-24-OMP-HLO-LED-80-5500-35-UNV-1-TBD-W-TBD-TBD

Recessed Architectural Flourescent 2x4
Manufacturer: Lumenwerx
Type: NOV-24-PMO-HLO-T8-2-UNV-RS or D TBD-1-TBD-W-TBD-TBD

Architectural LED Exit Sign
Manufacturer: Hubbell Dual Lite
Type: LE-C/W-S/D-G-AS REQ-W-A-M

Round Compact Fluorescent Downlight
Manufacturer: Kurt Versen
Type: P926-SC-WT

Round LED Downlight
Manufacturer: Kurt Versen
Type: A1135-13-35-120/277-SC-WT

DIVISION 28 FDAC System

28 31 30 FDAC SYSTEM
Fire Control Panel
Manufacturer: Notifier by Honeywell
Model: NFS2-3030

Intelligent Detector
Manufacturer: Notifier by Honeywell
Model: FAPT-851

Duct Smoke Detector
Manufacturer: Notifier by Honeywell
Model: DNR

Heat Detector
Manufacturer: Notifier by Honeywell
Model: 302 Series

Strobes, Speaker-Strobes, Wall and Ceiling
Manufacturer: Notifier by Honeywell
Model: SpectrAlert Advance

TAB F3 - TENANT STANDARD DETAILS

801 DOOR ELEVATION
802 DOOR W/ SIDELIGHT ELEVATION
803 TYPICAL DOOR JAMB DETAIL
804 TYPICAL DOOR HEAD DETAIL
805 TYPICAL DOOR SILL DETAIL

811 DOOR / SIDELIGHT JAMB DETAIL
812 SIDELIGHT JAMB DETAIL
813 DOOR HEAD DETAIL
814 SIDELIGHT HEAD DETAIL
815 SIDELIGHT SILL DETAIL

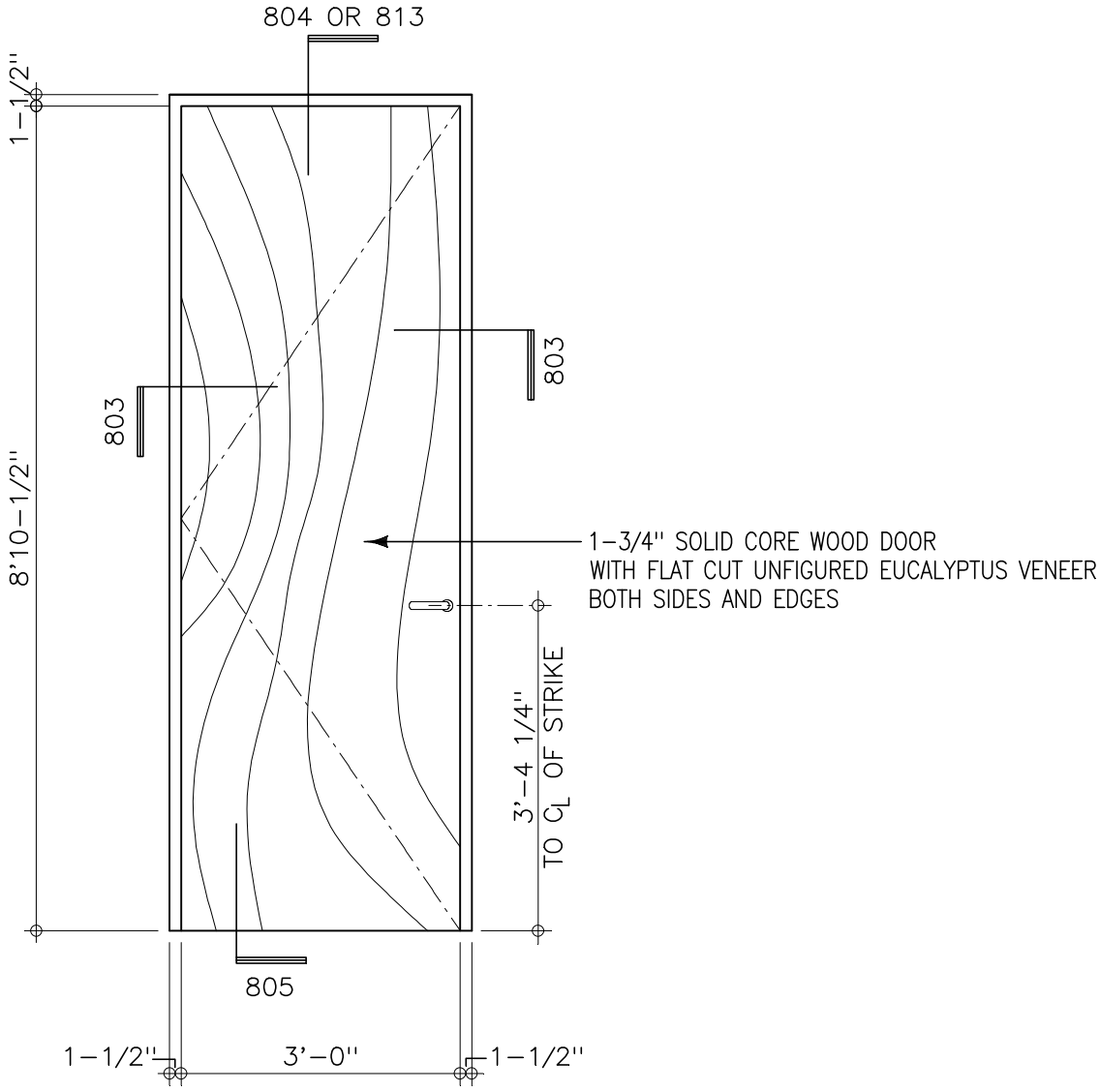
901 MECHANICAL Z-WALL PARTITION
902 STANDARD WALL PARTITION
903 DEMISING WALL PARTITION
904 TWO HOUR RATED PARTITION DETAIL
905 ONE HOUR RATED PARTITION DETAIL
906 STANDARD PARTITION DETAIL
907 DEMISING PARTITION DETAIL
908 CONDUIT / PIPE PENETRATION DETAIL
909 PARTITION AT MULLION DETAIL
910 TYPICAL COLUMN ENCLOSURE

921 VERTICAL HANGER ATTACHMENT DETAIL
922 CONTROL JOINT AT GYP. BD. CEILING DETAIL
923 GYP. BD. CEILING AT WALL DETAIL
924 ACOUSTICAL CEILING TO GYP. BD. DETAIL

931 ACCESS FLOOR DETAILS
932 ACCESS FLOOR DETAILS

951 WALL SECTION (TYPICAL)
952 RCP PARTIAL PLAN
953 RCP AT PERIMTER SLOT DIFFUSER
954 WINDOW MULLION HEAD DETAIL
955 CEILING TERMINATION DETAIL
956 WALL SECTION (LEVEL 12 – TERRACE)
957 PERIMETER SILL DETAIL (LEVEL 12 - TERRACE)
958 PERIMETER HEAD DETAIL (LEVEL 12 – TERRACE)
959 WALL SECTION (LEVEL 13)
960 PERIMETER HEAD DETAIL (LEVEL 12)
961 LIGHT BOX PLAN DETAIL
962 LIGHT BOX HEAD DETAIL

991 TYPICAL MOUNTING HEIGHTS
992 TYPICAL LEAK PROTECTION AT WET AREA PERIMETER



DOOR ELEVATION

SCALE: 1/2"=1'–0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

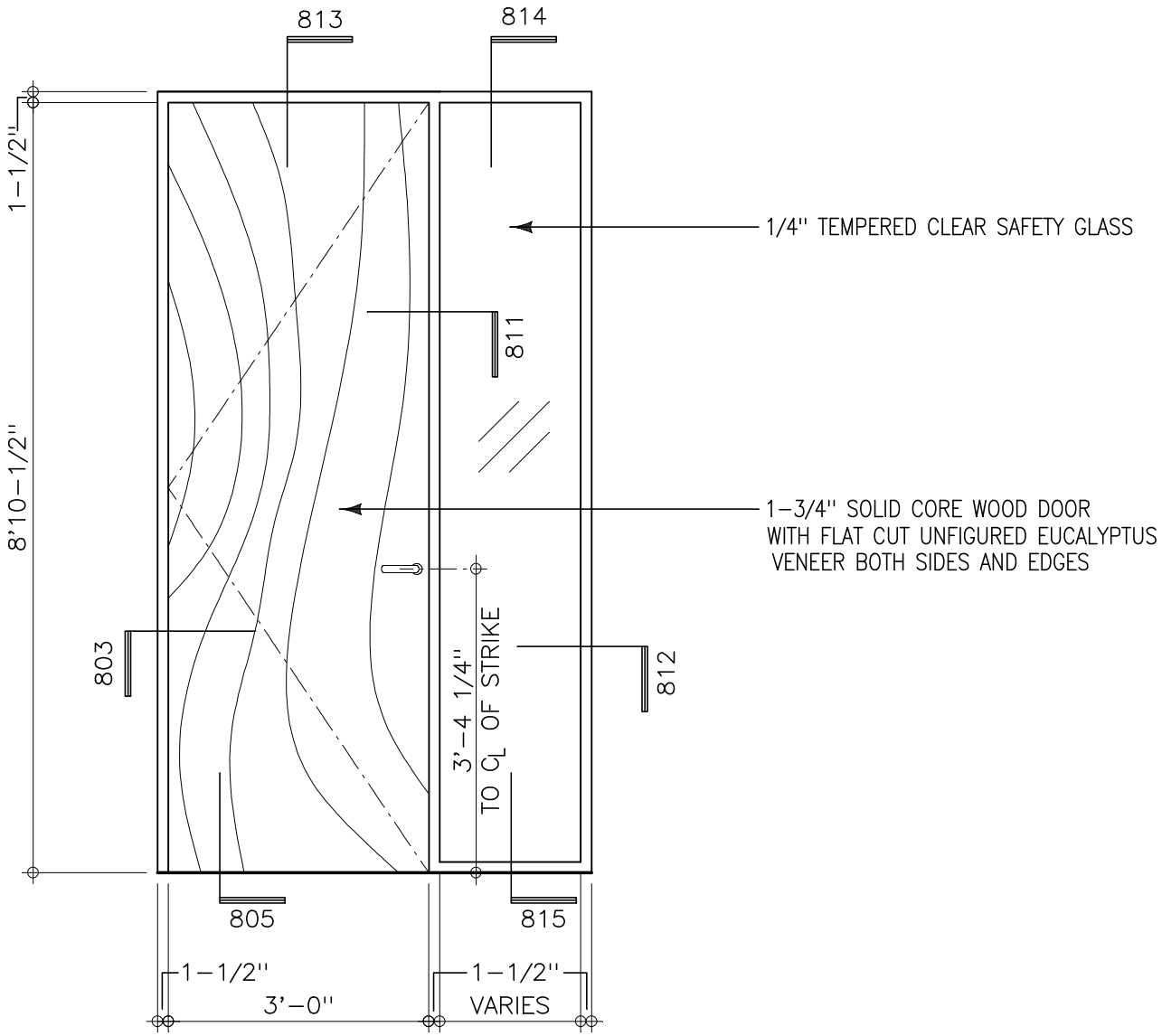
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

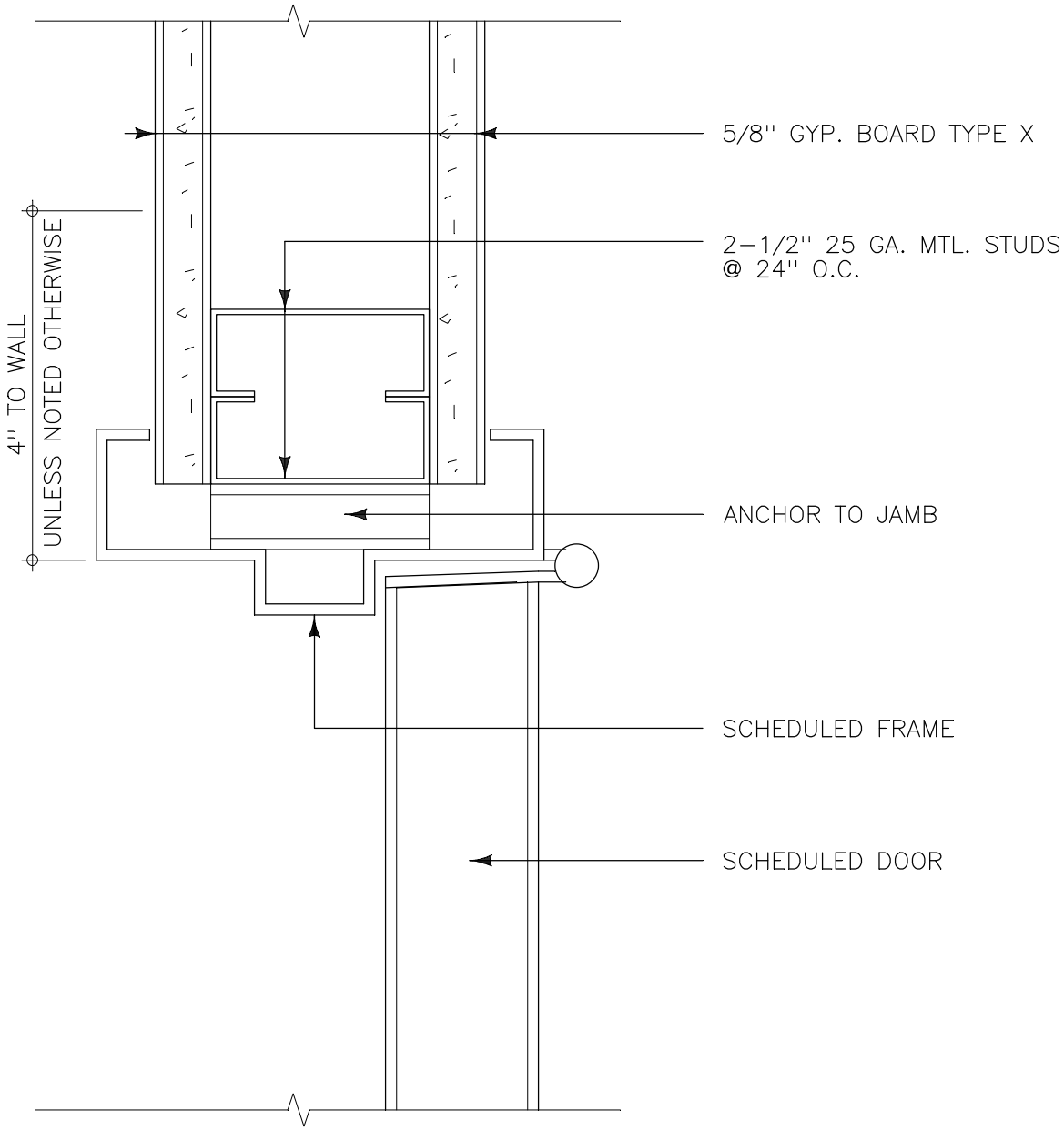
TENANT

801



DOOR W/ SIDELIGHT ELEVATION **SCALE: 1/2"=1'–0"**

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 802



TYPICAL DOOR JAMB DETAIL

SCALE: 6''=1'–0''

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

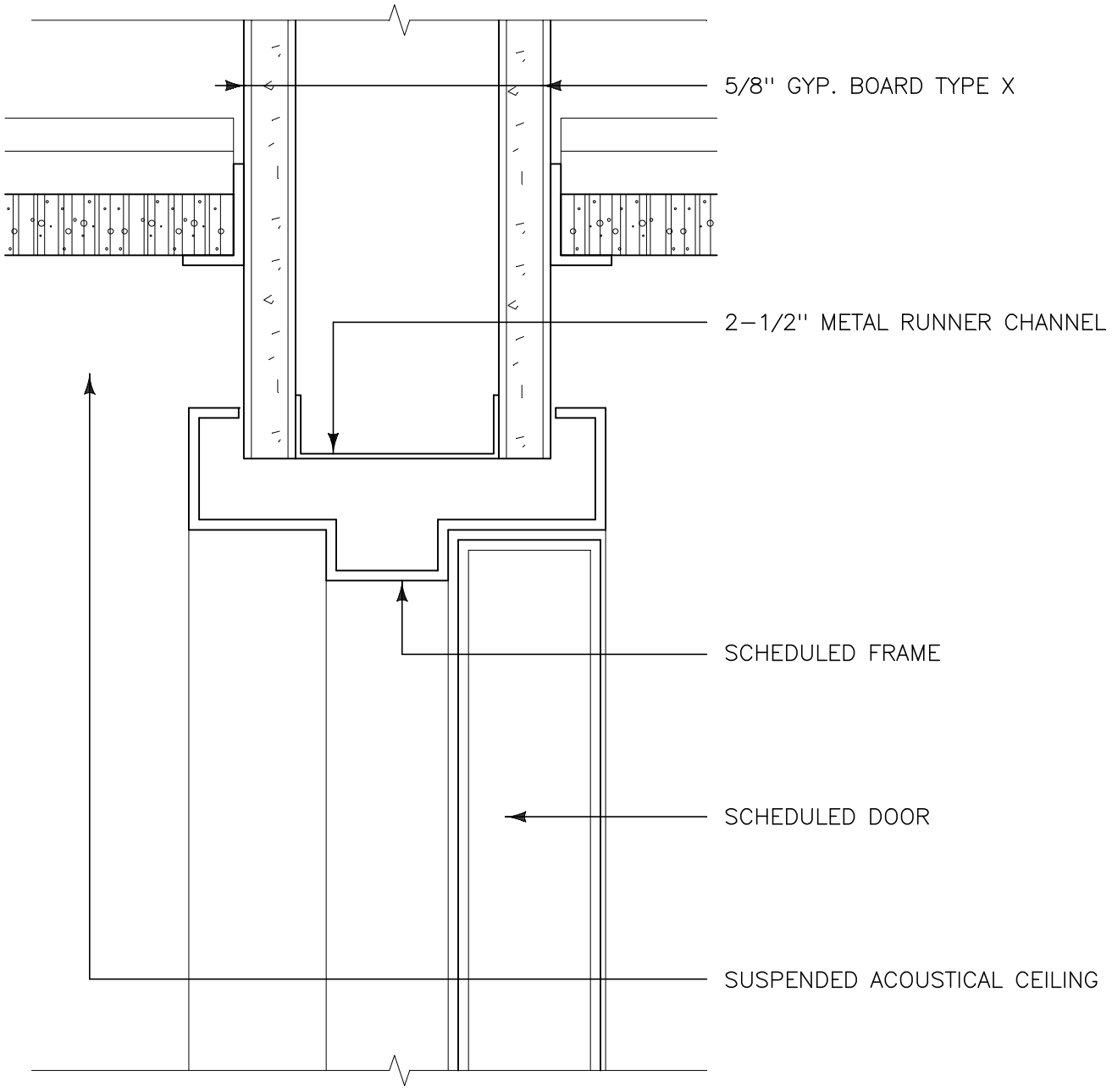
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

803



TYPICAL DOOR HEAD DETAIL

SCALE: 6''=1'–0''

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

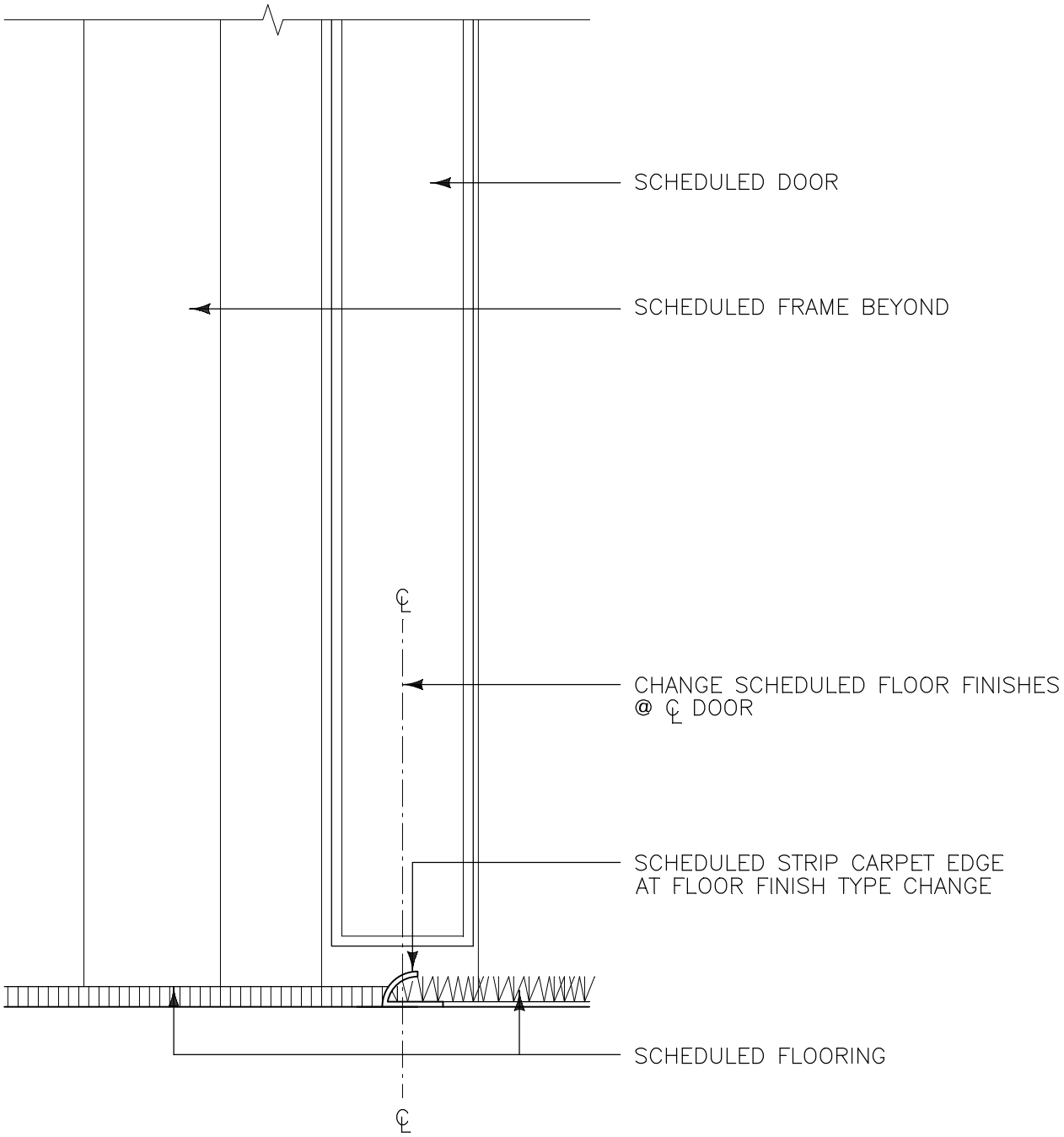
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

804



TYPICAL DOOR SILL DETAIL

SCALE: 6''=1'–0''

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

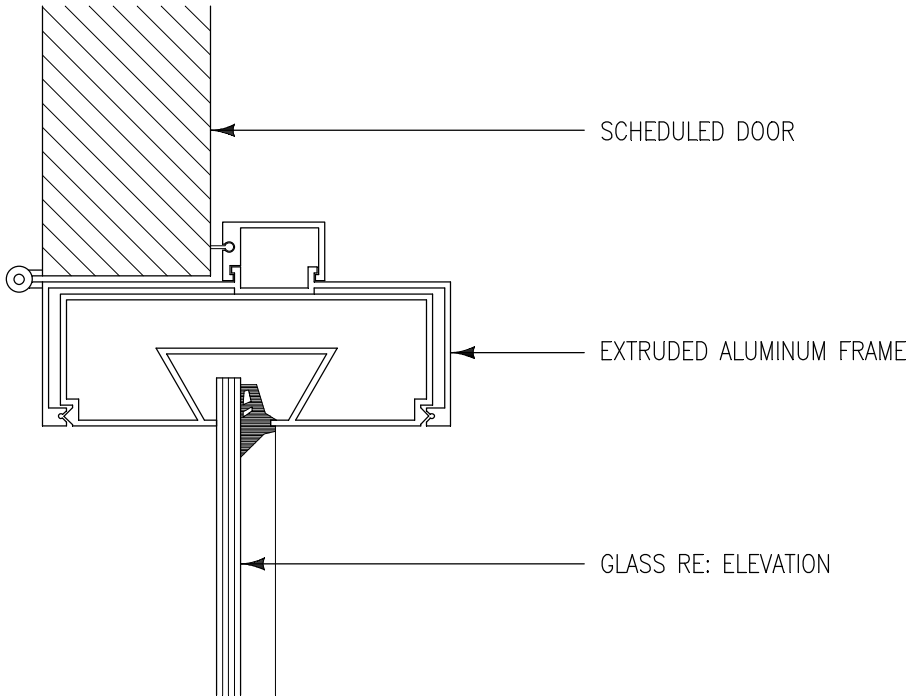
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

805



DOOR / SIDELIGHT JAMB DETAIL

SCALE: 6''=1'–0''

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

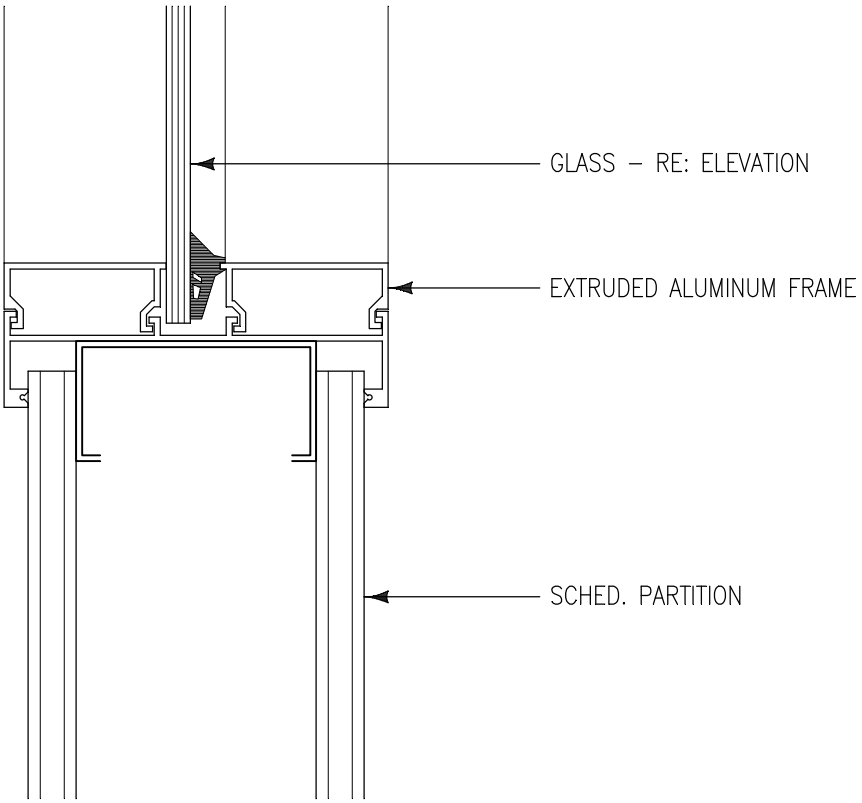
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

811



SIDELIGHT JAMB DETAIL

SCALE: 6''=1'–0''

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

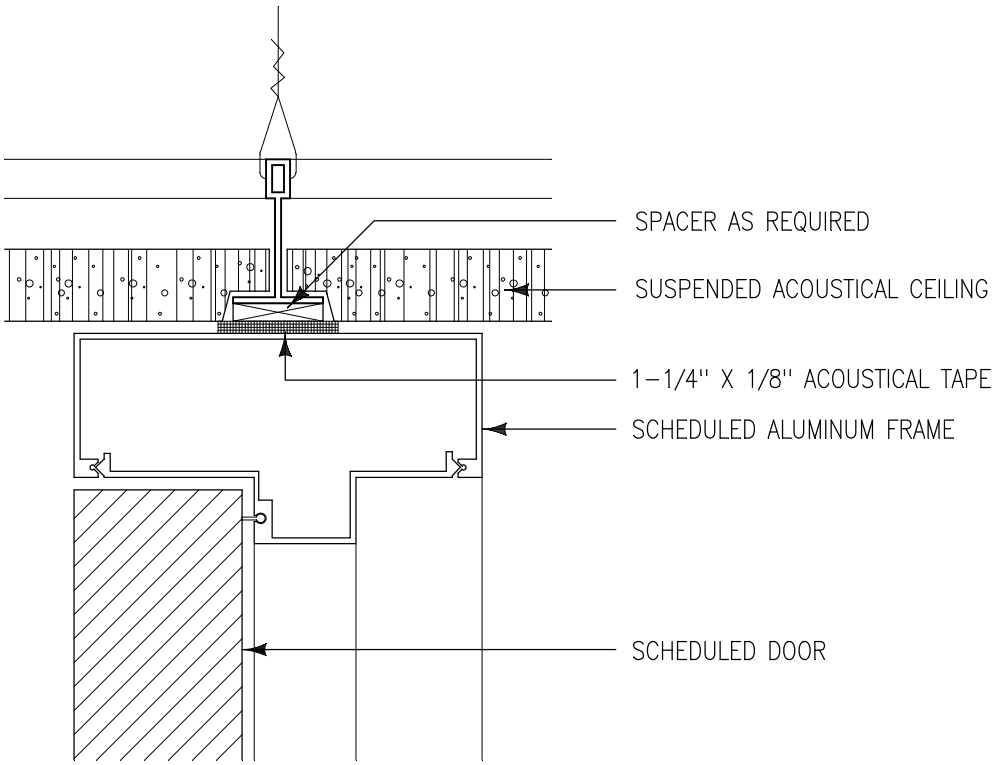
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

812



DOOR HEAD DETAIL

SCALE: 6"=1'-0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

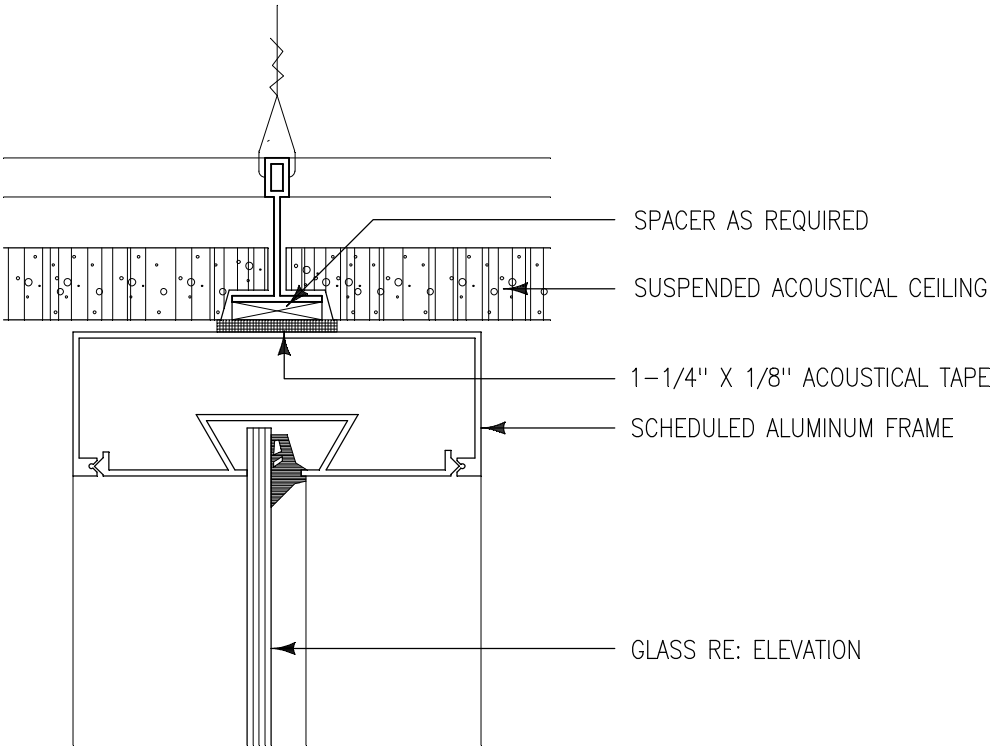
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

813



SIDELIGHT HEAD DETAIL

SCALE: 6"=1'–0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

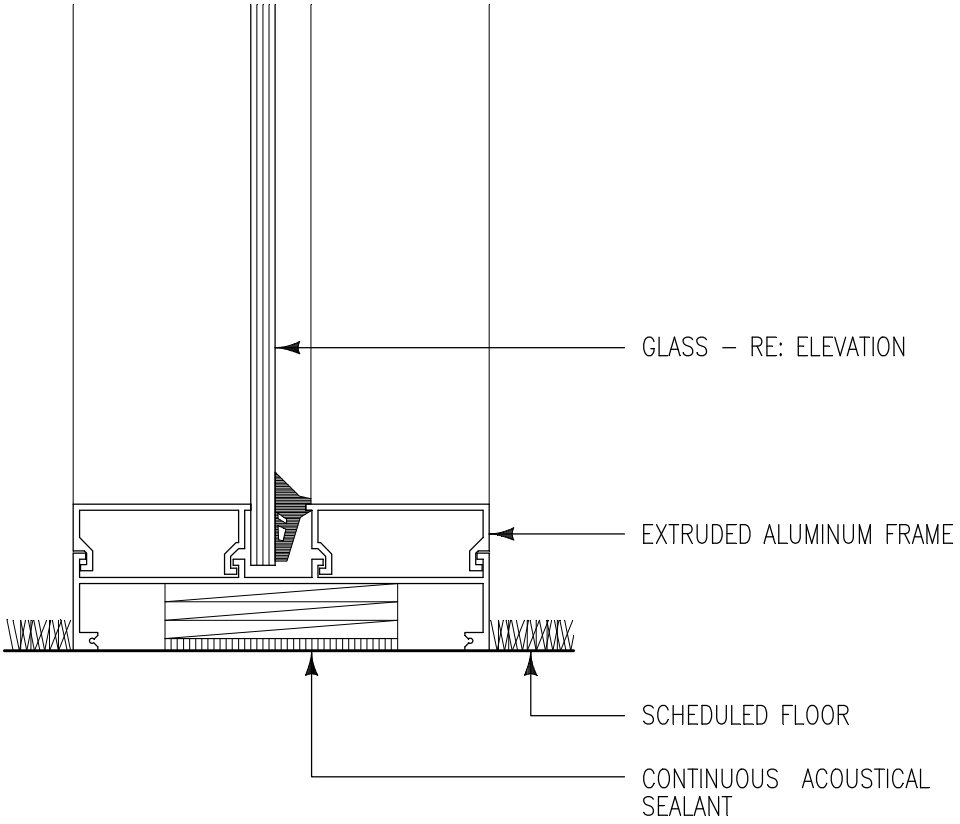
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

814



SIDELIGHT SILL DETAIL

SCALE: 6''=1'–0''

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

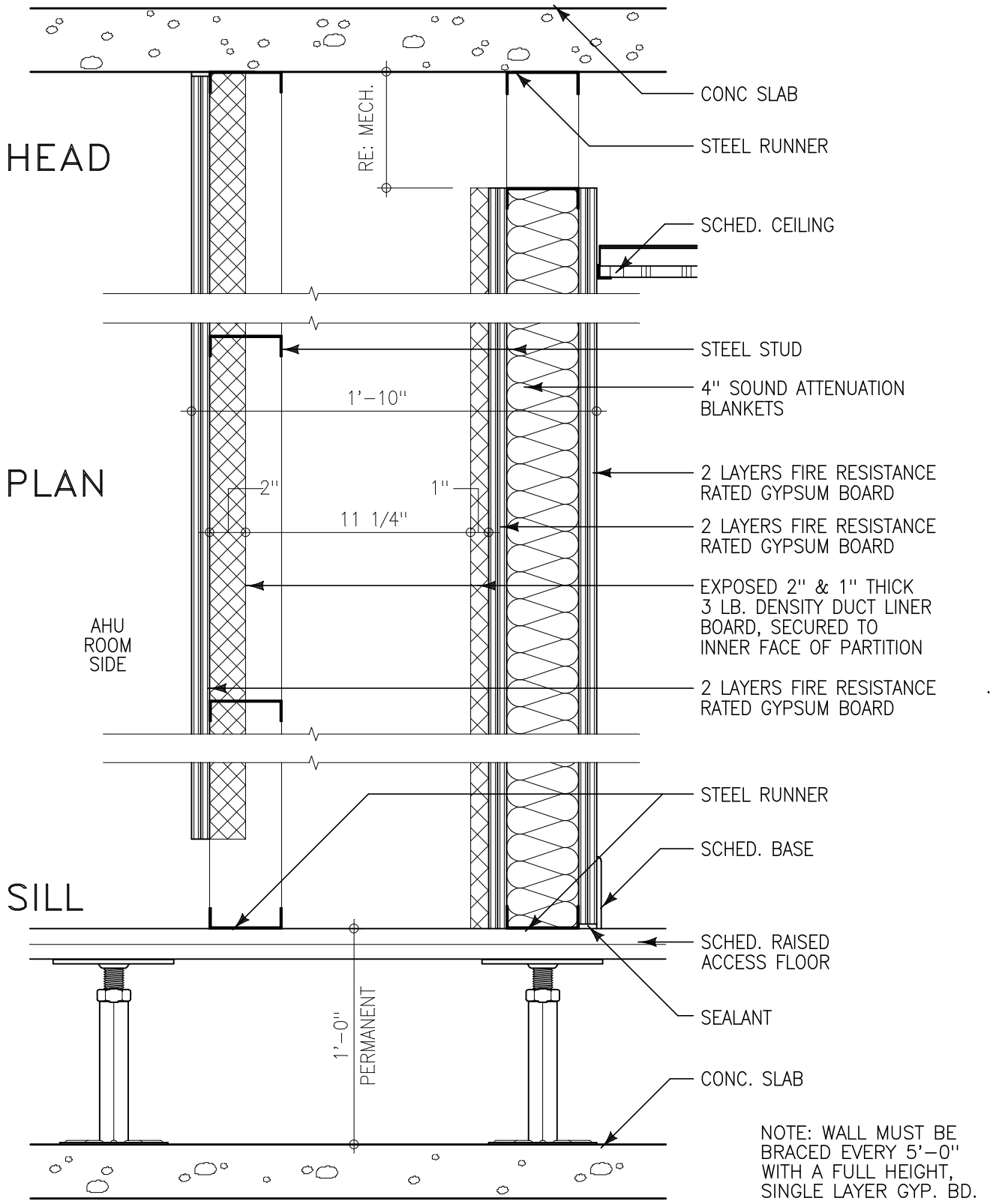
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

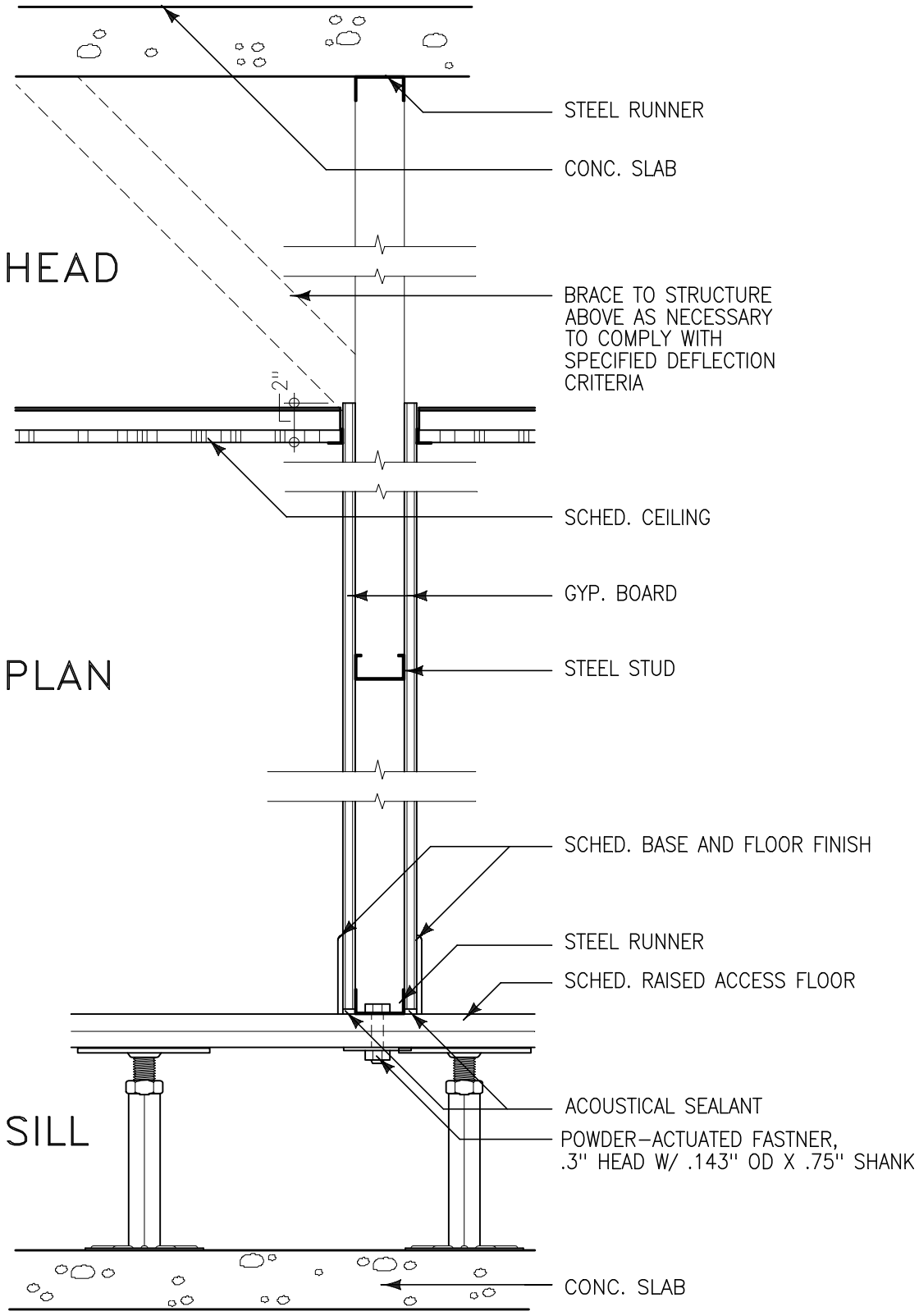
TENANT

815



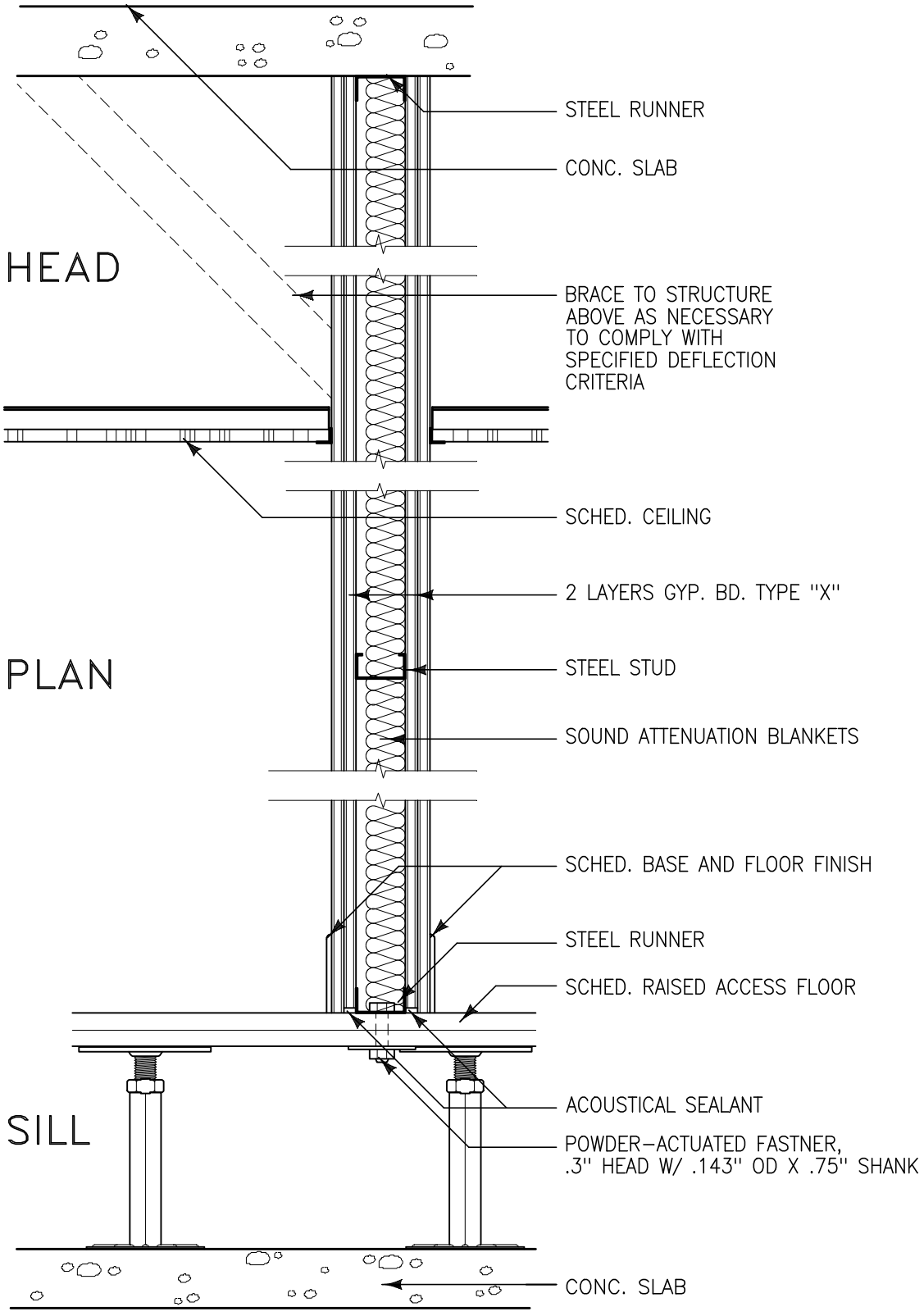
MECHANICAL Z-WALL PARTITION **SCALE: 1 1/2"=1'-0"**

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 901



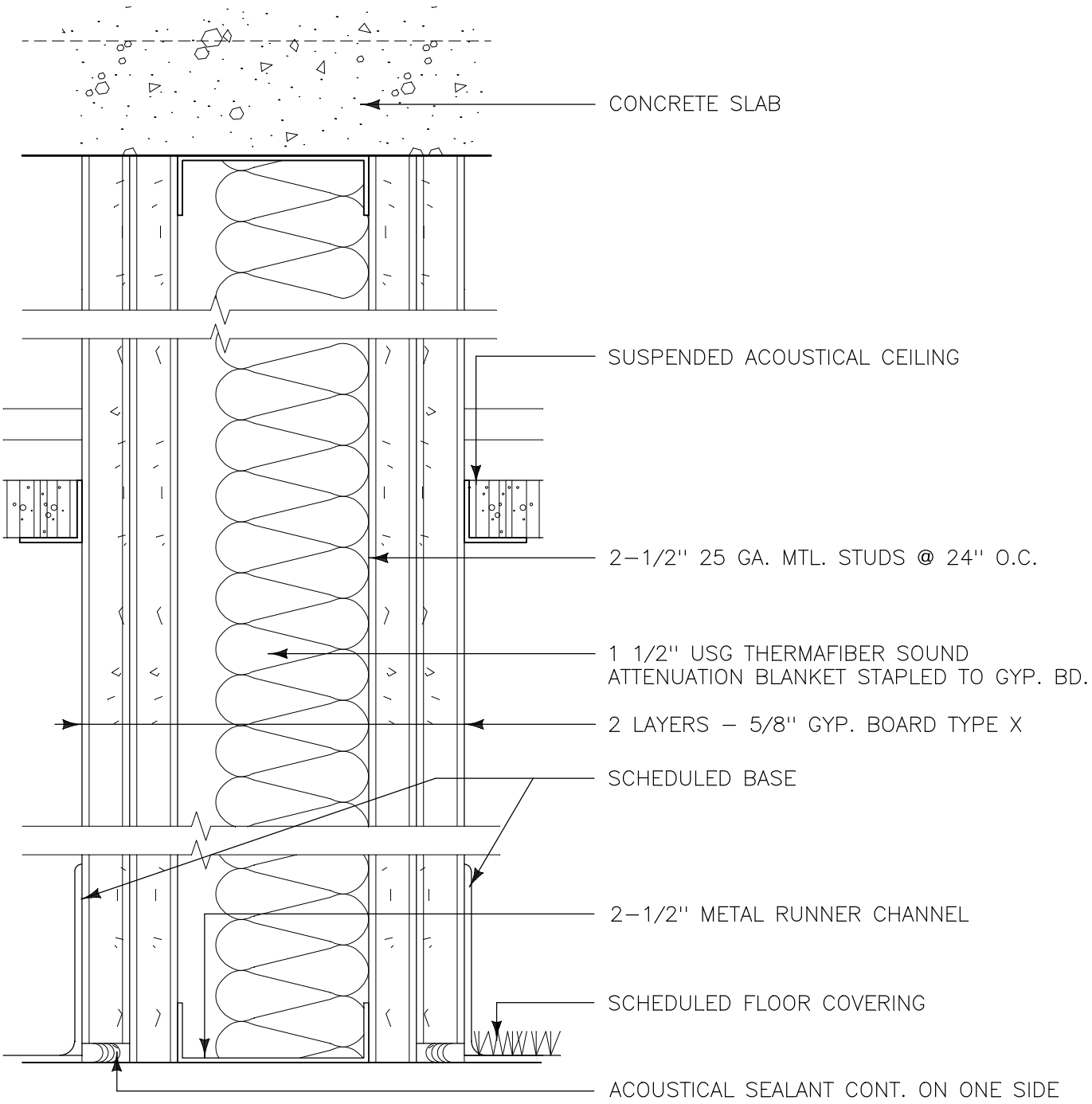
STANDARD WALL PARTITION **SCALE: 1 1/2"=1'–0"**

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 902



DEMISING WALL PARTITION **SCALE: 1 1/2"=1'-0"**

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 903



2 HOUR U.L. DESIGN NO. U419

TWO HOUR RATED PARTITION DETAIL — SCALE: 6''=1'–0''

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

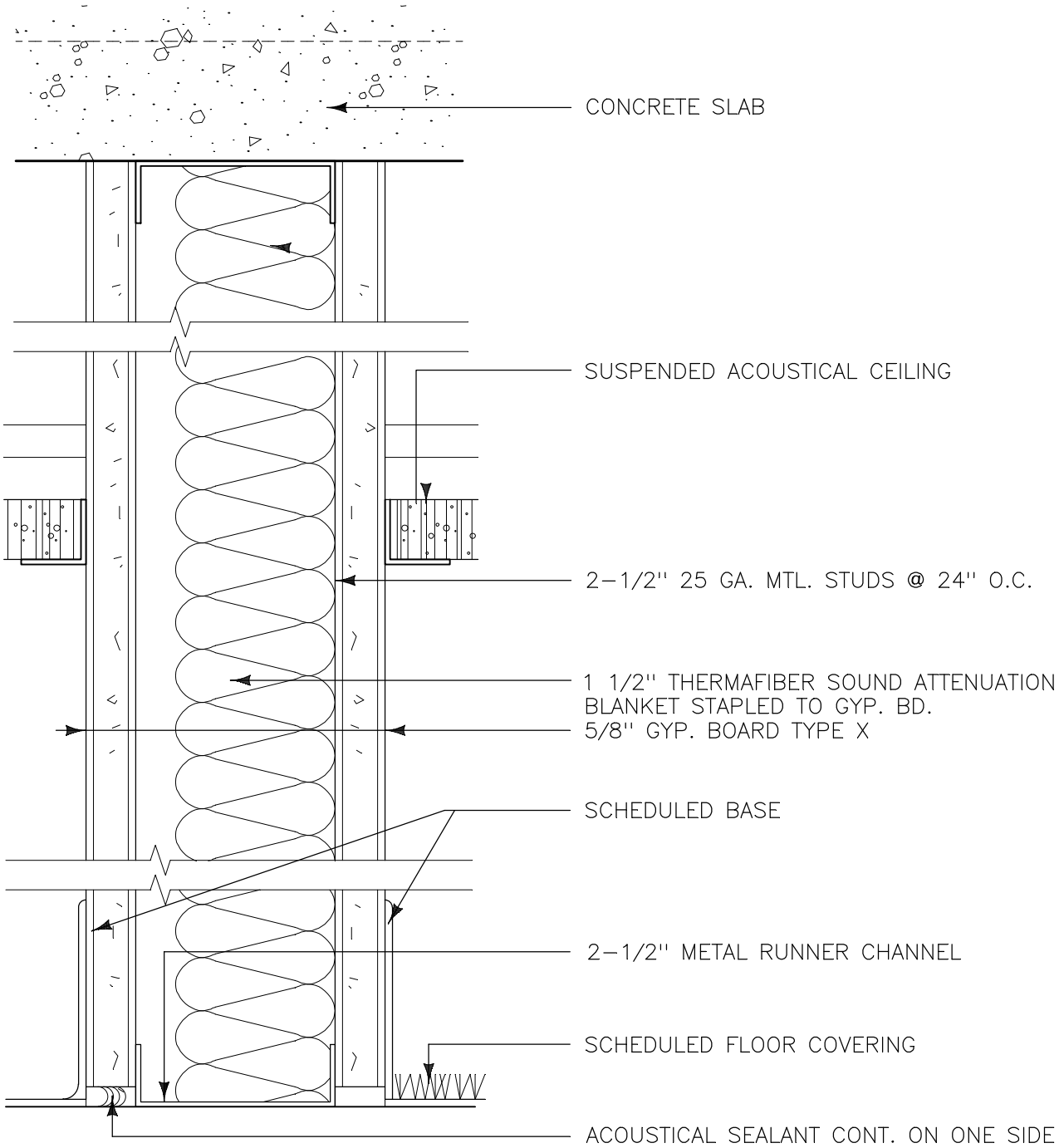
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

904



1 HOUR U. L. DESIGN NO. 448

NOTE: PARTITION IS NOT DESIGNED TO SUPPORT WALL MOUNTED OVERHEAD FURNITURE COMPONENTS OR MILLWORK

ONE HOUR RATED PARTITION DETAIL — SCALE: 6"=1'–0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

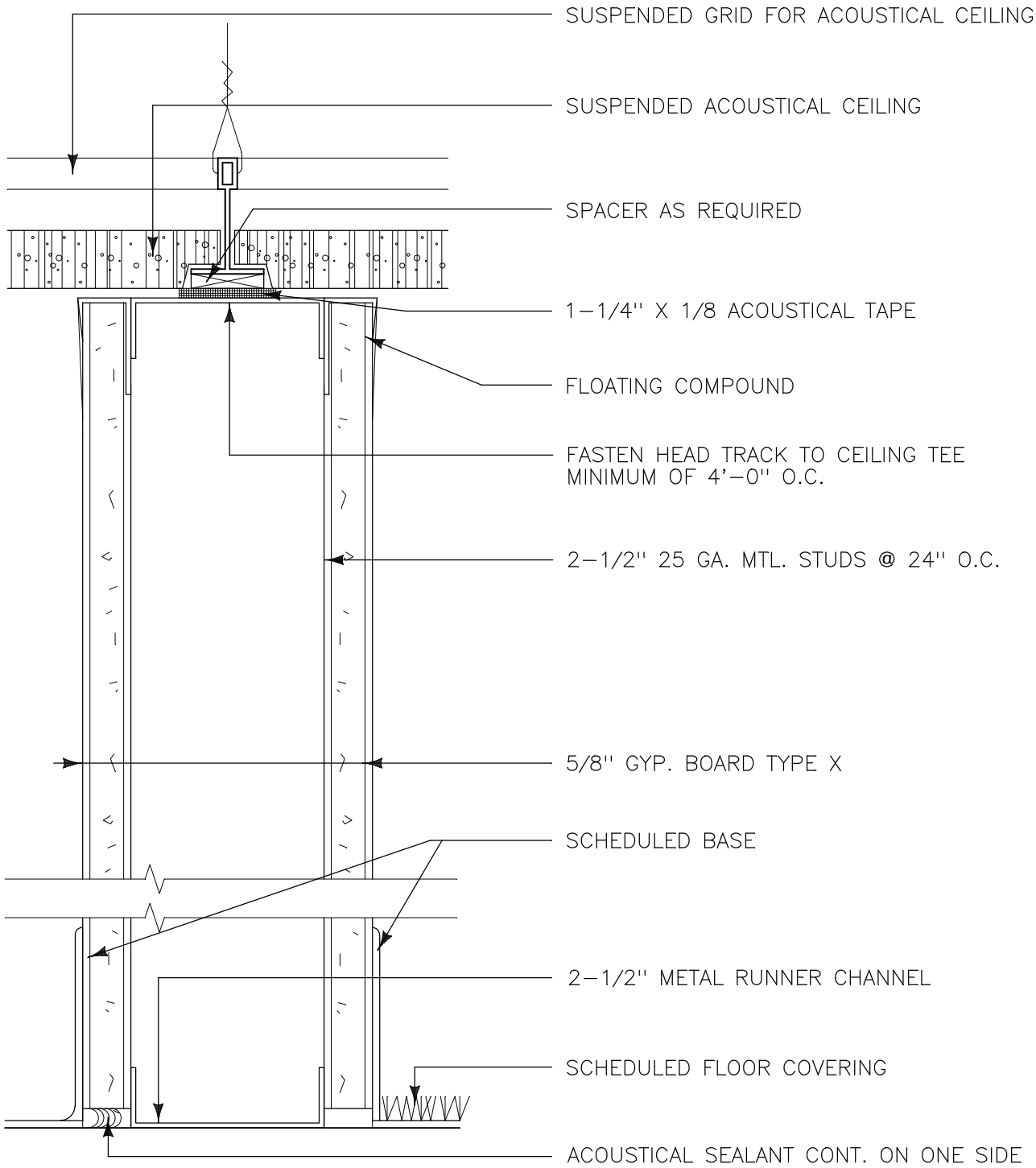
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

905



NOTE: PARTITION IS NOT DESIGNED TO SUPPORT WALL MOUNTED OVERHEAD FURNITURE COMPONENTS OR MILLWORK

STANDARD PARTITION DETAIL — SCALE: 6"=1'–0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

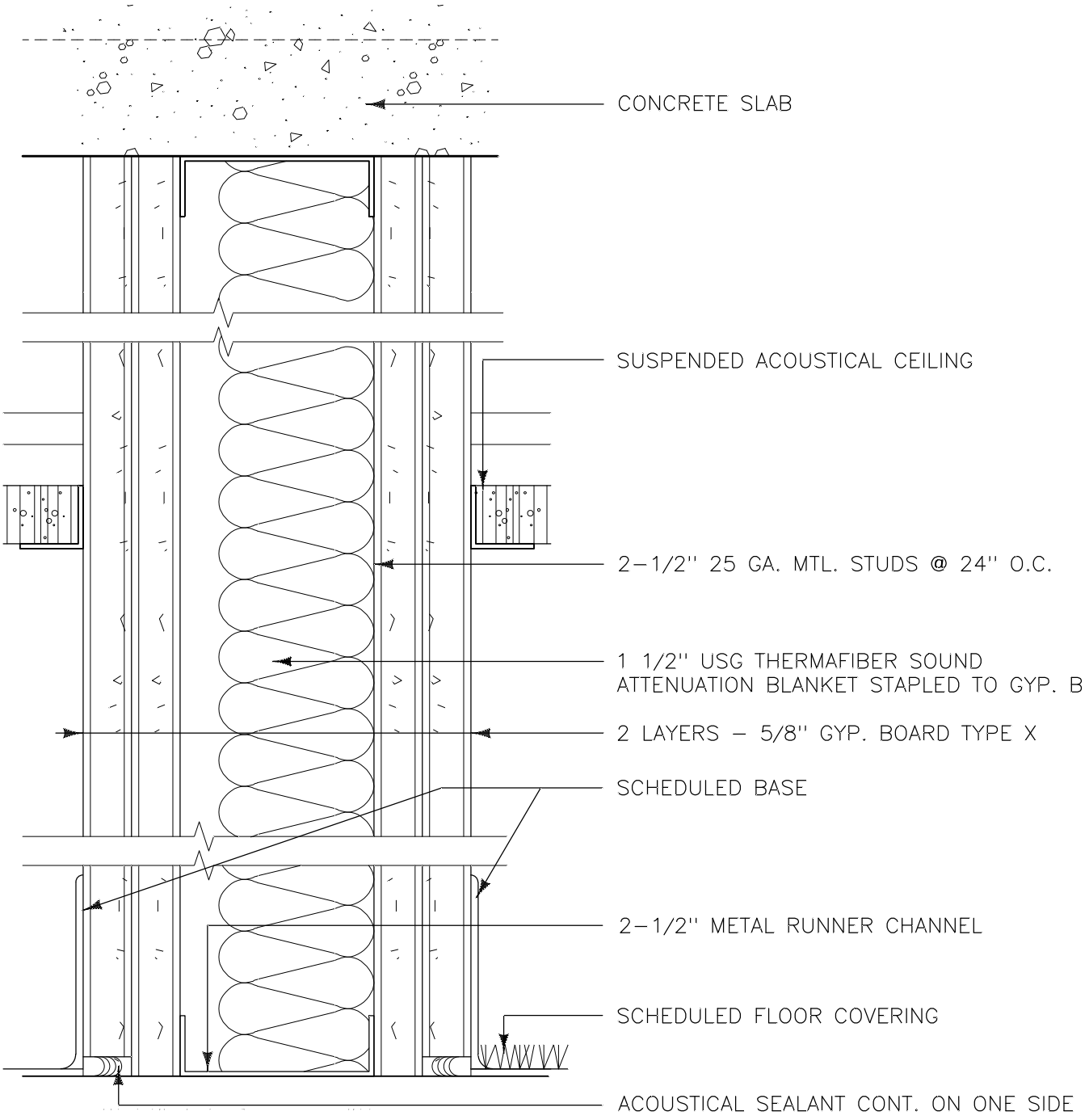
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

906



DEMISING PARTITION DETAIL

SCALE: 6"=1'–0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

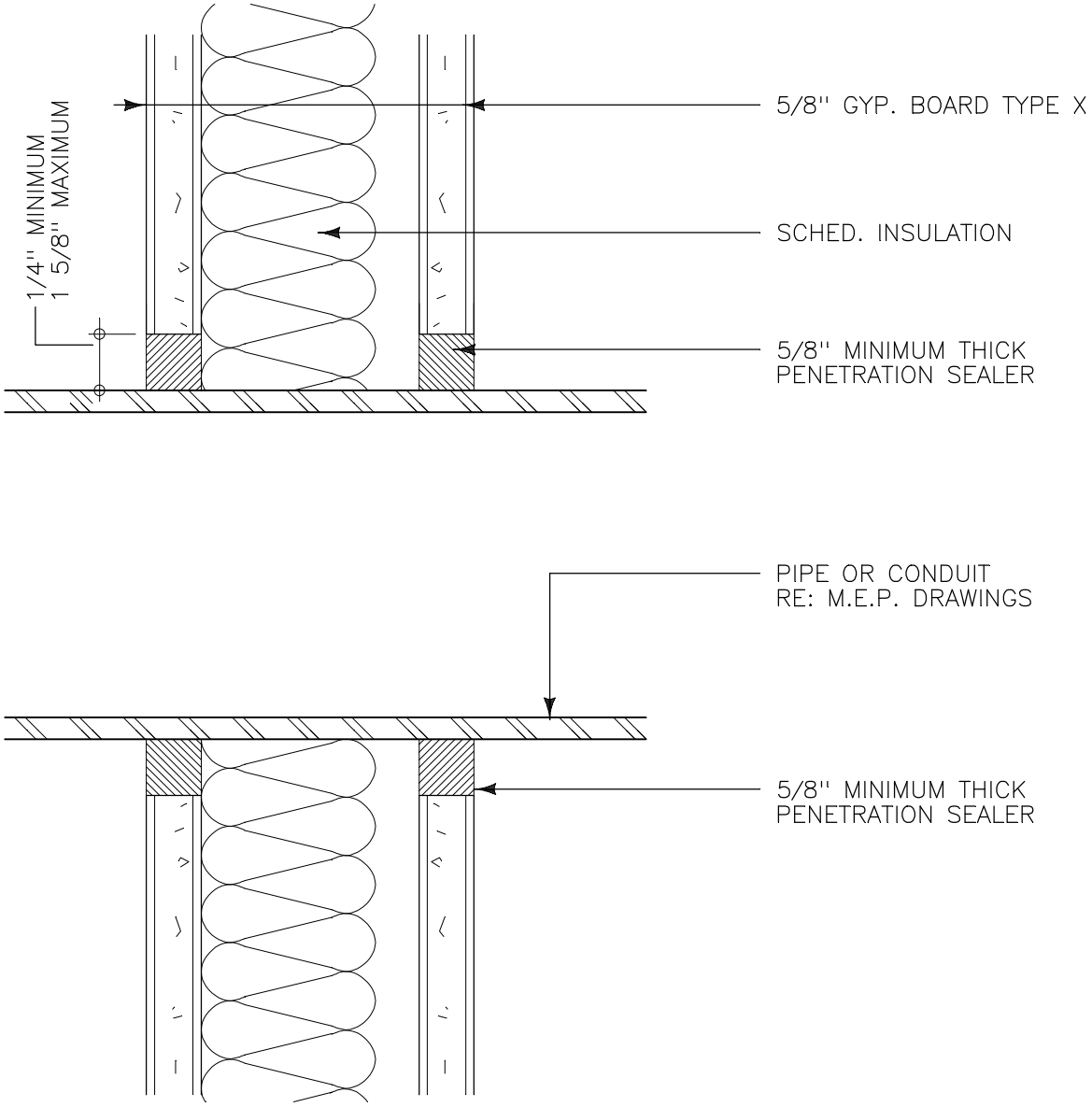
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

907



1 HOUR CONSTRUCTION – UL DES. NO. W–L–1039

CONDUIT/PIPE PENETRATION DETAIL NO SCALE

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

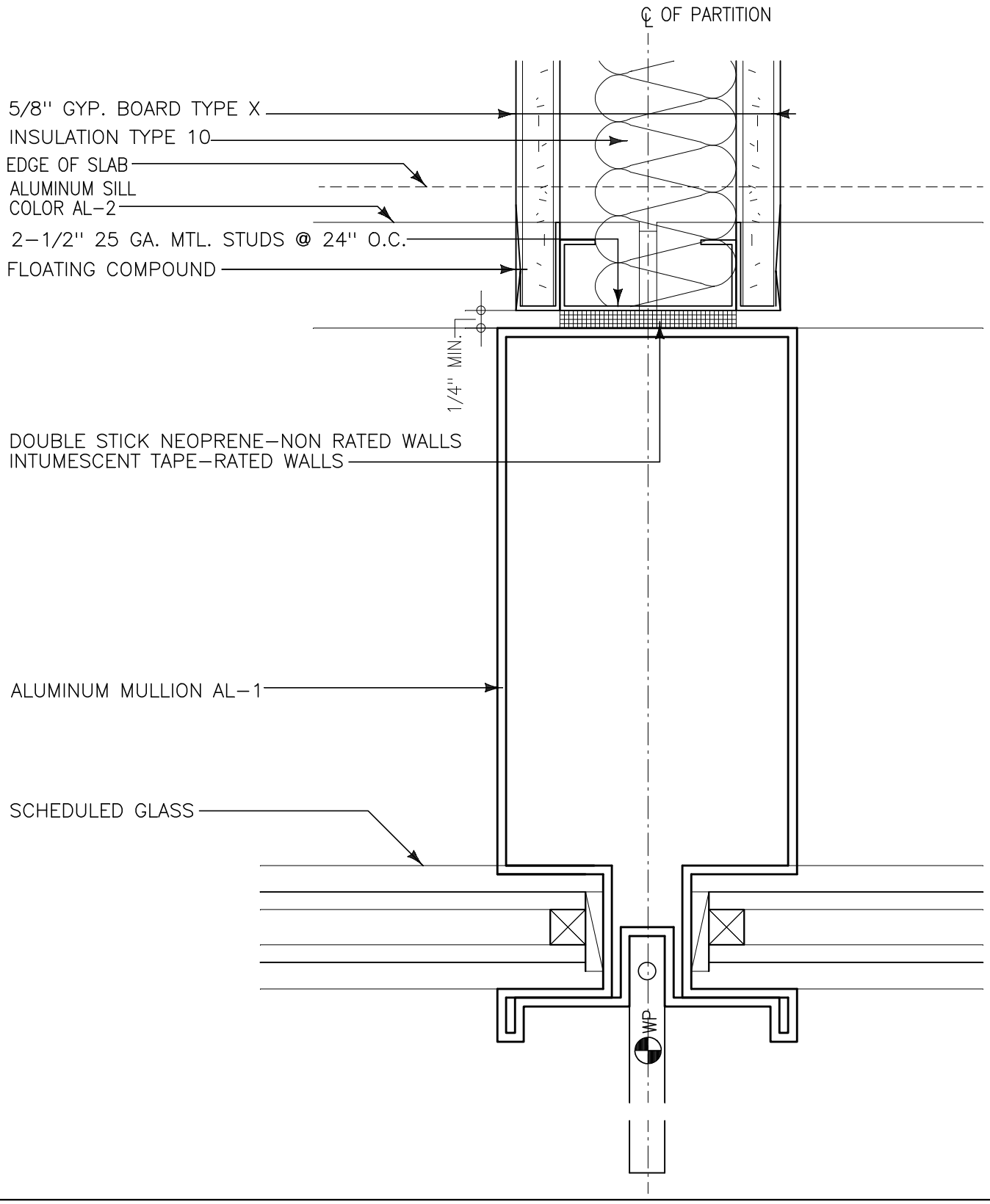
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

908



PARTITION AT MULLION DETAIL

SCALE: 6''=1'-0''

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

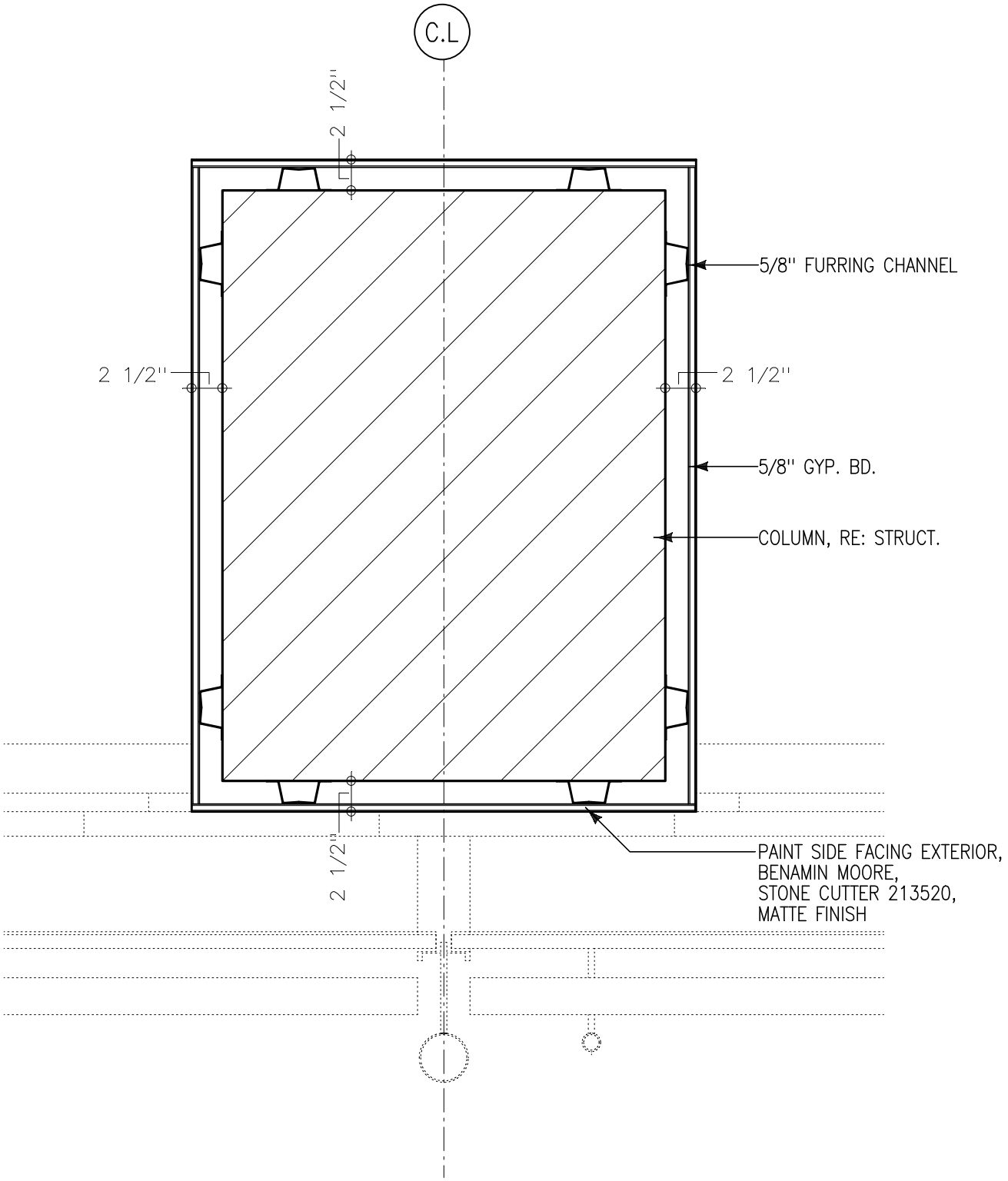
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

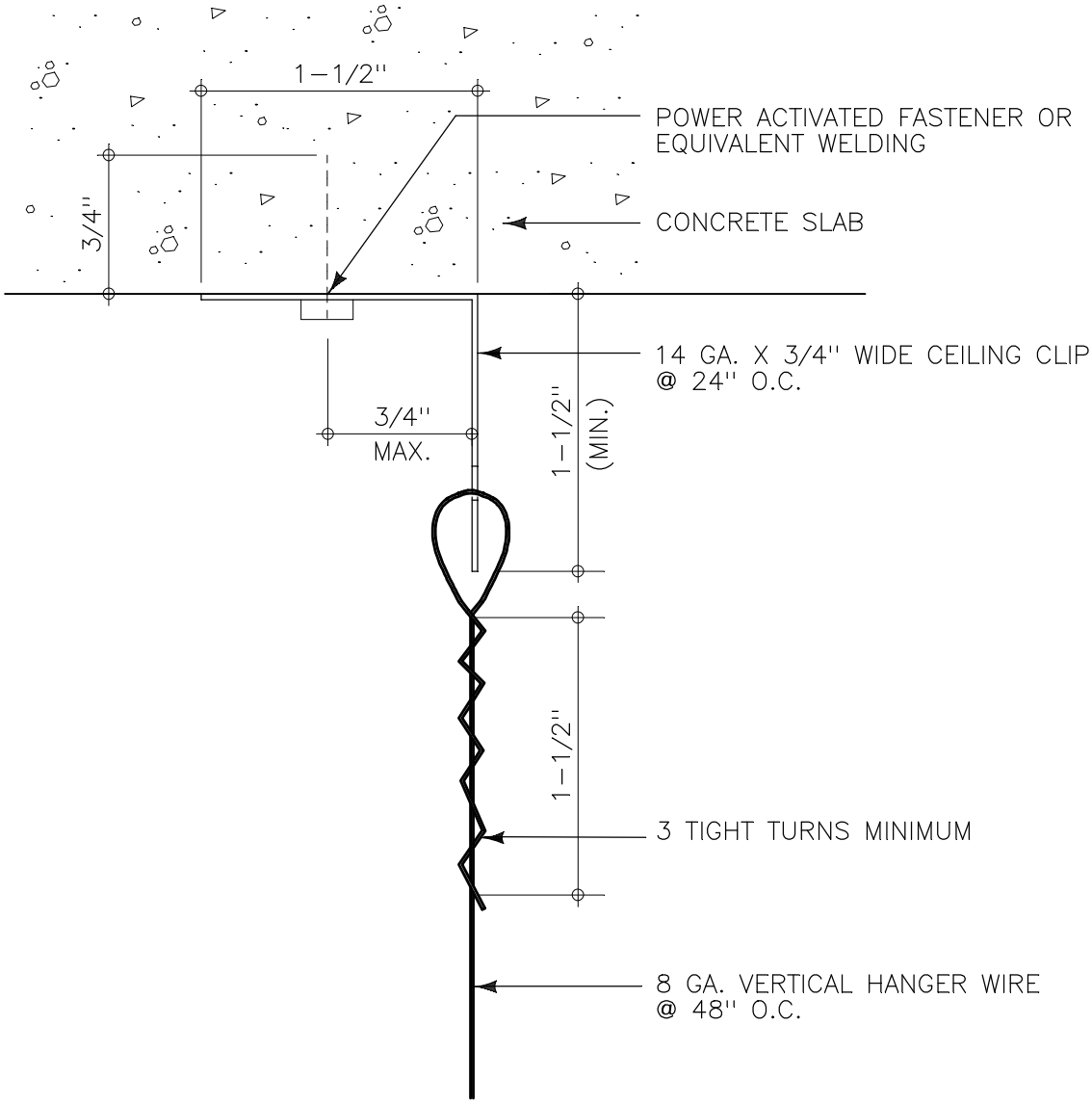
TENANT

909



TYPICAL COLUMN ENCLOSURE **SCALE: 1/2"=1'–0"**

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 910

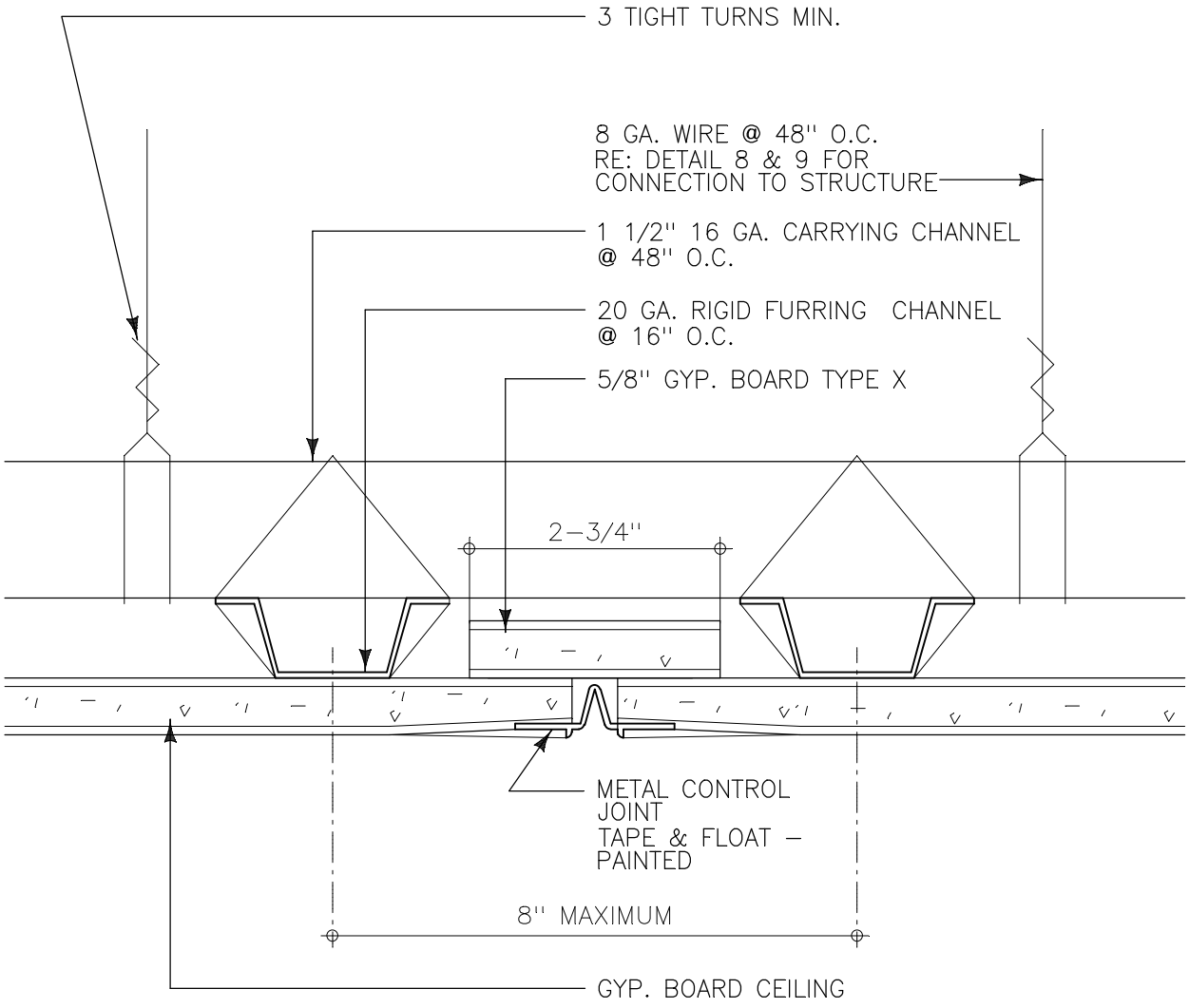


NOTE:

SIZE ATTACHMENT DEVICES FOR 5 TIMES DESIGN LOAD INDICATED IN ASTM C635, TABLE 1, DIRECT HUNG.

VERTICAL HANGER ATTACHMENT DETAIL — SCALE: FULL SIZE

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 921



CONTROL JOINT AT GYP. BD. CEILING DETAIL SCALE: 6"=1'–0"

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

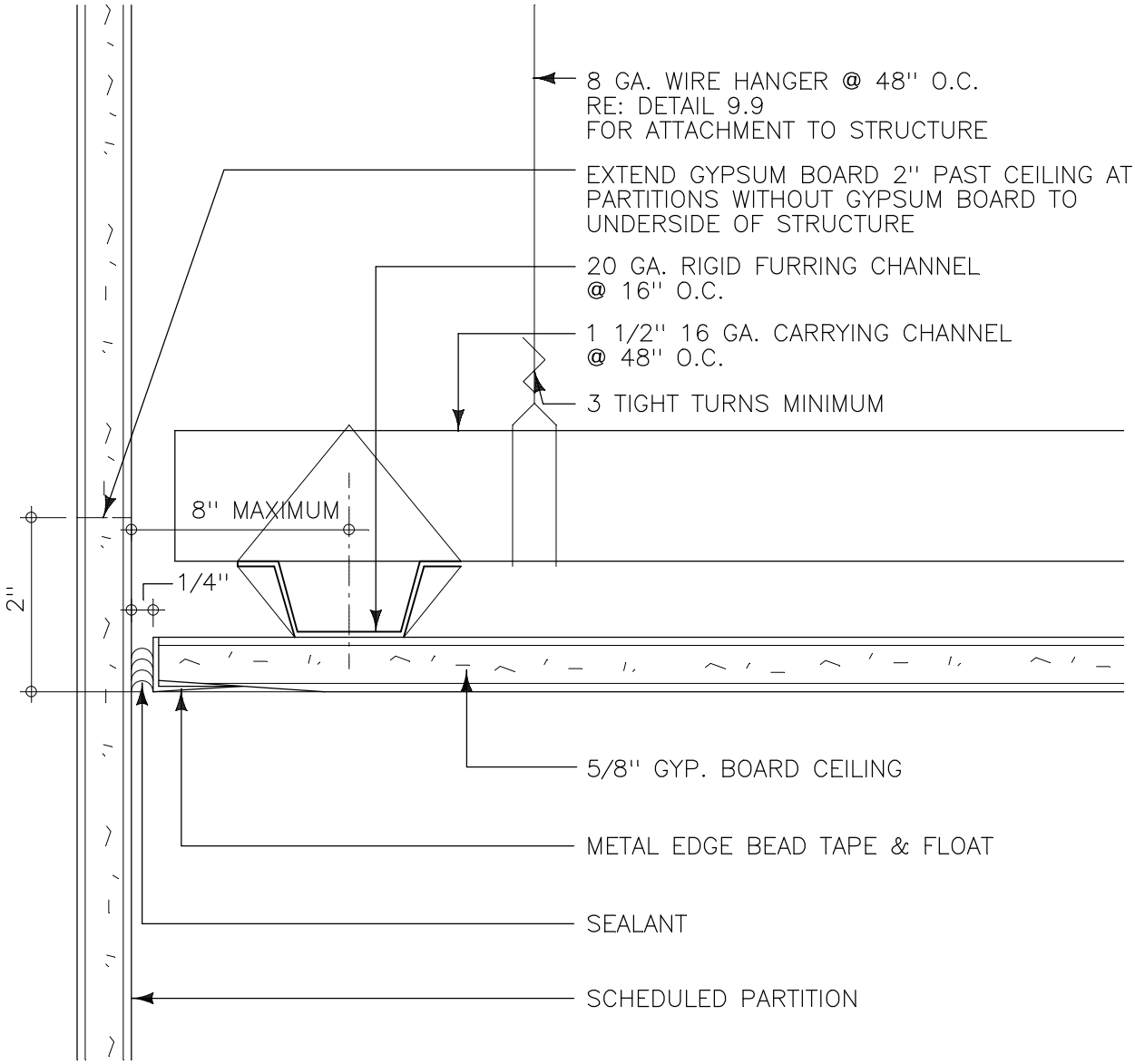
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

922

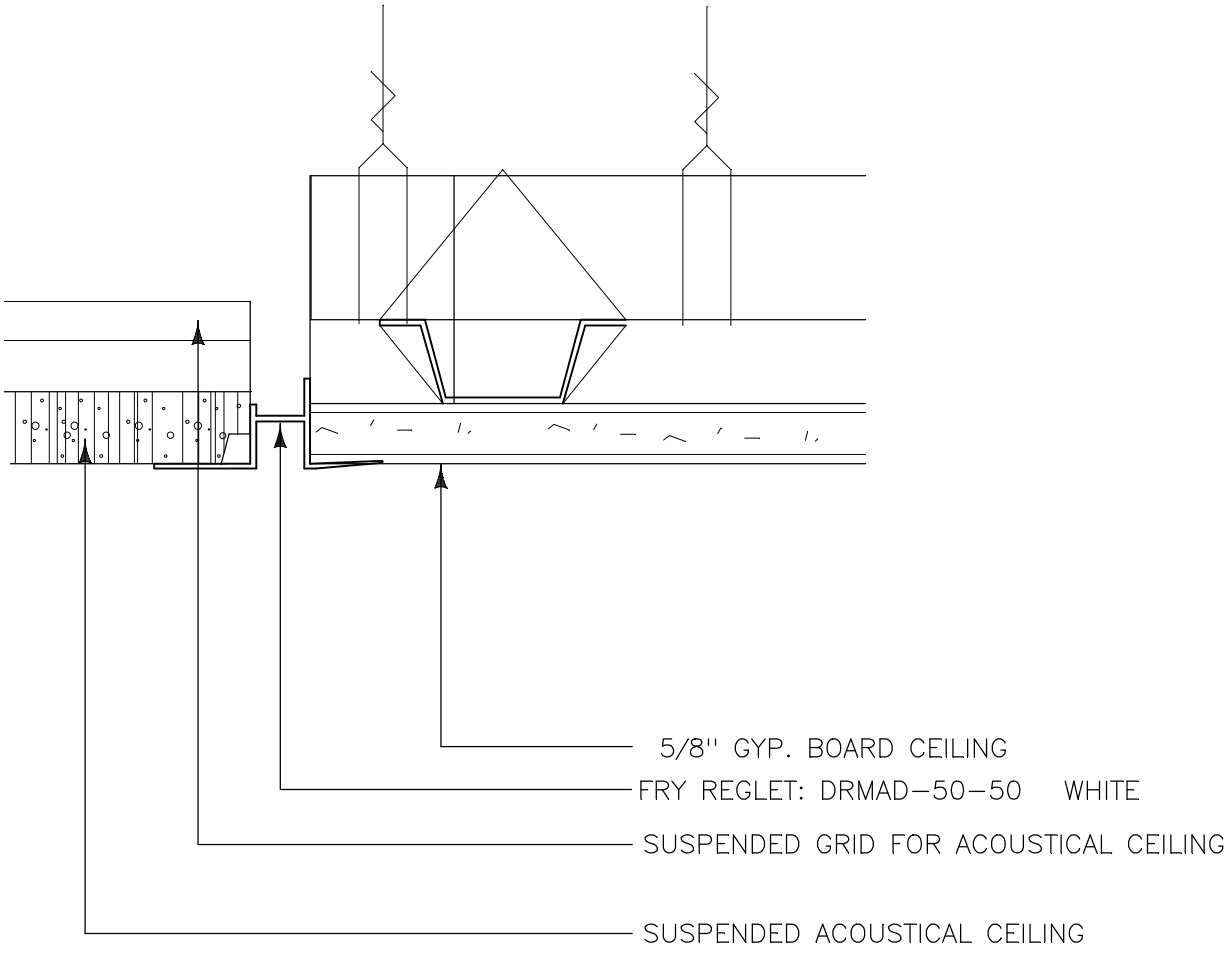


NOTE:

1. SIZE ATTACHMENT DEVICES FOR 5 TIMES DESIGN LOAD INDICATED IN ASTM C635, TABLE 1, DIRECT HUNG.

GYP. BD. CEILING AT WALL DETAIL — SCALE: 6''=1'–0''

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 923



ACOUSTICAL CEILING TO GYP. BD. DETAIL

SCALE: 6''=1'–0''

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

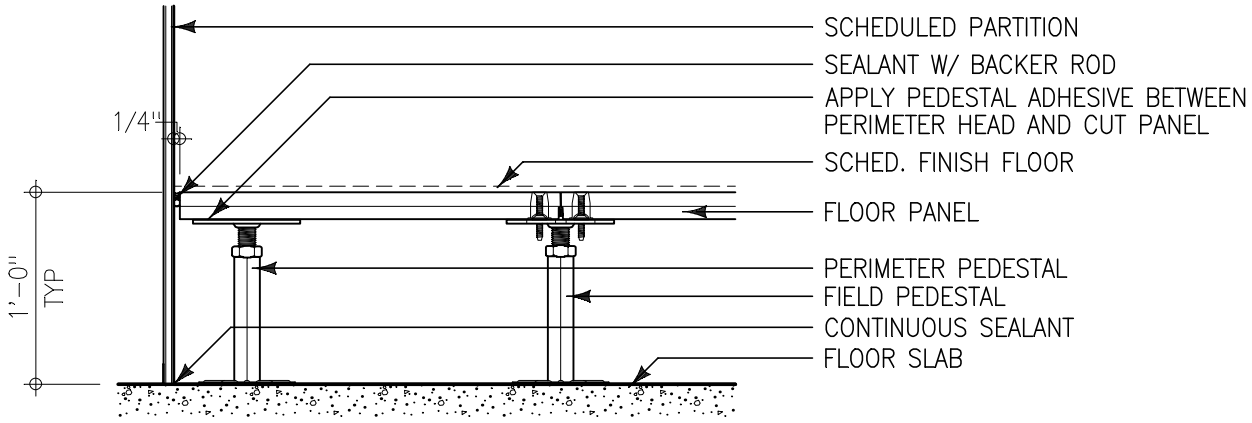
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

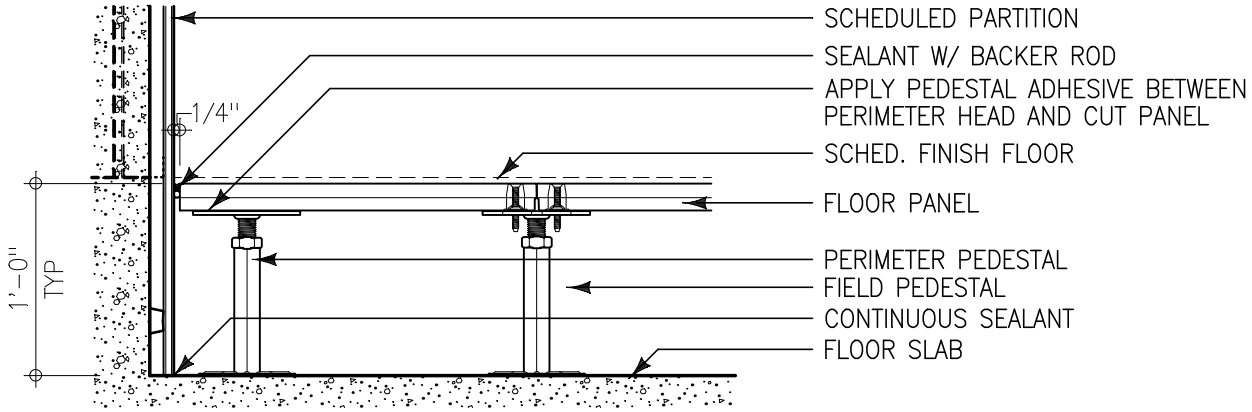
M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

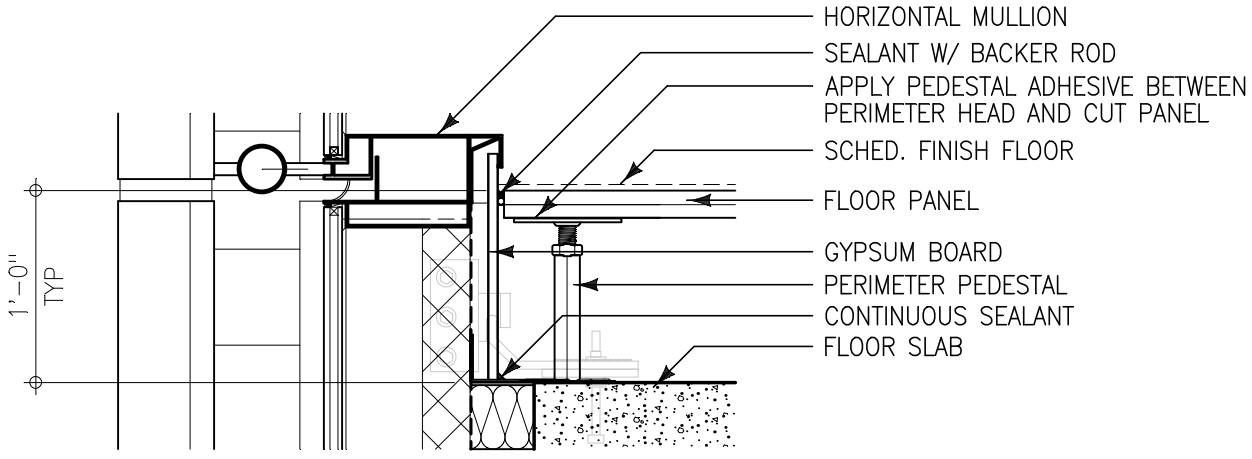
924



ACCESS FLOORING DETAIL



ACCESS FLOORING DETAIL AT COLUMN OR VERTICAL STRUCTURE



ACCESS FLOORING DETAIL AT PERIMETER CURTAIN WALL

ACCESS FLOOR DETAILS **SCALE: 1"=1'-0"**

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

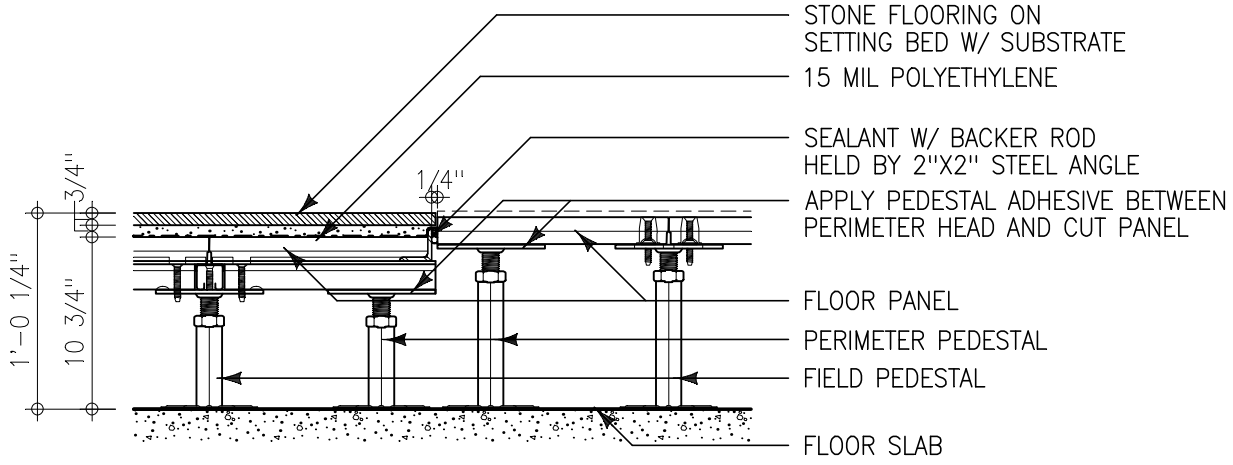
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

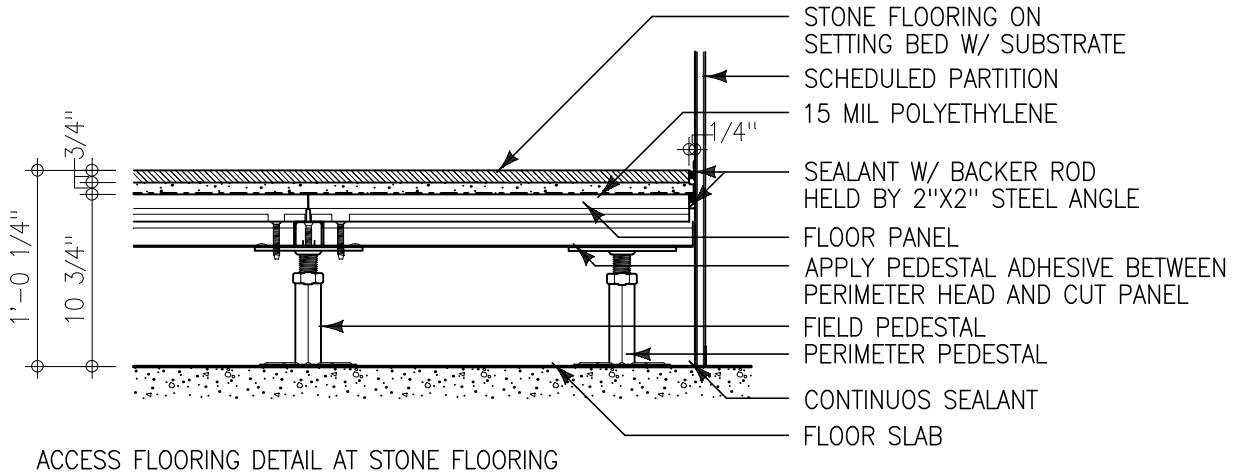
M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

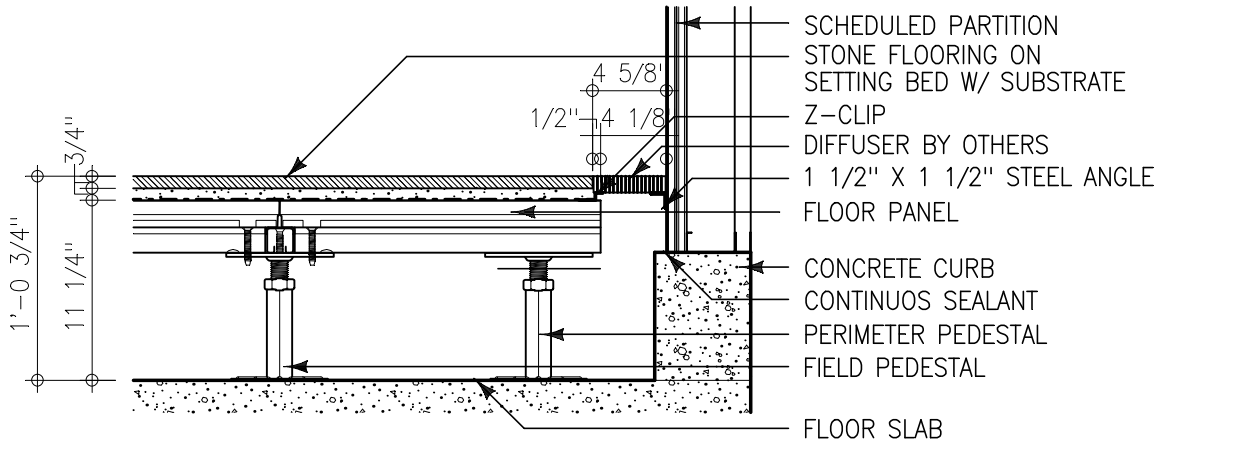
931



ACCESS FLOORING DETAIL AT STONE FLOORING TRANSITION



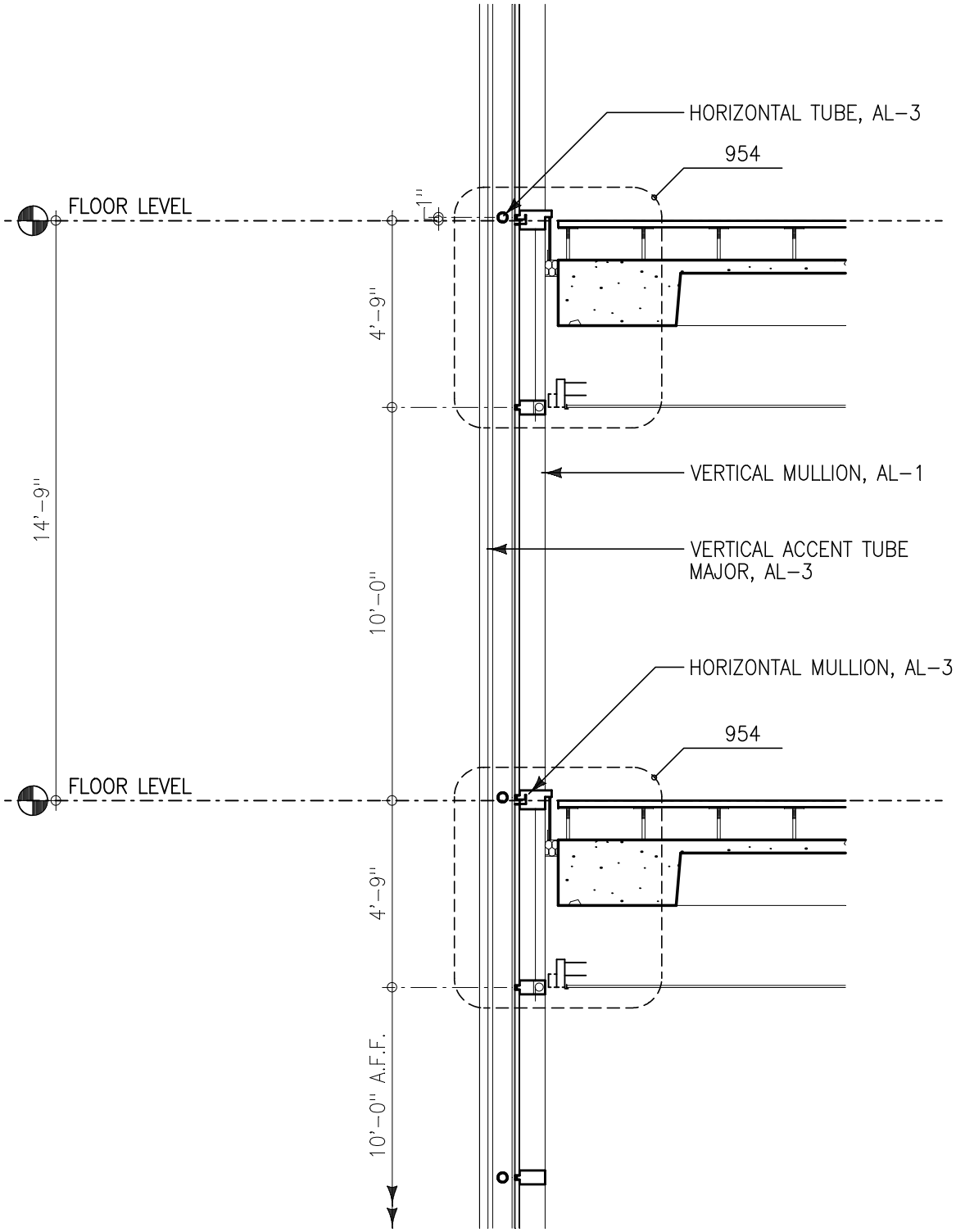
ACCESS FLOORING DETAIL AT STONE FLOORING



ACCESS FLOORING DETAIL AT PASSENGER ELEVATOR LOBBY

ACCESS FLOOR DETAILS **SCALE: 1"=1'-0"**

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 932



WALL SECTION (TYPICAL) SCALE: 1/4"=1'-0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

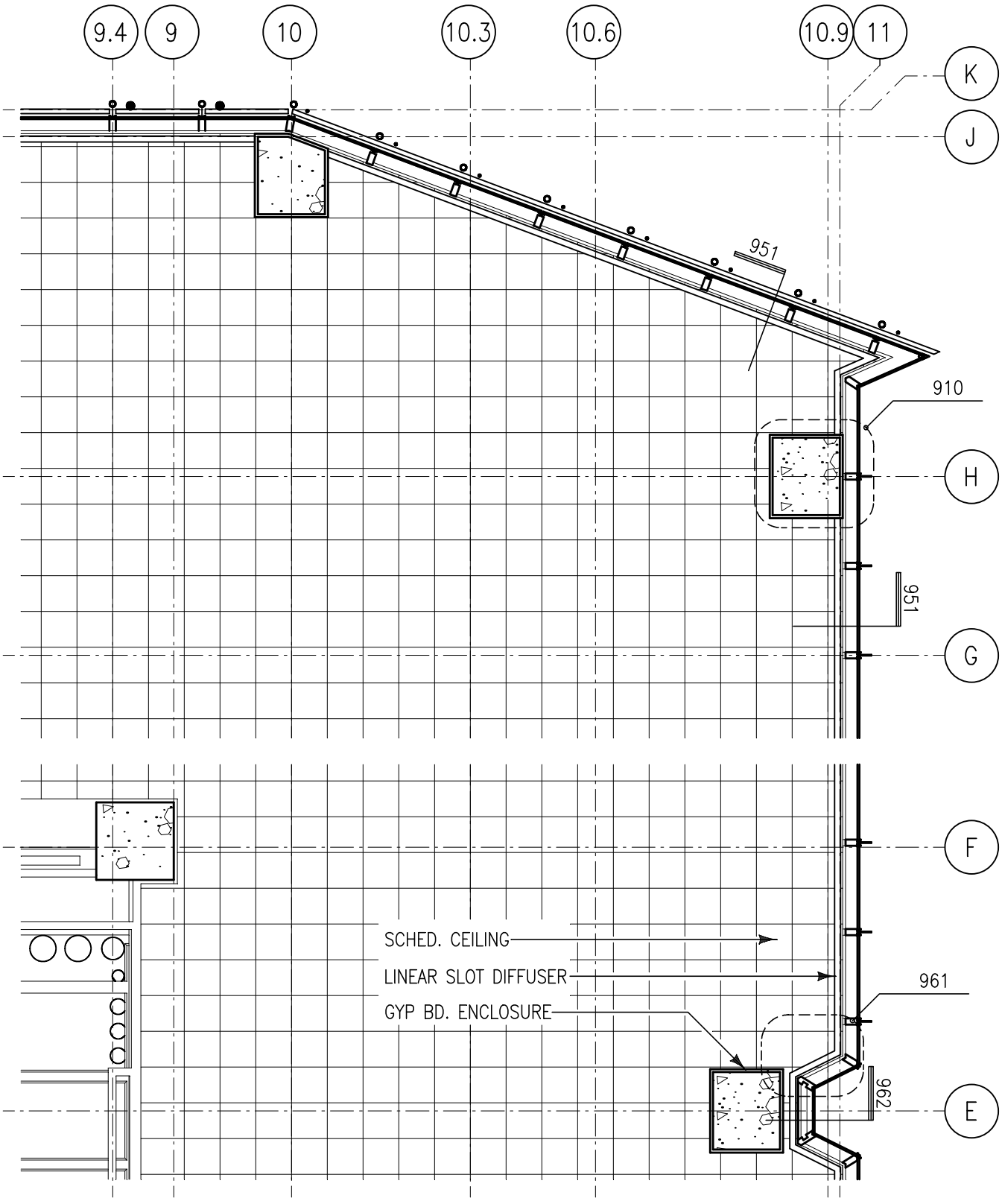
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

951



RCP PARTIAL PLAN

SCALE: 1/8"=1'-0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

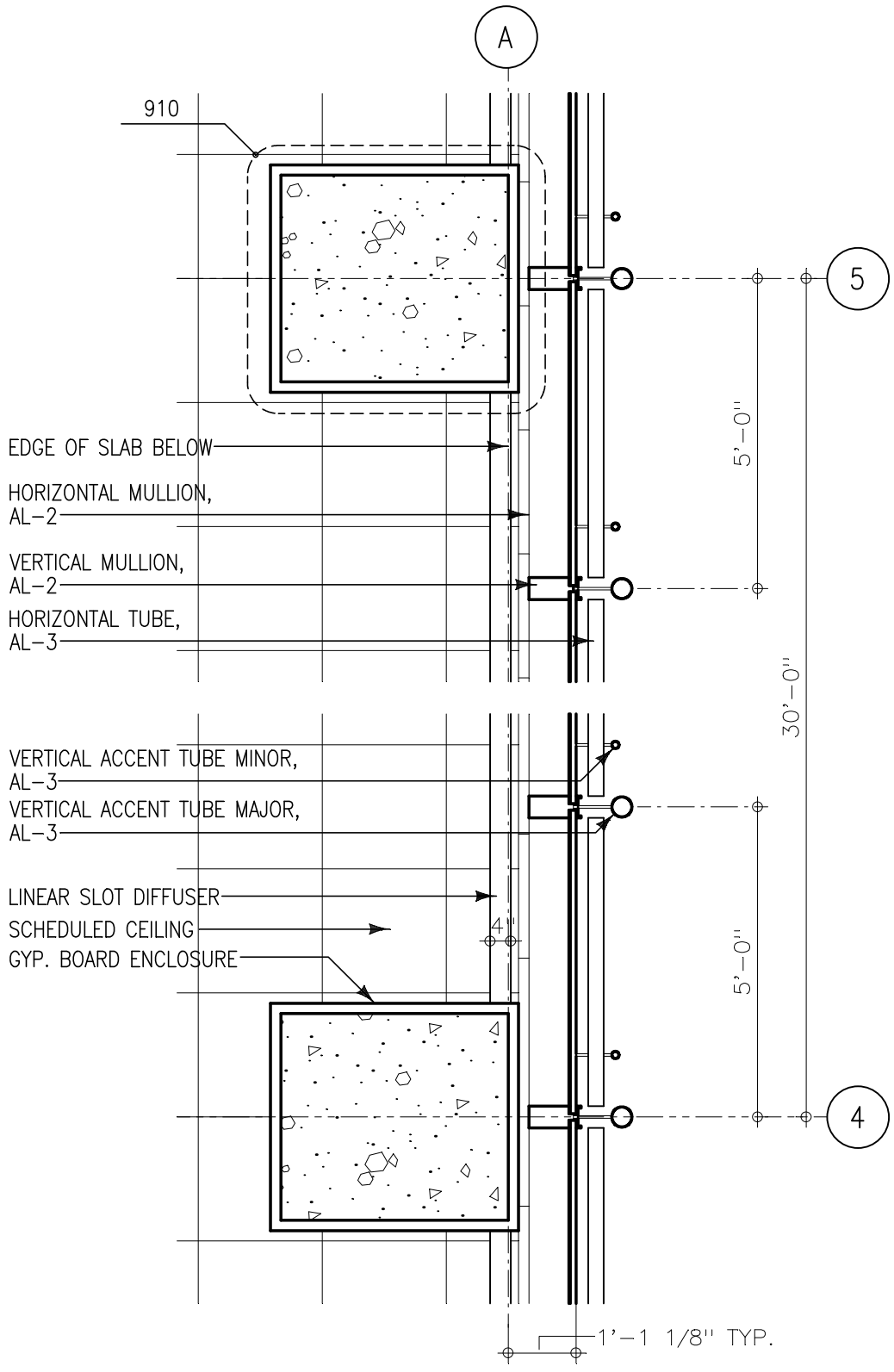
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

952



RCP AT PERIMETER SLOT DIFFUSER SCALE: 3/8"=1'-0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

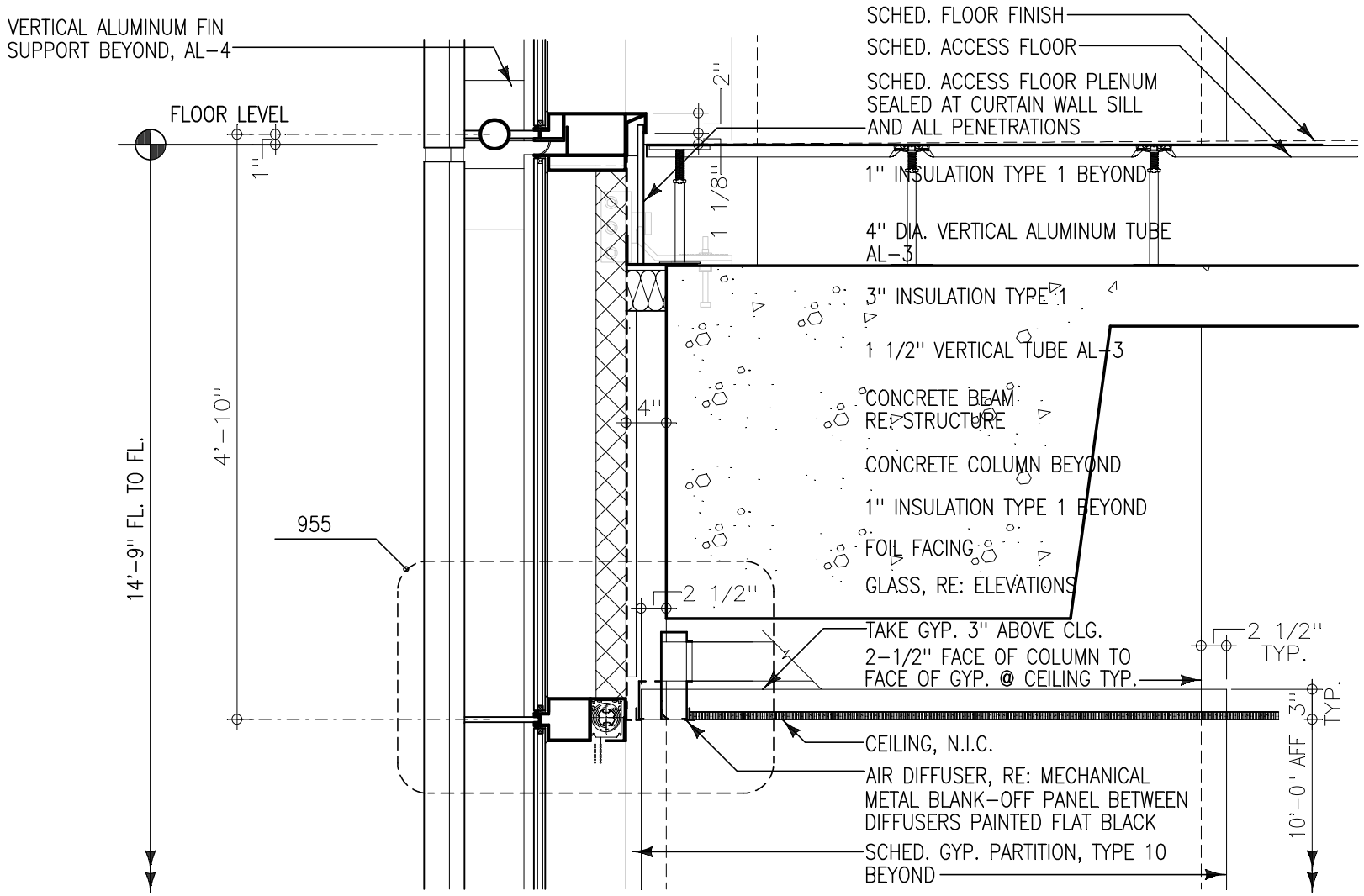
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

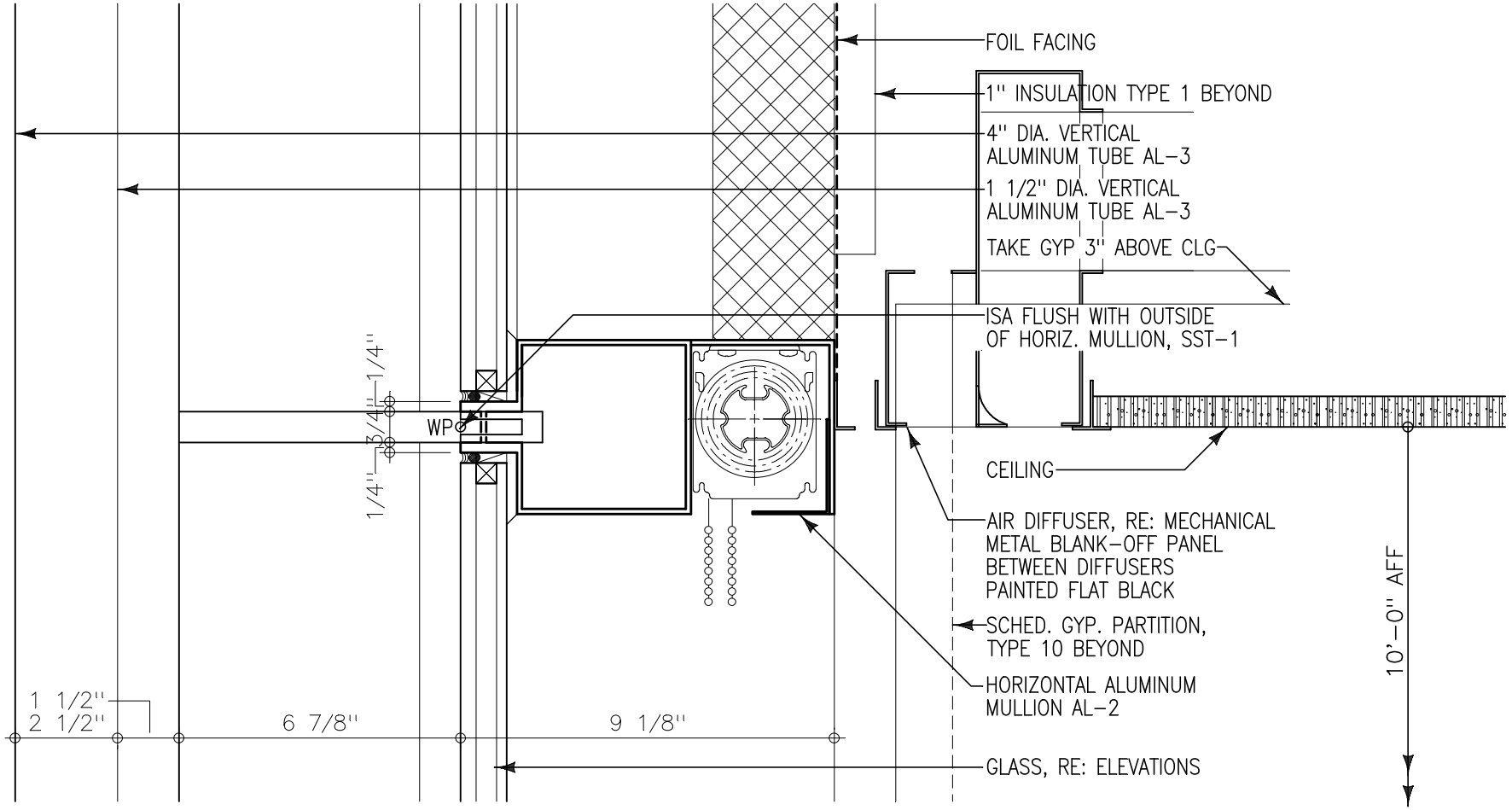
953



WINDOW MULLION HEAD DETAIL

SCALE: 3/4"=1'-0"

609 MAIN	HINES OWNER PICKARD CHILTON ARCHITECTS, INC. DESIGN ARCHITECT KENDALL/HEATON ASSOCIATES, INC. ARCHITECT	CARDNO STRUCTURAL ENGINEER M-E ENGINEERS M.E.P.F. CONSULTANT	TENANT 954



CEILING TERMINATION DETAIL

SCALE: 3"=1'-0"

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

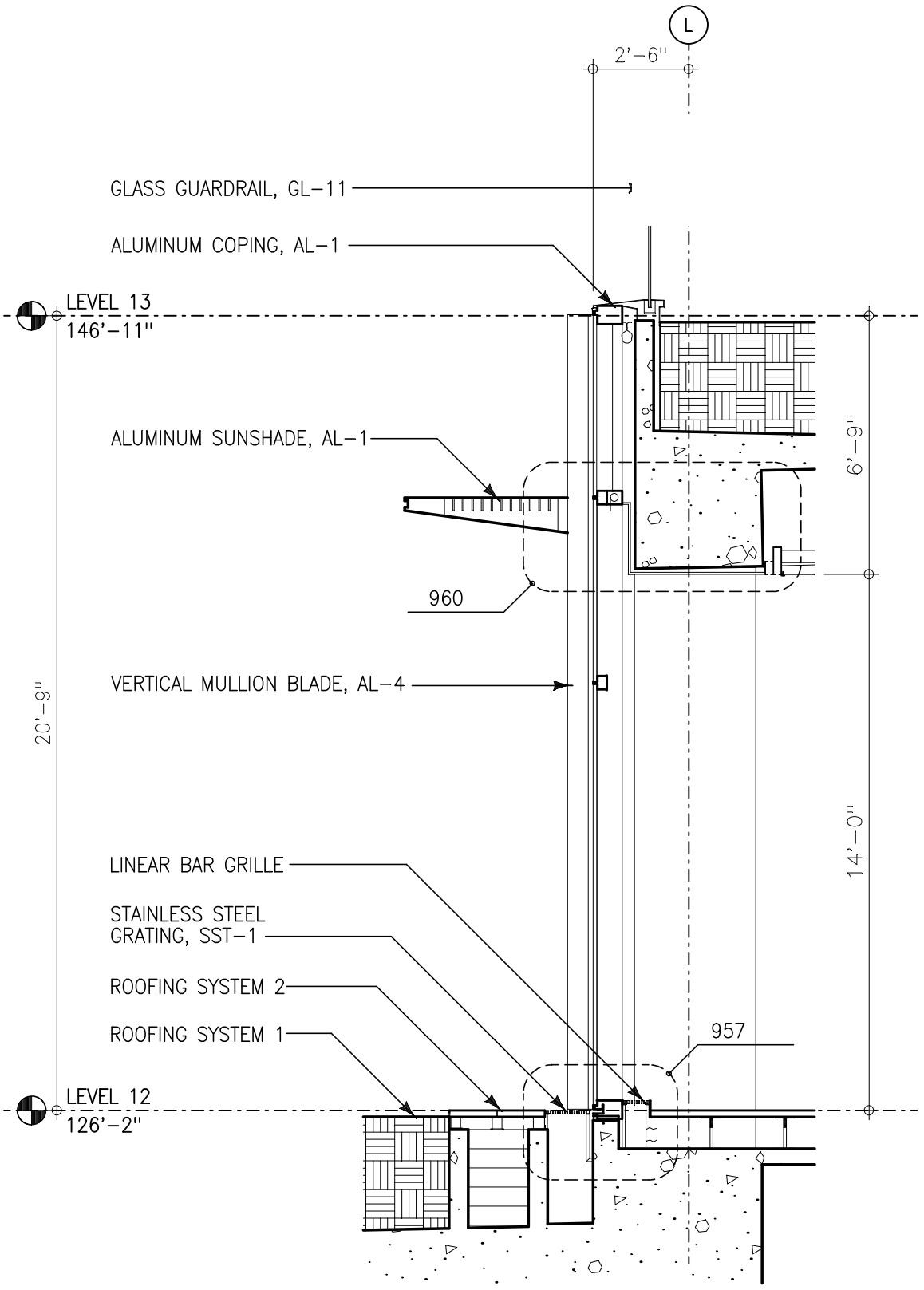
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

955



WALL SECTION (LEVEL 12 – TERRACE) **SCALE: 1/4"=1'-0"**

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

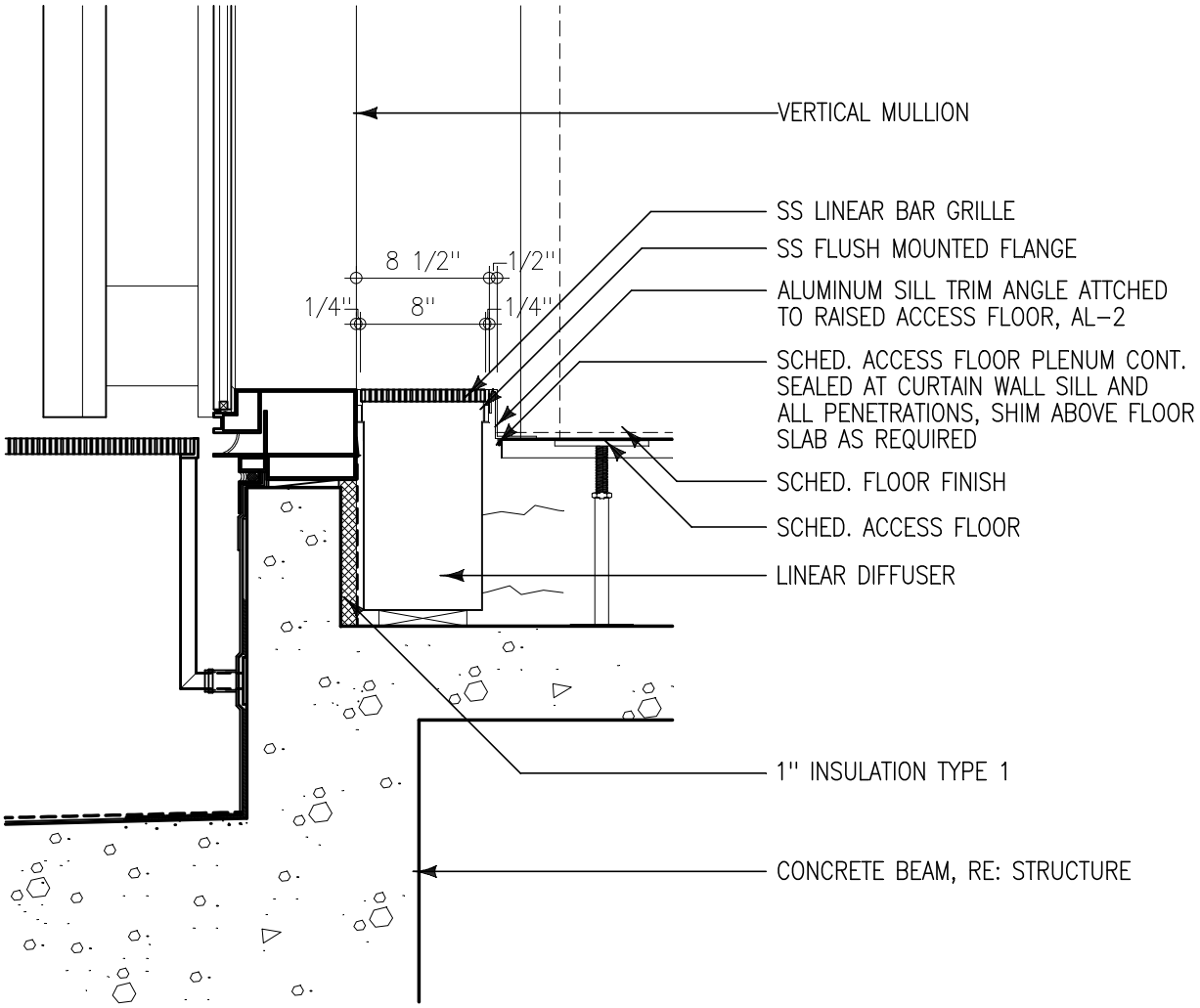
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

956



PERIMETER SILL DETAIL (LEVEL 12 – TERRACE) SCALE: 1"=1'-0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

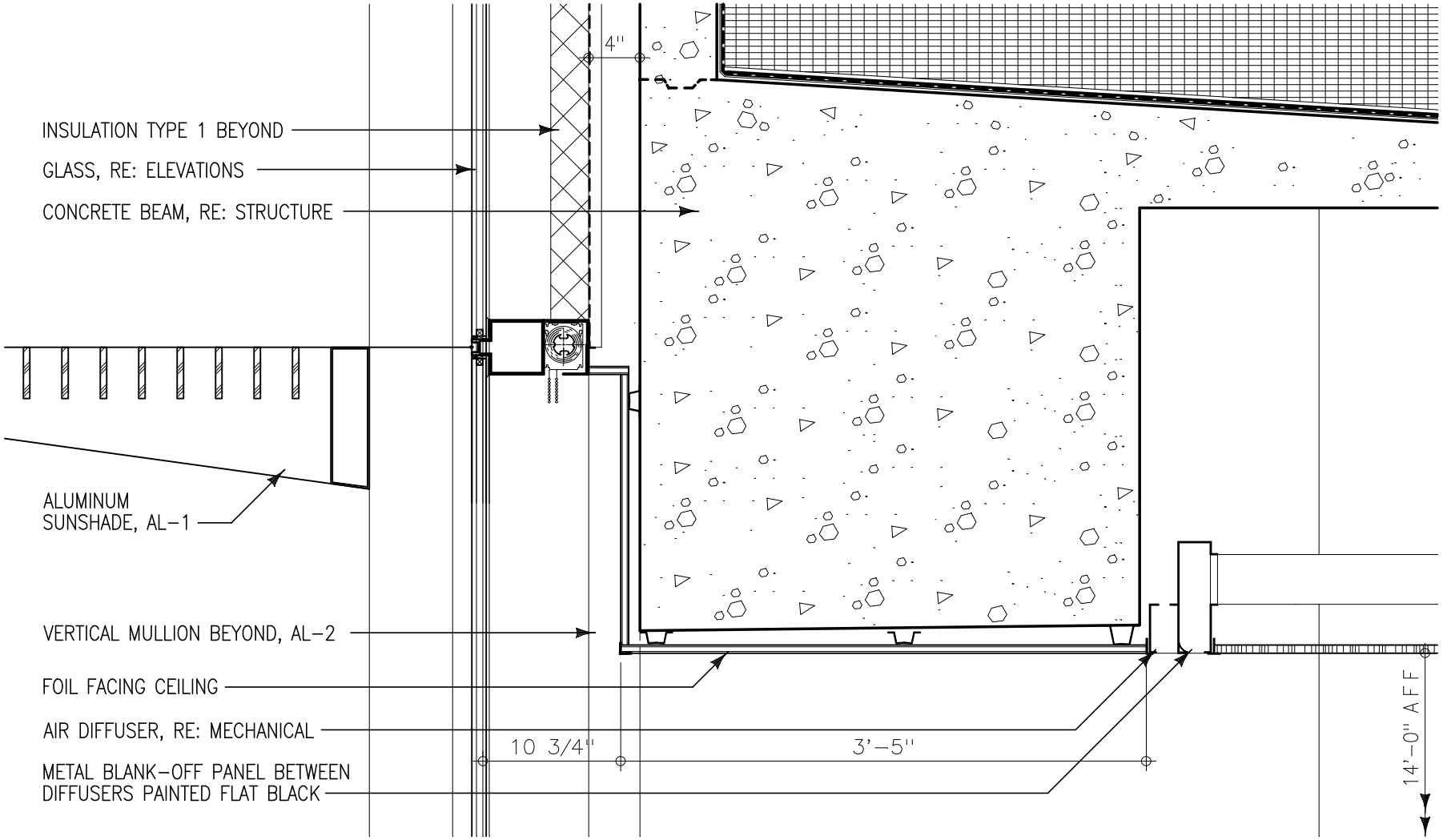
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

957



PERIMETER HEAD DETAIL (LEVEL 12 – TERRACE) SCALE: 1"=1'-0"

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

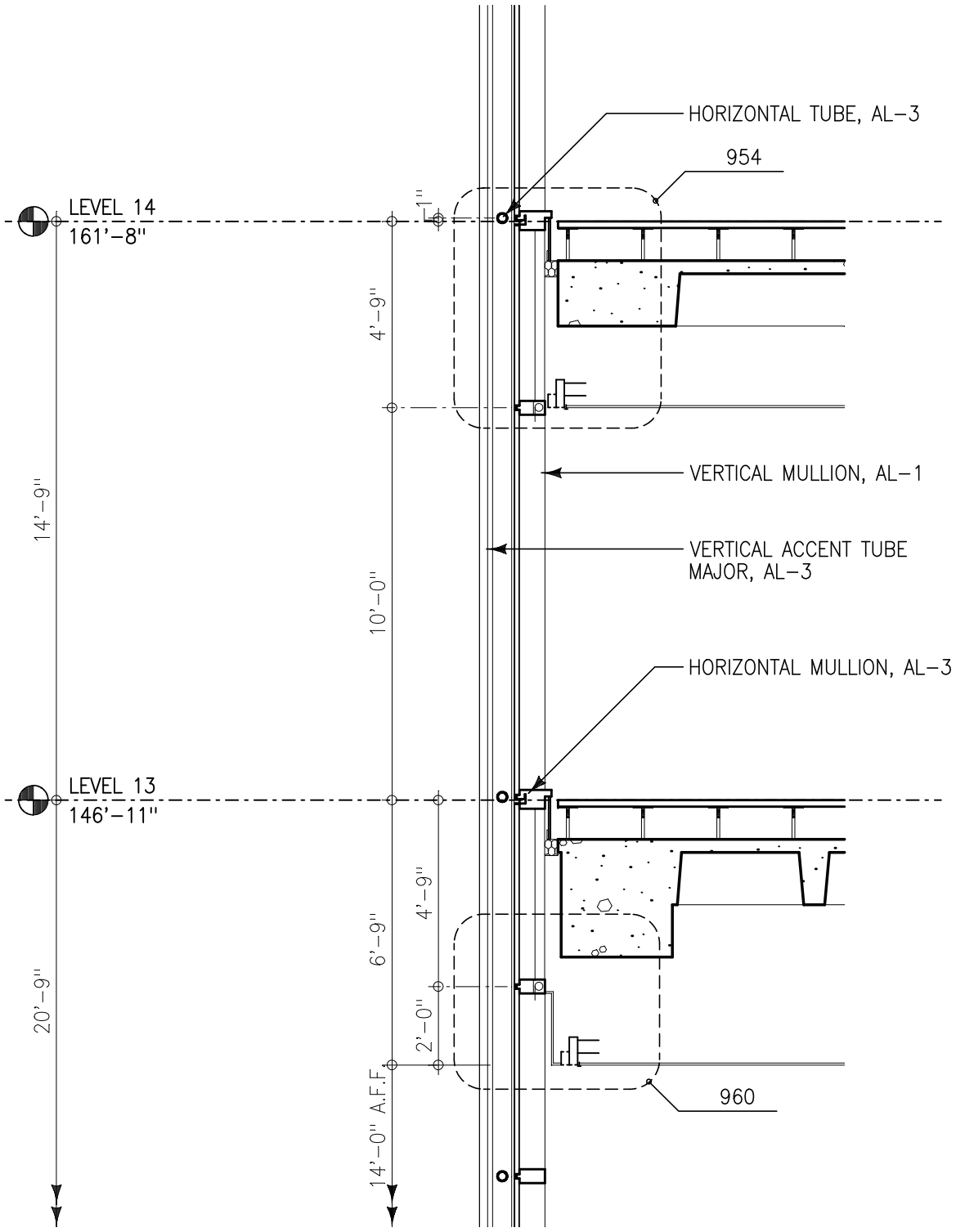
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

958



WALL SECTION (LEVEL 13) SCALE: 1/4"=1'–0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

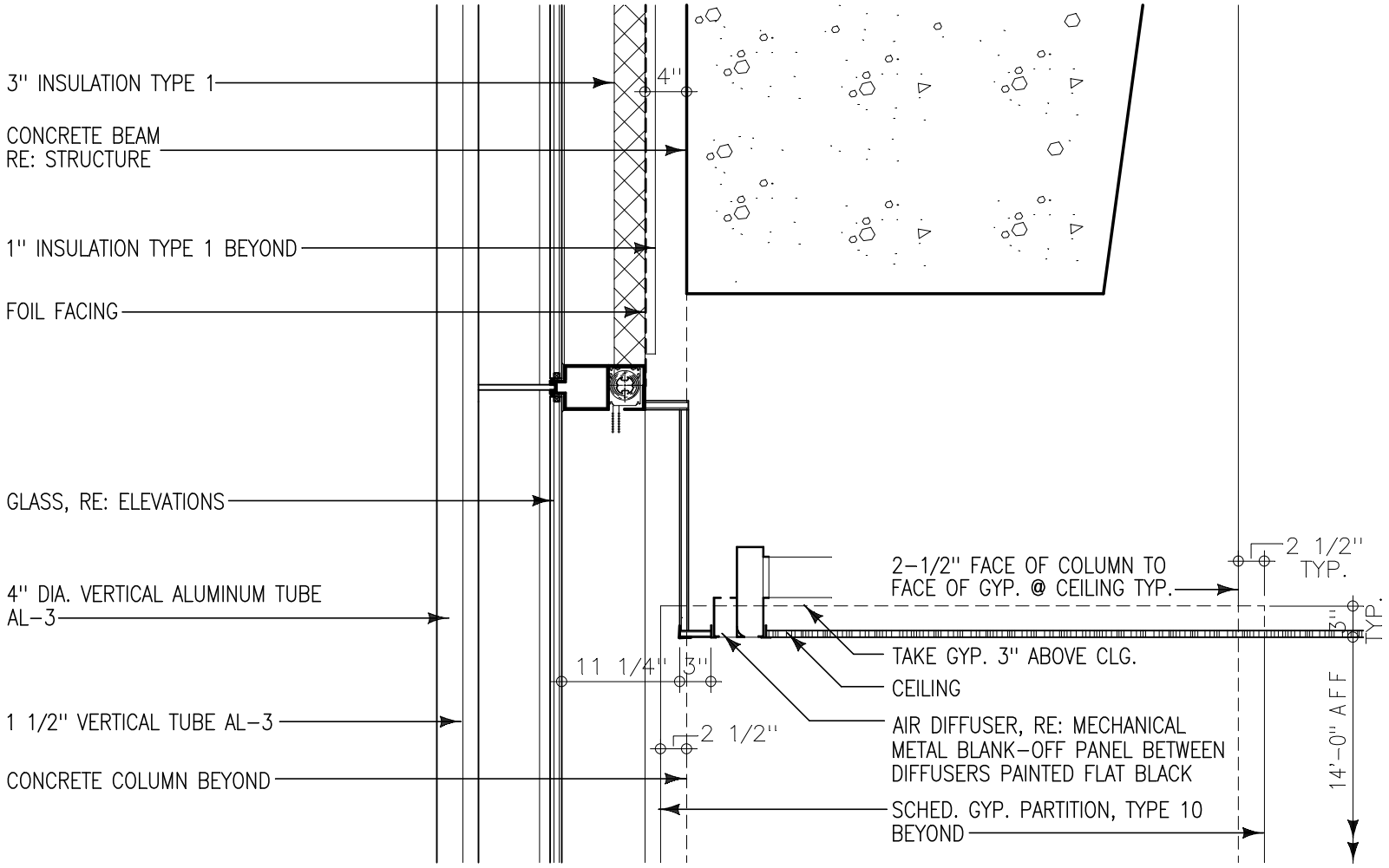
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

959



PERIMETER HEAD DETAIL (LEVEL 12) — **SCALE: 3/4"=1'-0"**

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

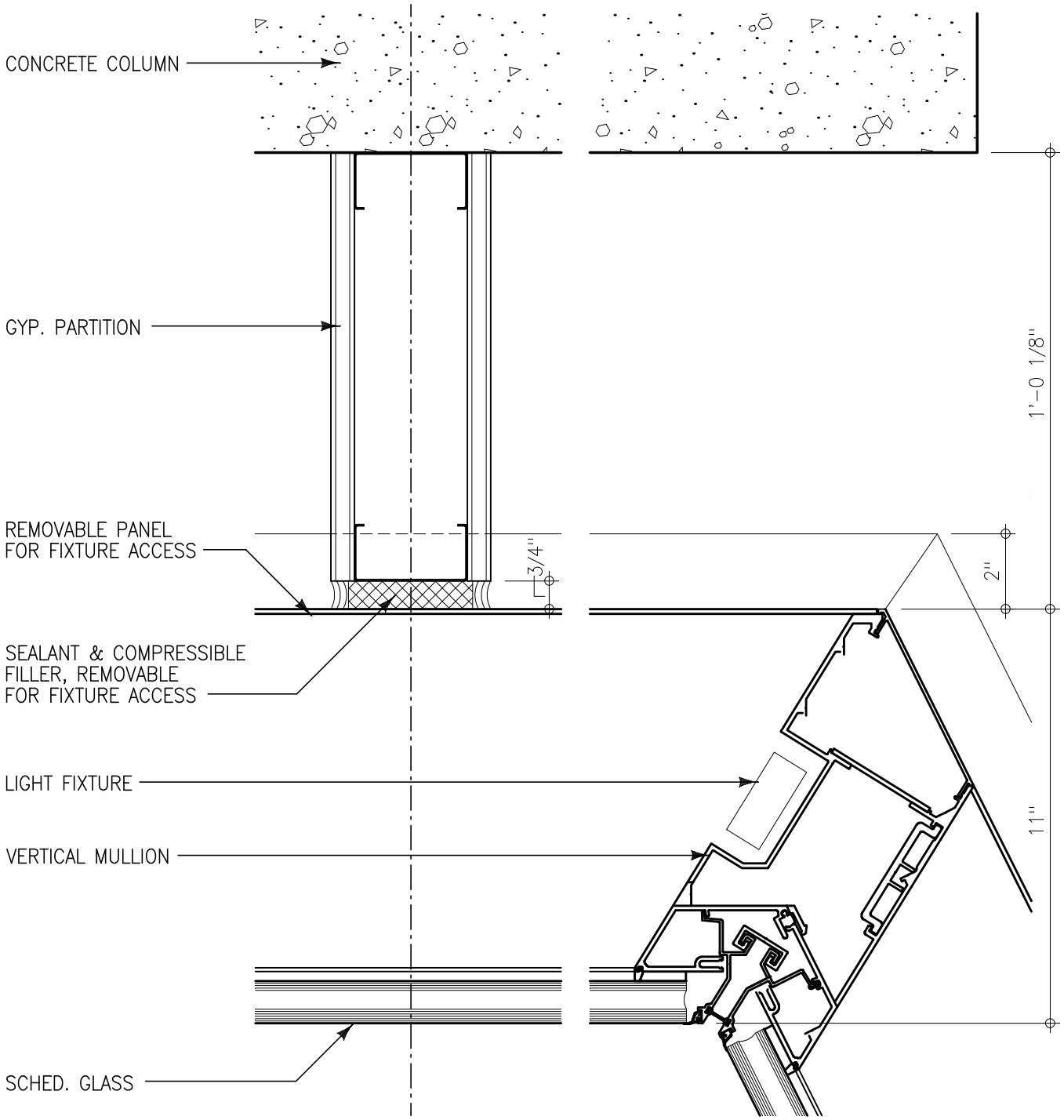
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

960



LIGHT BOX PLAN DETAIL

SCALE: 3"=1'-0"

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

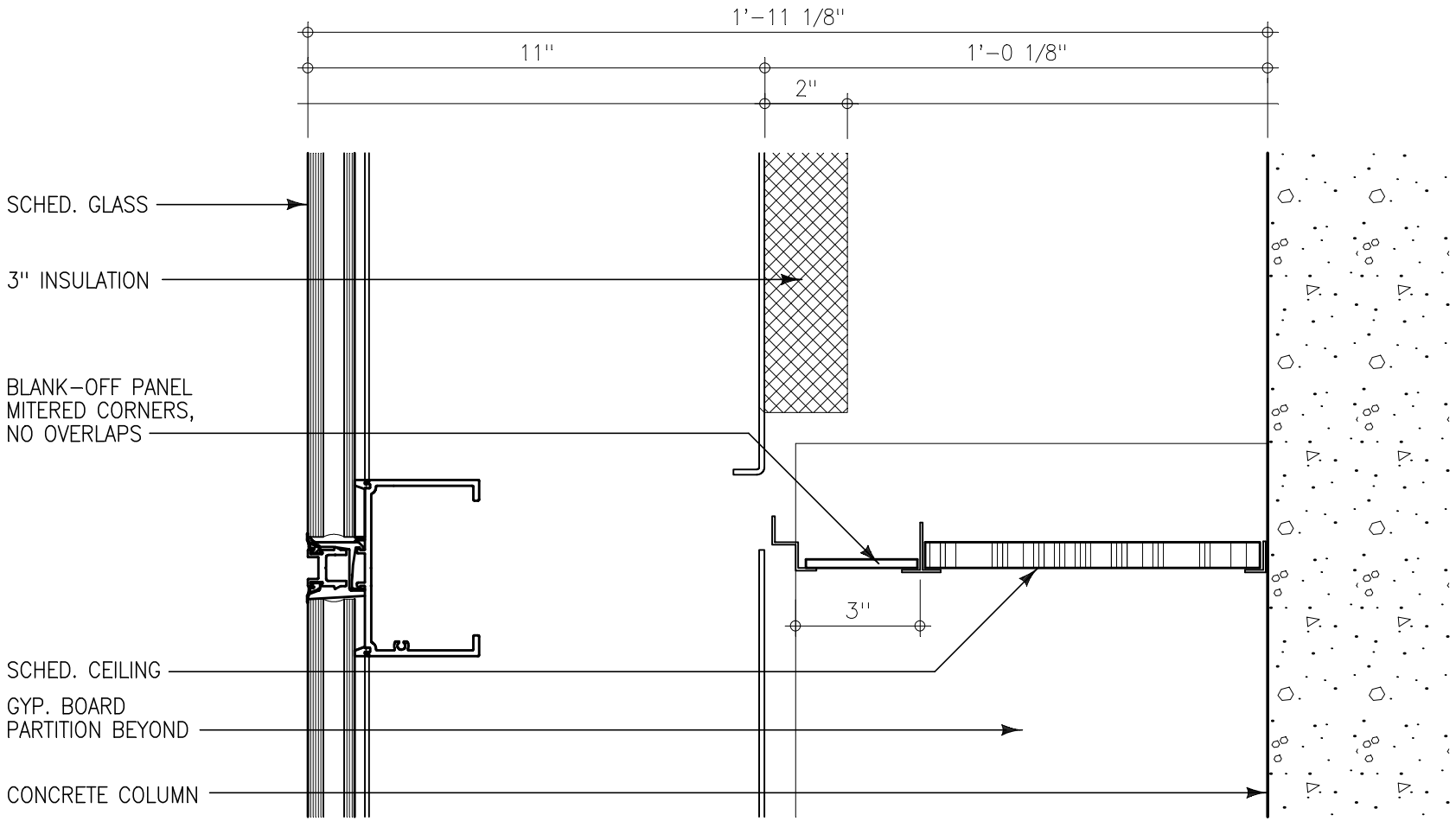
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

961



LIGHT BOX HEAD DETAIL — **SCALE: 3"=1'-0"**

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

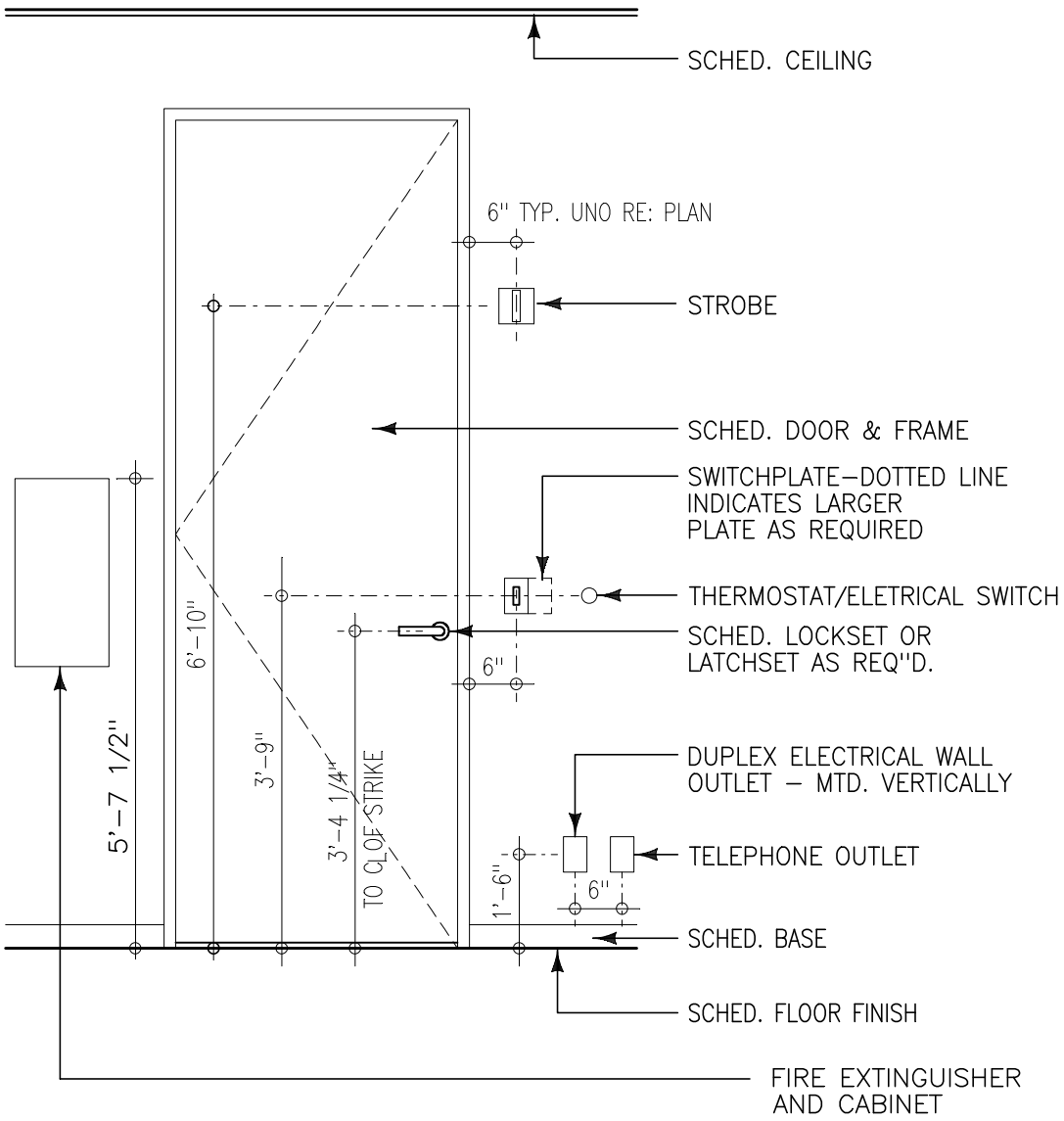
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

962



NOTE:

ELECTRICAL & TELEPHONE WALL OUTLETS & SWITCH PLATES TO BE LOCATED AT NEAREST STUD

TYPICAL MOUNTING HEIGHTS — SCALE: 1/2''=1'–0''

609 MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

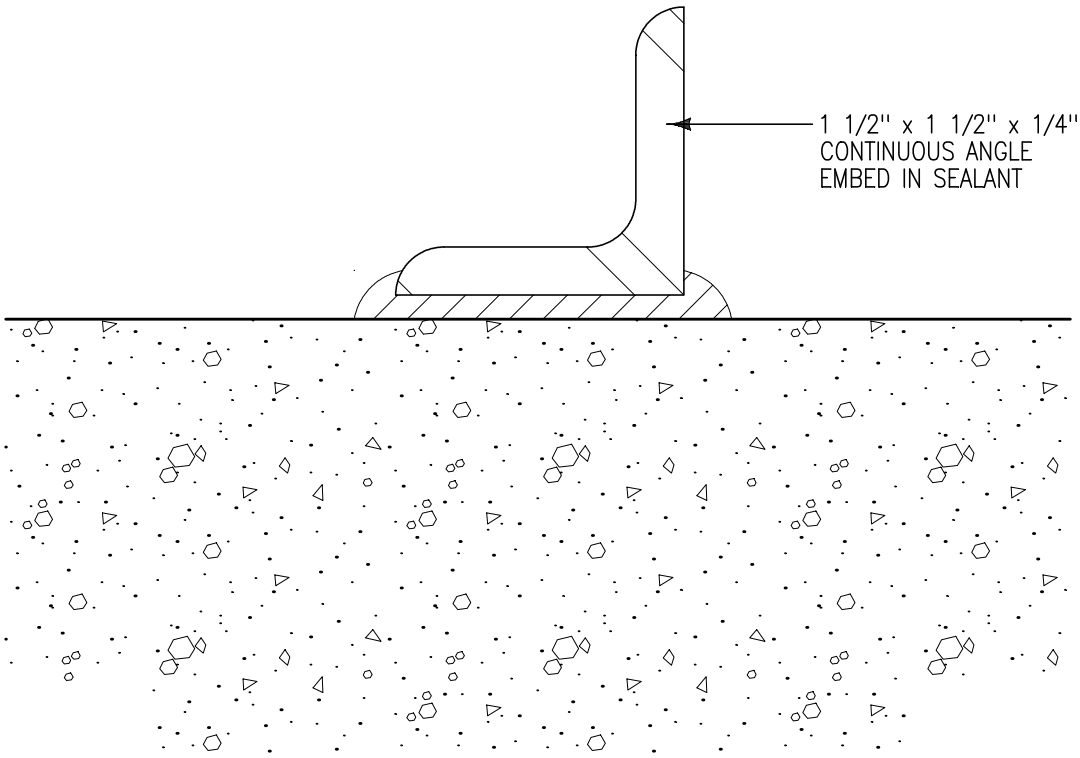
KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

991



TYPICAL LEAK PROTECTION AT WET AREA PERIMETER

SCALE: 12"=1'–0"

609
MAIN

HINES
OWNER

PICKARD CHILTON ARCHITECTS, INC.
DESIGN ARCHITECT

KENDALL/HEATON ASSOCIATES, INC.
ARCHITECT

CARDNO
STRUCTURAL ENGINEER

M-E ENGINEERS
M.E.P.F. CONSULTANT

TENANT

992

TAB F4 - TENANT STANDARD MANUFACTURER CUTSHEETS

PRODUCT DATA SHEETS ARE INCLUDED FOR GENERAL INFORMATION. REFER TO THE BASE BUILDING SPECIFICATIONS FOR CONSTRUCTION DETAILS, FEATURES, AND ADDITIONAL FORMATION.

DIVISION 8 DOORS AND WINDOWS

Stanley Hinges

Schlage Lockset & Latchset

Norton Closer

Hagar Floor Door Stop

Trimco Wall Door Stop

Ives Flush Bolts & Coordinator

Pemko Gasket & Astragal

DIVISION 9 FINISHES

Daltile Ceramic Tile

Horizon Tile Glass Tile

Armstrong Acoustical Panel Ceiling

Johnsonite Rubber Flooring

Armstrong Resilient Flooring & Base

Shaw Tile Carpeting

Manufacturer: Haworth Access Flooring

Knoll Vinyl Wall Covering

DIVISION 10 SPECIALTIES

J.L. Industries Fire Extinguisher & Cabinet

DIVISION 21 FIRE SUPPRESSION

Sprinkler Heads – Finished Areas
- Manufacturer: Viking
- Model: Mirage Standard
- Description: Concealed pendant, white cover plate

Sprinkler Heads – Shell and Mechanical Areas
- Manufacturer: Viking
- Model: Microfast Quick Response
- Description: Upright, bronze

DIVISION 22 PLUMBING

Lavatory
Water closet
Urinal
Leak Detection Sensor

DIVISION 23 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

Air Distribution Equipment

Underfloor air swirl diffuser – passive
Underfloor air swirl diffuser – active
Perimeter slot diffuser

DIVISION 26 ELECTRICAL

Electrical Power Monitoring – Tenant Submeters

Harmonic Mitigating Transformers

Panelboards

Wiring Devices
- Line Voltage Switches
- Plug Receptacles
- Coverplates
- Wallbox Dimmers
- Underfloor Wire Distribution Box (Equivalent)

Lighting Fixtures

- Recessed Architectural LED 2x4
- Recessed Architectural Flourescent 2x4
- Architectural LED Exit Sign
- Round Compact Fluorescent Downlight
- Round LED Downlight

Fire Control Panel

Intelligent Detector

Duct Smoke Detector

Heat Detector

Strobes, Speaker-Strobes, Wall and Ceiling

3 KNUCKLE FULL MORTISE HINGES

Standard Weight Concealed Bearing LifeSpan®

CB1900R – (ANSI A8112) Steel – polished and plated or phosphated and prime coated for painting
CB1960R – (ANSI A2112) Brass or bronze – polished and plated or painted
CB1960R (32) – (ANSI A5112) Stainless steel – highly polished
CB1960R (32D) – (ANSI A5112) Stainless steel – satin finish

- For medium weight doors of average frequency
- All hinges have template screw hole location for use on either wood or hollow metal doors and frames
- Concealed LifeStan® bearing for trouble-free, long life – no oil, no grease, no maintenance
- Pins in nonferrous hinges are stainless steel
- Hole in bottom tip for easy pin removal
- Reversible flush tips and pins
- LifeSpan® limited lifetime warranty
- Hinges can be furnished as follows:
  - with raised barrel (RB)
  - with electric wires and/or switches (CE and/or CS)
  - with hospital tips (HT)
  - with exposed tips (ET)
  - with decorative tips
  - with security studs
  - with non-removable pins (NRP)

Size Open		Gauge of Metal		Flat Head Screws Per Piece		Quantity Per Box	Quantity Per Case	Case Weight			
								Bronze		Steel	
Inches	(mm)	Inches	(mm)	Machine	Wood			Lbs.	(Kg)	Lbs.	(Kg)
3 1/2 x 3 1/2	(89 x 89)	.123	(3.1)	6 - 10-24 x 1/2	6 - 10 x 1	3 EA.	90 EA.	61	(28)	58	(26)
4 x 4	(102 x 102)	.130	(3.3)	8 - 12-24 x 1/2	8 - 12 x 1 1/4	3 EA.	48 EA.	45	(20)	43	(20)
4 1/2 x 4	(114 x 102)	.134	(3.4)	8 - 12-24 x 1/2	8 - 12 x 1 1/4	3 EA.	48 EA.	52	(24)	47	(21)
4 1/2 x 4 1/2	(114 x 114)	.134	(3.4)	8 - 12-24 x 1/2	8 - 12 x 1 1/4	3 EA.	48 EA.	56	(25)	52	(24)
5 x 4	(127 x 102)	.146	(3.7)	8 - 12-24 x 1/2	8 - 12 x 1 1/4	3 EA.	30 EA.	39	(18)	37	(17)
5 x 4 1/2	(127 x 114)	.146	(3.7)	8 - 12-24 x 1/2	8 - 12 x 1 1/4	3 EA.	30 EA.	43	(20)	38	(17)
5 x 5	(127 x 127)	.146	(3.7)	8 - 12-24 x 1/2	8 - 12 x 1 1/4	3 EA.	30 EA.	48	(22)	44	(20)
*6 x 6	(152 x 152)	.160	(4.1)	10 -1/4-20 x 1/2	10 -14 x 1 1/2	3 EA.	24 EA.	66	(30)	60	(27)

* Available in Steel only

Consult factory for other sizes not listed

GENERAL HINGE INFORMATION

Special Situation Products

- "CE" Concealed electric hinges conduct current regardless of door position to electric locks, exit devices, or hold open devices where tamper-proof hinge is required. Also to transmit signals from code readers on doors to remote computers for access control
- No electrical parts are exposed when hinge is installed
- Permanent fast pin
- Hinges should be installed in the center hinge location
- Not available as swing clear or raised barrel
- Hinges may be equipped with both concealed wires and concealed switches. When both are desired on the same hinge use prefix "CECS"
- Packed one per box with all machine screws and installlation instructions
- When ordering specify class number, size, finish and number of wires
  Suffix -54 for 4 wires, 56 for 6 wires -66 for 6 wires (2@24AWG, 4@28AWG), 58 for 8 wires or 10 for 10 wires
- Should be used along with a junction box
- Can be furnished with hospital tips

CECB179
CECB168
CECB191
CECB199
5-Knuckle
Concealed
Bearings

CEFBB179
CEFBB168
CEFBB191
CEFBB199
5-Knuckle
Exposed
Bearings

CECB1900R
CECB1901R
CECB1960R
CECB1961R
3-Knuckle
Concealed
Bearings

Not
Handed

Not
Handed

Handed
Specify
RH or LH

UL

Electrical Ratings

Suffix	# Wires	Wire Gage	Volts (AC or DC)	
			6, 12, 24	48
			Current	
-54	4	28AWG	1 amp/wire	5 milli-amp/wire
-56	6	28AWG	.7 amp/wire	5 milli-amp/wire
-58	8	28AWG	.5 amp/wire	5 milli-amp/wire
-10	10	28AWG	.4 amp/wire	5 milli-amp/wire
-66*	6	2@24AWG	2 amp/wire	5 milli-amp/wire
		4@28AWG	1 amp/wire	5 milli-amp/wire

Inrush 15A for .05 second/wire
"CE" hinges are listed by UL at these ratings
* Not available in FBB168 and FBB199

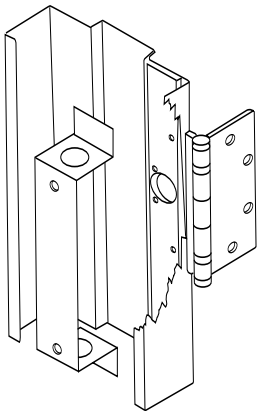
Class Number

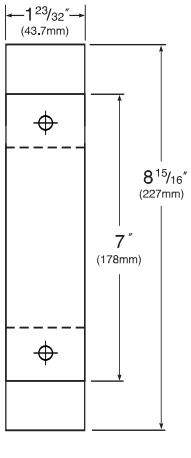
			Sizes Available	
CB179,	FBB179,	CB1900R	4½" x 4"	(114mm x 102mm)
CB168,	FBB168,	CB1901R	4½" x 4½"	(114mm x 114mm)
CB191,	FBB191,	CB1960R	5" x 4"	(127mm x 102mm)
CB199,	FBB199,	CB1961R	5" x 4½"	(127mm x 114mm)
			5" x 5"	(127mm x 127mm)
			6" x 4½"	(152mm x 114mm)
			6" x 5" *	(152mm x 127mm)
			6" x 6" *	(152mm x 152mm)

* Not available in CB191, FBB191, CB1900R and CB1960R

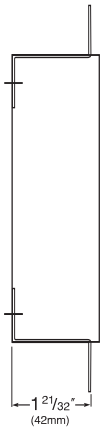
JB2R – Junction Box

- Note: Install in middle hinge location
- Can be shop welded or field installed — before frames are set
- Fits either 4½" (114mm) or 5" (127mm) size hinges





Junction Box
Top View



Right Side
View

Lock Functions | Single Cylinder Non-Deadbolt Functions

Schlage **ANSI**

L9050 **F04**
LV9050
Office and Inner Entry Lock
Latchbolt retracted by knob/lever from either side unless outside is made inoperative by key outside or by turning inside thumbturn. When outside is locked, latchbolt is retracted by key outside or by knob/lever inside. Outside knob/lever remains locked until thumbturn is returned to vertical or unlocked by key. Auxiliary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress.

L9056
LV9056
L9050 with Automatic Unlocking
Latchbolt retracted by knob/lever from either side unless outside is made inoperative by key outside or by rotating inside thumbturn. Outside knob/lever unlocked by key outside or thumbturn. Rotating inside knob/lever simultaneously retracts latchbolt and unlocks outside knob/lever. Auxiliary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress. (Previously XL11-776)

L9070 **F05**
LV9070
Classroom Lock
Latchbolt retracted by knob/lever from either side unless outside is locked by key. Unlocked from outside by key. Inside knob/lever always free for immediate exit. Auxiliary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress.

L9076 **F06**
LV9076
Classroom Holdback Lock
Latchbolt retracted by knob/lever from either side unless outside is locked by key. When locked, latchbolt retracted by key outside or knob/lever inside. Auxiliary latch deadlocks latchbolt when door is closed. Depress inside knob/lever and turn key 360° for holdback feature. Inside lever is always free for immediate egress.

L9080 **F07**
LV9080
Storeroom Lock
Latchbolt retracted by key outside or by knob/lever inside. Outside knob/lever always inoperative. Auxiliary latch deadlocks latchbolt when door is closed. Inside lever is always free for immediate egress.

L9080EL
LV9080EL
Electrically Locked (Fail Safe)
Outside knob/lever continuously locked by 24VAC or DC. Latchbolt retracted by key outside or by knob/lever inside. Switch or power failure allows outside knob/lever to retract latchbolt. Auxiliary latch deadlocks latchbolt when door is closed. Inside knob/lever always free for immediate exit. Inside lever is always free for immediate egress.

Schlage **ANSI**

L9080EU
LV9080EU
Electrically Unlocked (Fail Secure)
Outside knob/lever unlocked by 24VAC or DC. Latchbolt retracted by keyoutside or knob/lever inside. Auxiliarylatch deadlocks latchbolt when door is closed. Inside knob/lever always free for immediate exit. Inside lever is always free for immediate egress.

L9080EL-RX
L9080EU-RX
Request to Exit (RX) Electrified Lock
Same as L9080ELand L9080EU functions. In addition, a micro switch positioned inside the lock case monitors the retractor crank, and is actuated when rotation of the inside or outside knob/lever rotates the retractor hub. The switch signals the use of that opening to security systems, allowing a non-disruptive means of immediate egress. Specify per L283-059 for normally closed contacts (default). Specify L283-125 for normally open contacts. Inside lever is always free for immediate egress. (Previously XL11-807)

Lock Functions | ANSI A156.13, Series 1000

	Schlage	ANSI
	**L9010**	**F01**

Passage Latch
Latchbolt retracted by knob/lever from either side at all times. Inside lever is always free for immediate egress.

L9040 **F22**
LV9040
Bath/Bedroom Privacy Lock
LockLatchbolt retracted by knob/lever from either side unless outside is locked by inside thumbturn.Turning inside knob/lever or closing door unlocks outside knob/lever. To unlock from outside, remove emergency button, insert emergency thumbturn(furnished) in access hole and rotate. Inside lever is always free for immediate egress..

L9044
LV9044
Privacy With Coin Turn Outside
Latchbolt retracted by knob/lever from either side unless outside is locked by inside thumbturn or outside coin turn. Operating inside knob/lever, closing door, rotating inside thumbturn or rotating outside cointurn unlocks outside knob/lever. Specify per L283-056 for Torx® screws. Available with rose trim only. (Previously XL11-868)

L9440
LV9440 **F19**
Privacy With Deadbolt
Latchbolt retracted by knob/lever from either side. Deadbolt thrown or retracted by inside thumbturn. Throwing deadbolt locks outside knob/lever. Rotating inside knob/lever simultaneously retracts deadbolt and latchbolt, and unlocks outside knob/lever. To unlock from outside, remove emergency button, insert emergency thumbturn in access hole and rotate. Inside lever is always free for immediate egress. (Previously XL11-761)

	Schlage	ANSI
	**L9444**	
	LV9444	

Privacy with Deadbolt and Coin Turn Outside
Latchbolt retracted by knob/lever from either side. Deadbolt thrown or retracted by inside thumbturn or outside coin turn. Throwing deadbolt locks outside knob/lever. Rotating inside knob/lever simultaneously retracts deadbolt and latchbolt, and unlocks outside knob/lever. Rotating outside coin turn retracts deadbolt and unlocks outside knob/lever. Specify per L283-056 for Torx screws. Available with rose trim only. Inside lever is always free for immediate egress. (Previously XL11-868)

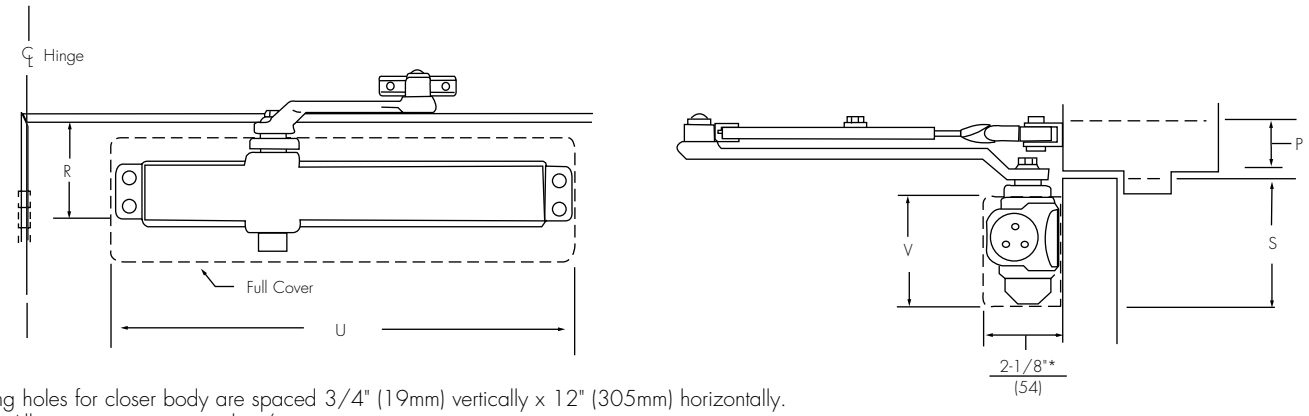
L0170
Half Dummy Trim
Knob/lever on one side fixed by mounting bar.

L0172
Full Dummy Trim
Knob/lever on both sides fixed by mounting bar.

L9175
Half Dummy Trim with Lock Case
Fixed knob/lever on one side inoperable. Includes lock case and armored front. Options same as L9176 below.

L9176
Full Dummy Trim with Lock Case
Fixed knob/lever on both sides. Includes lock case and blank armor front. May be ordered with optional XL11-743 armored front with cutout to receive deadbolt.

REGULAR ARM



Mounting holes for closer body are spaced 3/4" (19mm) vertically x 12" (305mm) horizontally.
Note: All measurements are inches/mm.
Maximum 180° door swing, conditions permitting.

Closer Series	Covers	P Minimum Ceiling Clearance			R Minimum Top Rail				S Minimum Top Rail Clearance		U Closer Length	V Closer Height
					W/O Drop Plate		W/8146 Drop Plate					
		NHO	Low Profile	HO	NHO	Low Profile	NHO	Low Profile	NHO	Low Profile		
8100	No Cover	1-1/2" (38)	1" (25)	1-5/8" (41)	2-1/2" (64)	2-3/8" (60)	1-5/8" (41)	1-1/2" (38)	3-1/2" (89)	3-3/8" (86)	12-3/4" (324)	2-7/8" (73)
8300	Slim Line Plastic										13" (330)	
8500	Full Plastic											
8500M	Metal								4-1/4" (108)	4-1/8" (105)	13-5/8" (346)	3-3/4" (95)
8500A	Arch. Plastic								3-5/8" (92)	3-1/2" (89)	14" (356)	3-1/8" (79)
8500MA	Arch. Metal								3-1/2" (89)	3-3/8" (86)		3" (76)

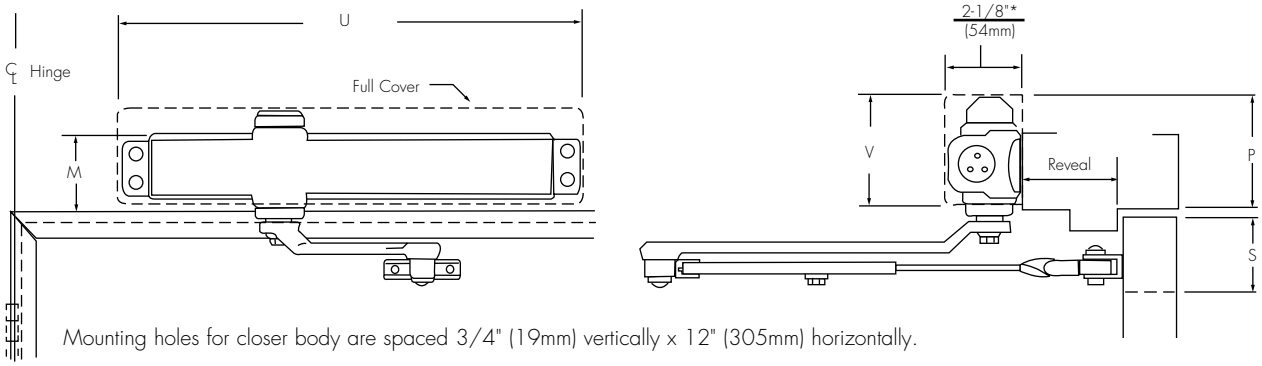
Door Widths Inches (cm)		Model Number			
		Sized Closers		Multi-Sized Closer	
Interior	Exterior	Non-Hold Open	Hold Open	Non-Hold Open	Hold Open
30" (76)	—	8302, 8502	8302H, 8502H	8301 8501	8301H 8501H
36" (91)	30" (76)	8303, 8503	8303H, 8503H		
48" (122)	36" (91)	8304, 8504	8304H, 8504H		
—	48" (122)	8305, 8505	8305H, 8505H		
Unusual		8306, 8506	8306H, 8506H		

Note: 8301/8501 door closers are set at midpower range from the factory and can be adjusted for door sizes noted above.

* Projection is for Slim Line or Full Covers. Projection for Metal Covers = 2-3/16" (56mm). Projection for Architectural Plastic & Architectural Metal Covers = 2-1/4" (57mm).

Note: Please contact factory if door weight exceeds 250 lbs.

TOP JAMB



Mounting holes for closer body are spaced 3/4" (19mm) vertically x 12" (305mm) horizontally.

Note: All measurements are inches/mm.

Closer Series	Covers	M Minimum Frame Face			P Minimum Ceiling Clearance			S Minimum Top Rail Clearance 5/8" (16mm) Frame Stop									U Closer Length	V Closer Height
								W/O Drop Plate			W/8146 Drop Plate			With 8148/8547 Drop Plate				
		W/O Drop Plate	With 8146 Drop Plate	With 8148, 8158, 8547, 8547A Drop Plate	W/O Drop Plate	With 8146 Drop Plate	With 8148, 8158, 8547, 8547A Drop Plate	NHO	Low Profile	HO	NHO	Low Profile	HO	NHO	Low Profile	HO		
8100	No Cover	1-3/4" (40)	1-1/8" (29)	1-1/2" (38)	2-3/4" (70)	1-5/8" (41)	1-1/2" (38)	2-1/4" (57)	N/A	2-1/2" (64)	3-3/8" (86)	2-3/4" (70)	3-5/8" (92)	4-3/8" (111)	3-3/4" (95)	4-5/8" (117)	12-3/4" (324)	2-7/8" (73)
8300	Slim Line Plastic																13" (330)	
8500	Full Plastic																	
8500M	Metal		N/A	1-5/8" (41)	3-3/4" (95)	N/A	1-5/8" (41)										13-5/8" (346)	3-3/4" (95)
8500A	Arch. Plastic			1-1/2" (38)	3" (76)		1-1/2" (38)										14" (356)	3-1/8" (79)
8500MA	Arch. Metal				2-7/8" (73)													3" (76)

Reveal Information

Door Widths Inches (cm)		Catalog Number - Sized Closers
Interior	Exterior	
30" (76)	—	J8302, J8502
36" (91)	30" (76)	J8303, J8503
48" (122)	36" (91)	J8304, J8504
—	48" (122)	J8305, J8505
Unusual		J8306, J8506

Sized Closers	Reveal Range Inches (mm)	Maximum Door Opening	
		NHO	Hold Open
J8000	2-3/4" (70) to 7" (178)	150°	
J8000H	2-3/4" (70) to 6-3/4" (171)		150°
Multi-Sized Closers			
J8301, J8501	2-3/4" (70) to 4-1/4" (108)	180°	
J8301, J8501	4-1/4" (108) to 7" (178)	150°	
J8301H, J8501H	2-1/8" (54) to 4-1/4" (108)		180°
J8301H, J8501H	4-1/4" (108) to 6-3/4" (171)		150°

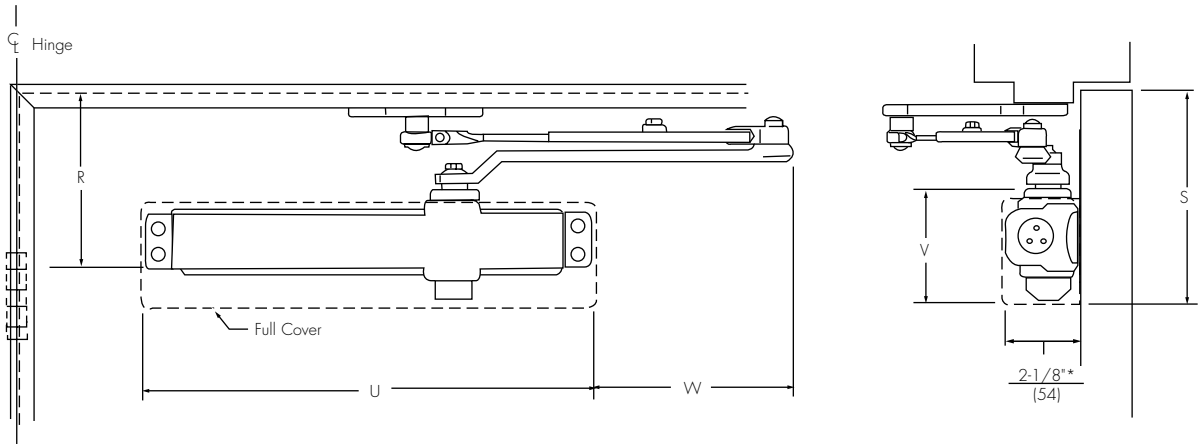
Reference Note on page 13 for information regarding multi-sized closers.
* Projection is for Slim Line or Full Covers. Projection for Metal Covers = 2-3/16" (56mm). Projection for Architectural Plastic & Architectural Metal Covers = 2-1/4" (57mm).
Note: Please contact factory if door weight exceeds 250 lbs.

Reveal Information (regular arm installed top jamb)

Sized Closers	Reveal Range Inches (mm)	Maximum Door Opening	
		NHO	Hold Open
8000	0 to 2-7/8" (73)	180°	
8080 w/Drop Plate**	0 to 2-3/4" (70)	180°	
8000H	0 to 2-3/4" (70)		180°
Multi-Sized Closers			
8301, 8501	0 to 2-7/8" (73)	180°	
8301, 8501 w/Drop Plate	0 to 2-3/4" (70)	180°	
8301H, 8501H	0 to 2-3/4" (70)		180°

Note: Reveal range information is based upon 1-3/4" (44mm) doors hung on 4-1/2" wide hinges.
** Drop Plate 8146, 8148, 8158, 8547 or 8547A

PARALLEL ARM



Mounting holes for closer body are spaced 3/4" (19mm) vertically x 12" (305mm) horizontally.
Note: All measurements are inches/mm.
Maximum 180° door swing, conditions permitting.

Closer Series	Covers	R Minimum Top Rail Minimum Top Rail 5/8" (16mm) Frame Stop						S Minimum Top Rail Clearance			U Closer Length	V Closer Height	W Arm Extension
		W/O Drop Plate			With 8148, 8158, 8548, 8548A Drop Plate								
		NHO	Low Profile	HO	NHO	Low Profile	HO	NHO	Low Profile	HO			
8100	No Cover	5-1/4" (133)	4-5/8" (117)	5-1/4" (133)	3" (76)	2-3/8" (60)	3" (76)	6-1/4" (159)	5-5/8" (143)	6-1/4" (159)	12-3/4" (324)	2-7/8" (73)	8-1/8" (206)
8300	Slim Line Plastic										13" (330)		8" (203)
8500	Full Plastic												
8500M	Metal							6-7/8" (175)	6-1/4" (159)	6-7/8" (175)	13-5/8" (346)	3-3/4" (95)	7-5/8" (194)
8500A	Arch. Plastic							6" (152)	5-3/8" (137)	6" (152)	14" (356)	3-1/8" (79)	
8500MA	Arch. Metal							5-7/8" (149)	5-1/4" (133)	5-7/8" (149)		3" (76)	

^Not available for doors that swing 180°

Door Widths Inches (cm)		Model Number			
		Sized Closers		Multi-Sized Closer	
Interior	Exterior	Non-Hold Open	Hold Open	Non-Hold Open	Hold Open
30" (76)	—	P8302, P8502	P8302H, P8502H	8301 8501	8301H 8501H
36" (91)	30" (76)	P8303, P8503	P8303H, P8503H		
42" (107)	36" (91)	P8304, P8504	P8304H, P8504H		
48" (122)	42" (107)	P8305, P8505	P8305H, P8505H		
—	48" (122)	P8306, P8506	P8306H, P8506H		

Note: 8301/8501 door closers are set at midpower range from the factory and can be adjusted for door sizes noted above.
* Projection is for Slim Line or Full Covers. Projection for Metal Covers = 2-3/16" (56mm). Projection for Architectural Plastic & Architectural Metal Covers = 2-1/4" (57mm).
Note: Please contact factory if door weight exceeds 250 lbs.

259F

Tri Base Floor Stop

Notes:

- 1/2" (13 mm) max door to floor clearance
- Heavy duty - for use in high traffic areas
- For use on wood or concrete floors

PRODUCT SPECIFICATIONS

BASE:
- 2-1/2" wide x 1-9/16" deep (64 mm x 40 mm)

OVERALL HEIGHT:
- 1-11/16"(43 mm)

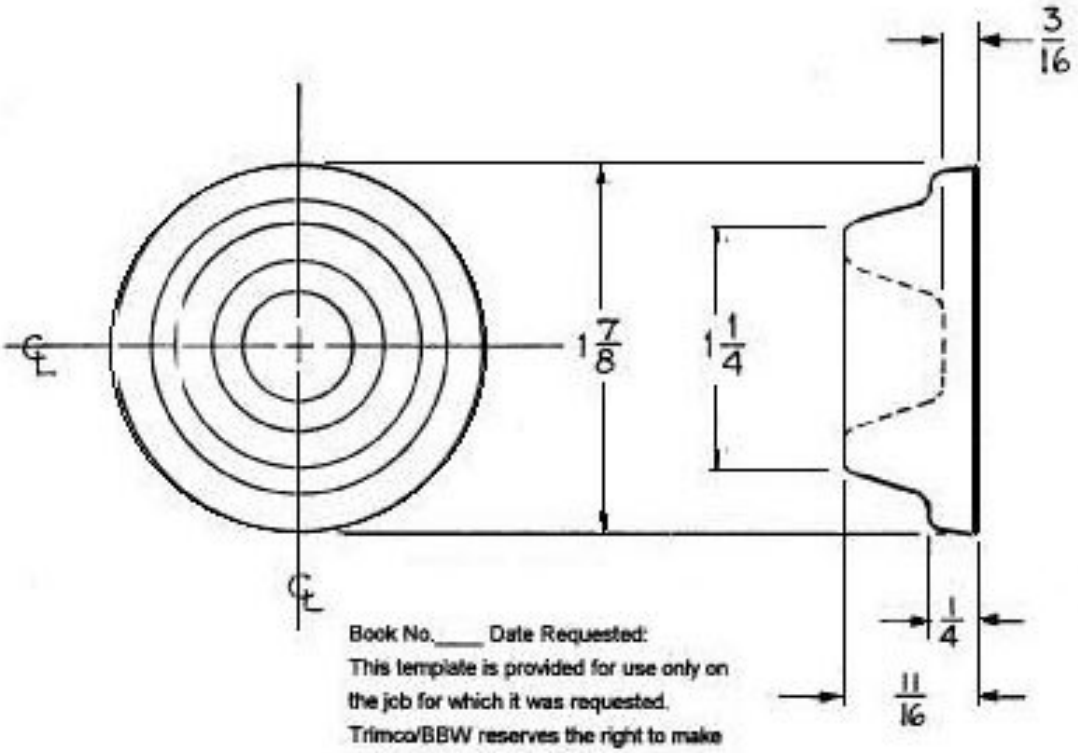
MATERIAL:
- Cast brass with grey rubber bumper

FINISHES:
- US3, US4, US10, US10B, US26, US26D

FASTENERS:
- Three (3) #10 x 1-1/4" FPHWS, three (3) plastic anchors, three (3) 10-32 x 3/4" FPHMS, and three (3) 10-32 lead anchor

NOTES:

REVISIONS			
LTR	DESCRIPTION	DATE	CHECKED
—	NEW DWG. TA	12-7-94	



Book No.____ Date Requested:
This template is provided for use only on the job for which it was requested. Trimco/BBW reserves the right to make design changes without notice.

TRIMCO P/N	BBW P/N	FASTENERS
1271 SA	WC 10SA	SELF ADHESIVE
1271 TB	WC10-XTB	#6-32 × 1 3/4 OH, PH, MS. WITH TOGGLE BOLT, DRILL 1/2 Ø HOLE
1271 WS	WC10 - X	#8 × 1 1/4 OH, PH, SMS WITH PLASTIC TOGGLE, DRILL 3/8 Ø HOLE

Trimco / BBW
Triangle Brass Manufacturing Company, Inc.
3528 Emery Street, P.O. Box 23277
Los Angeles, CA 90023, USA

SCALE

USED ON: 1271 SA, 1271TB, 1271 WS

TITLE: 1271
WALL STOP-SLF ADHESIVE-GREY

PART NO

DRAWN BY T.A. 12-7-94

A

DWG. NO. 11333

IVES

Automatic Flush Bolts – Metal Doors

Meets ANSI A156.3 Type 25.
UL Listed 3 Hour Fire Doors 8'0" x 10'0"

FB31P Top and Bottom Bolts (Pair)

- Fully Automatic—inactive door is latched, bolts are extended when active door closes, door is unlatched, bolts retract when active door is opened.
- Low Actuation Forces—Top Bolt Has No Spring Tension.
- Fits standard ANSI A115.4 Door Frame Preparations.
- Non-handed.
- Bolt throw is 3/4" with a 7/8" vertical adjustment.
- Bolt backset is 3/4"
- Standard Rod Length is 12", which is measured from the center of the flush bolt body to the bolt tip. Optional rod lengths available for top bolt only on non-fire rated openings—18", 24", 36" and 48.

DP1 or DP2 optional dust proof strike available, see page C11.

FB31T Top Bolt Only
FB31B Bottom Bolt Only

FB32 Top Bolt with Auxiliary Fire Latch

- FB32 Model with Auxiliary Fire Latch eliminates the bottom bolt and is UL Listed for Fire Doors.

Meets ANSI A156.3 Type 25.
UL Listed 3 Hour Fire Doors 8'0" x 10'0"

FB33 Top Bolt with Auxiliary Fire Latch and Retrofit Plate

- FB33 Model with Auxillary Fire Latch eliminates the bottom bolt and includes a retrofit plate to cover existing bottom bolt prep. UL Listed for Fire Doors.

Dimensions

Body Size: 1" Wide x 6-3/4" Long x 2" Deep

Guide Size: 1" Wide x 1-27/32" Long x 27/32" High x 3/32" Thick

Strike Size: 15/16" Wide x 2-1/4" Long x 1/16" Thick

Rub Plate Size: 1-1/4" Wide x 1-11/16" Long x 3/64" Thick

Auxiliary Fire Latch Size: 1" Wide x 1-3/4" Long x 3-1/4" Deep

Retrofit Plate Size: 1" Wide x 6-3/4" Long x 3/32" Thick

Finishes

Ives Number	US3	US4	US10	US10B	US32	US32D
BHMA	605	606	612	613	629	630

IVES

Manual Flush Bolts – Metal Doors

Meets ANSI/BHMA A156.16, L04251.
UL Listed 90 Minute Fire Doors 8'0" x 10'0"

FB458 Top or Bottom Bolts

- When the active door is opened, the lever can be moved to the 'up' position, retracting the bolt and allowing the inactive leaf to be opened. When the inactive leaf is closed, the lever can be moved to the 'down' position, projecting the bolt into the strike and securely locking the inactive leaf.
- Simplified installation in metal frames. Round bolt head requires only a punched hole. Use of strike optional. Special design of guide and flat sided bolt tip to prevent bolt rotation.
- Non-handed.
- Bolt tip is 1/2" diameter.
- Bolt throw is 3/4" with a 7/8" vertical adjustment.
- Bolt backset is 3/4"
- Standard Rod Length is 12", which is measured from the center of the flush bolt body to the bolt tip. Optional Rod Lengths available - 6", 9", 18" and 24" for fire rated Doors. Optional Rod lengths available - 6", 9", 18", 24", 30", 36" and 48" for non-fire rated doors.

DP1 or DP2 optional dust proof strike available, see page C11.

Dimensions

Body Size: 1" Wide x 6-3/4" Long x 1-1/8" Deep

Guide Size: 1" Wide x 2" Long x 5/64" Thick

Strike Size: 15/16" Wide x 2-1/4" Long x 5/64" Thick

Finishes

Ives Number	US3	US4	US5	US10	US10B	US15	US26	US26D
BHMA	605	606	609	612	613	619	625	626

IVES

Coordinators – Bar Coordinators and Filler Bars

COR Series Bar Coodinators

Meets ANSI/BHMA A156.3, Type 21A.
UL Listed for installation on labeled frame.

- The COR Series Coordinators are designed for use on pairs of doors when one door needs to close before the other.
- All COR units function easily. The active door lever, located nearest to the active stop, holds the active door open until the trigger mechanism is released by the closing of the inactive leaf.
- All COR units may not function correctly with swingclear hinges.
- All COR units are equipped with an adjustable override feature which allows the active door to close under extreme pressure.
- All COR units are compatible with Flush Bolts.
- The COR Series is available in five sizes for variable door opening widths.
- The COR Series does not cover the entire length of the stop, so a FL filler bar can be provided to maintain architecturally clean lines.
- COR Series Coordinator Channels and FL fillers are made of aluminum.
- Optional Filler Bars: FL20 - 20", FL32 - 32" and FL44 - 44", available to maintain clean line.
- Optional Mounting Brackets available: MB1, MB2, MB1F, MB2F, MB3F, MB1V, MB2V, and MB3V for other stop applied hardware.

For Openings Where Doors Are Same Size

Coordinator Number	Length of Channel	For Opening Widths	Common Applications
COR32	32"	34" - 52"	Pair of 2'0" Doors
COR42	42"	52" - 72"	Pair of 2'6" Doors
COR52	52"	62" - 92"	Pair of 3'0" Doors
COR60	60"	70" - 108"	Pair of 3'6" Doors
COR72	72"	84" - 132"	Pair of 4'0" Doors

For Openings Where Doors Are Unequal Size

The coordinator length should equal the active door width plus approximately 1/2 the inactive door width. The coordinator must be 6" longer than the active door width and shorter than the overall frame opening between stops.

Finishes

Ives Finish	US28	US26D	315AN
BHMA	628	713	711

FL Series Filler Bars

- The FL Filler Bars are available in three sizes for variable frame openings.
- FL Filler Bars are made of aluminum
- FL Filler Bars are field sized to frame opening.

Filler Bar Number	Length	Dimensions
FL20	20"	1-5/8" W x 5/8" D x 20" L
FL32	32"	1-5/8" W x 5/8" D x 32" L
FL44	44"	1-5/8" W x 5/8" D x 44" L

Finishes

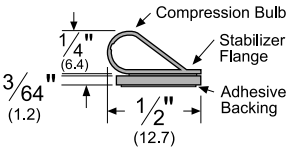
Ives Finish	US28	US26D	315AN
BHMA	628	713	711

PEMKO
ASSA ABLOY

ADHESIVE GASKETING:
HOT SMOKE SEAL™/SILICONSEAL™ COMBINATION FIRE/SMOKE GASKETING

HSS2000xS88_

AVAILABLE FINISHES: **BL, C, D, TAN, W**
AVAILABLE LENGTHS: **18', 20', 21', 24'**
WIDTH: **1/2" (12.7 mm)**
HEIGHT: **1/4" (6.4 mm) - S88; 3/64" (1.2 mm) - HSS2000**
TOTAL HEIGHT: **19/64" (7.6 mm)**



BL (Black)
C (Clear)
D (Dark Brown)
TAN (Tan)
W (White)

TITLE:
PREPARED FOR:
PREPARED BY:
DATE:
COMMENTS:

HSS2000xS88_CUT Rev 1 - 04.01.08

PEMKO
ASSA ABLOY

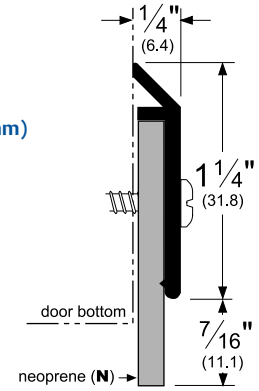
DOOR BOTTOMS: DOOR BOTTOM SWEEPS

315_N

AVAILABLE FINISHES: **B, C, D, G, SN**

WIDTH: **1/4" (6.4 mm)**

PROFILE HEIGHT: **1-1/4" (31.8 mm)**
TOTAL HEIGHT WITH INSERT: **1-11/16" (42.9 mm)**



TITLE:
PREPARED FOR:
PREPARED BY:
DATE:
COMMENTS:

B (Mill Finish Extruded Bronze [Brass])
C (Clear Anodized Aluminum)
D (Dark Bronze Anodized Aluminum)
G (Gold Anodized Aluminum)
SN (Satin Nickel Anodized Aluminum)

315_N_CUT Rev 1 - 05.14.08

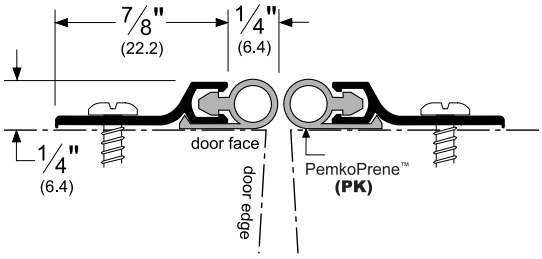
PEMKO
ASSA ABLOY

ASTRAGALS & MEETING STILES:
ASTRAGALS AND MEETING STILE GASKETING-
SPLIT ASTRAGALS

303_S (MS)

ORDER TWO (AS A PAIR)

AVAILABLE FINISHES: **A, BDG, D, G, PW, SN**
PROFILE WIDTH: **7/8" (22.2 mm) (x2)**
TOTAL WIDTH WITH INSERT: **1-1/8" (28.6 mm) (x2)**
HEIGHT: **1/4" (6.4 mm)**



A (Mill Finish Aluminum)
BDG (Bright Dip Gold Anodized Aluminum)
D (Dark Bronze Anodized Aluminum)
G (Gold Anodized Aluminum)
PW (Painted White Aluminum)
SN (Satin Nickel Anodized Aluminum)

TITLE:
PREPARED FOR:
PREPARED BY:
DATE:
COMMENTS:

303_S_CUT Rev 1 - 04.01.08

EXHIBITION™
COLORBODY™ PORCELAIN

FIELD TILE

STARK WHITE EX01


MODE BEIGE EX06


TAILOR BEIGE EX07


MODERN TAN EX08


GREY EX02


TREND GREY EX03


DARK GREY EX04


BLACK EX05


BORREL EX11


ECRU EX12


FRAY EX10


TWILL EX09

EXHIBITION™
COLORBODY™ PORCELAIN

SIZES - CEMENT VISUAL

		SQ.FT. CARTON	PIECES PER CARTON
24 x 48 Field Tile (Unpolished)	(23-3/8" x 46-7/8") (59.5 cm x 119.2 cm)	15.50	2
24 x 24 Field Tile (Unpolished & Textured)	(23-3/8" x 23-3/8") (59.5 cm x 59.5 cm)	11.64	3
12 x 24 Field Tile (Unpolished & Textured)	(11-5/8" x 23-3/8") (29.65 cm x 59.5 cm)	9.70	5

SIZES - FABRIC VISUAL

		SQ.FT. CARTON	PIECES PER CARTON
24 x 24 Field Tile Unpolished	(23-3/8" x 23-3/8") (59.5 cm x 59.5 cm)	11.64	3
12 x 24 Field Tile Unpolished	(11-5/8" x 23-3/8") (29.65 cm x 59.5 cm)	9.7	5

RESIDENTIAL USAGE

FLOORS	WALLS	COUNTERTOPS	EXTERIOR PATIOS	EXTERIOR POOL DECKS
F	W	C	EP	ED

COMMERCIAL USAGE

	INTERIOR			EXTERIOR	
	RESIDENTIAL	LIGHT COMMERCIAL	COMMERCIAL	RESIDENTIAL	COMMERCIAL
Floors/Patios	✓	✓	✓	✓▲	✓▲
Walls/Backsplashes	✓	✓	✓	✓	✓
Countertops	✓	✓	✓	✓	✓
Pool Decking	✓◆	✓◆	✓◆	✓◆	✓◆
Pool Linings	✓	✓	✓	✓	✓

Suitable for exterior applications in freezing and non-freezing climates when proper installation methods are followed.
▲ Unpolished & Textured surfaces
◆ Textured surface only

NOTES

Special care should be taken when grouting with dark pigmented colors. A grout release is recommended to prevent finely powdered pigments from lodging in the pores of the surface. Use of a latex modified thinset is recommended for installation.

Special care needs to be given when installing tiles 20" and larger. Please refer to www.daltile.com/LargeTiles for information.

Since there are variations in all fired ceramic products, tile and trim supplied for your particular installation may not match these samples. Final color selection should be made from actual tiles and trim and not from tile and trim samples or color reproductions. Manufactured in accordance with ANSI A137.1 standards.

For additional information, refer to "Factors to Consider" at www.daltile.com/CommercialFactors.

Water, oil, grease, etc. create slippery conditions. Floor applications with exposure to these conditions require extra caution in product selection. Not for use on ramps.

TRIM

	TYPE	NUMBER	SIZE	PCS. PER CARTON
	Bullnose	S-43C9	3 x 12	30
	Cove Base	S-36C9T	6 x 12	20
	Cove Corner	SC-36C9T	1 x 6	10

SHADE VARIATION

HIGH (V3)
Color variation from tile to tile and within each tile.

INSTALLATION

THICKNESS	GROUT JOINT RECOMMENDATION
3/8"	1/8" (3/16" when rectangular sizes are used in a staggered brick-joint pattern, where the overlap does not exceed 33%)

DYNAMIC C.O.F. (WET) : 2

The higher the rating, the higher the slip resistance.

1 < 0.42

2 ≥ 0.42

STATIC C.O.F. (WET) : 2

1 0.50 - 0.59

2 ≥ 0.60

TEST RESULTS

	ASTM#	Textured Result	Unpolished Result
Water Absorption	C373	< .05%	< .05%
Breaking Strength	C648	> 450 lbs	> 450 lbs
Scratch Hardness	MOHS	8	8
Chemical Resistance	C650	Resistant	Resistant
Dynamic C.O.F.	A137.1	Wet: ≥ 0.42	Wet: ≥ 0.42
Static C.O.F.	C1028	Wet: ≥ 0.65 Dry: ≥ 0.80	Wet: ≥ 0.60 Dry: ≥ 0.70


PRE CONSUMER RECYCLED MATERIALS

TRU-EDGE


EXTERIOR PRODUCT

daltile®
DESIGN WITH CONFIDENCE™

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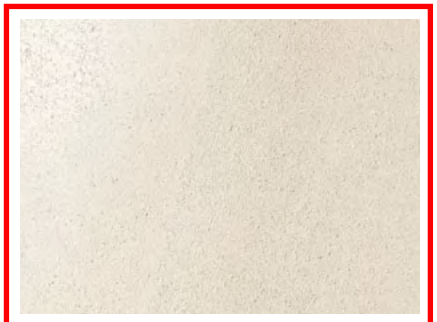
For more information about Daltile products and services, visit our website at DALTILE.COM.

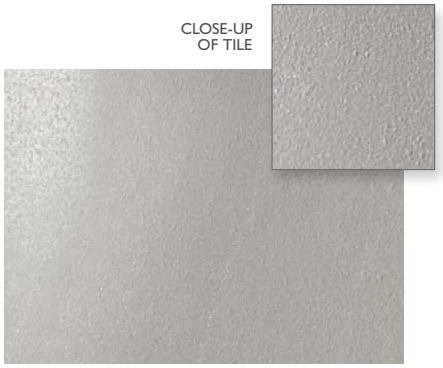
EVER™ | COLORBODY™ PORCELAIN

floor • wall • countertop • exterior

Light Polished Field Tile

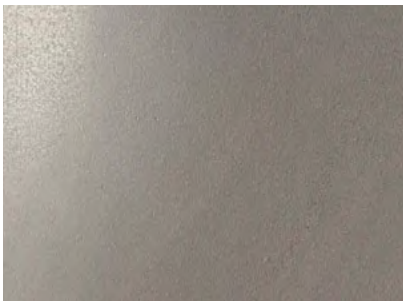

MOON EV01


LIGHT EV02



ARTIC EV03


ROCK EV04


EARTH EV05


DARK EV06

Unpolished Field Tile


MOON EV01


LIGHT EV02

ARTIC EV03


ROCK EV04


EARTH EV05


DARK EV06

SIZES

		SQ.FT. CARTON	PCS. PER CARTON
24 x 48 Field Tile*** (Unpolished & Light Polished)	(23.42" x 47.04") (60 cm x 120 cm)	15.5	2
24 x 24 Field Tile (Unpolished*, Light Polished**, Textured***)	(23.42" x 23.42") (60 cm x 60 cm)	11.62	3
18 x 18 Field Tile* (Unpolished)	(17.56" x 17.56") (45 cm x 45 cm)	10.89	5
16 x 24 Field Tile*** (Unpolished & Textured)	(15.59" x 23.42") (40 cm x 60 cm)	10.33	4
12 x 24 Field Tile (Unpolished* & Textured**)	(11.65" x 23.42") (30 cm x 60 cm)	11.62	6
8 x 24 Field Tile*** (Unpolished & Textured)	(7.71" x 23.42") (20 cm x 60 cm)	9.04	7
12 x 24 Brick Accent*	(11.65" x 23.42") (30 cm x 60 cm)	- -	4

* Stocked items
** Special Order with 2 week lead time
*** Special Order with 6-8 week lead time

RESIDENTIAL USAGE

FLOORS	WALLS	COUNTERTOPS	EXTERIOR PATIOS	EXTERIOR POOL DECKS
F	W	C	EP▲	ED◆

Suitable for exterior applications in freezing and non-freezing climates when proper installation methods are followed.

▲ Unpolished & Textured surfaces
◆ Textured surface only

COMMERCIAL USAGE

	INTERIOR			EXTERIOR	
	RESIDENTIAL	LIGHT COMMERCIAL	COMMERCIAL	RESIDENTIAL	COMMERCIAL
Floors/Patios	✓	✓	✓	✓▲	✓▲
Walls/Backsplashes	✓	✓	✓	✓	✓
Countertops	✓	✓	✓	✓	✓
Pool Decking	✓◆	✓◆	✓◆	✓◆	✓◆
Pool Linings	✓	✓	✓	✓	✓

Suitable for exterior applications in freezing and non-freezing climates when proper installation methods are followed.

▲ Unpolished & Textured surfaces
◆ Textured surface only

NOTES

Manufacturer Warning: Tile with a polished surface has a dynamic coefficient of friction less than 0.42 as measured by the DCOF Acutest method. Tiles with DCOF Acutest values less than 0.42 are not recommended for use in areas with wet or slippery conditions. If such tiles are used as a walking surface where water, ice, oil, grease and/or other substances are present, such a condition could cause a reduction in foot traction and become unexpectedly slippery resulting in a fall or personal injury. See ANSI standard A137.1 section 6.2.2.1.10, available at www.tileusa.com.

Special care should be taken when grouting with dark pigmented colors. A grout release is recommended to prevent finely powdered pigments from lodging in the pores of the surface. Use of a latex modified thin-set is recommended for installation.

Special care needs to be given when installing tiles 20" and larger. Please refer to www.daltile.com/LargeTiles for information.

Since there are variations in all fired ceramic products, tile and trim supplied for your particular installation may not match these samples. Final color selection should be made from actual tiles and trim and not from tile and trim samples or color reproductions. Manufactured in accordance with ANSI A137.1 standards.

Water, oil, grease, etc. create slippery conditions. Floor applications with exposure to these conditions require extra caution in product selection. Not for use on ramps.

For additional information refer to "Factors to Consider" at http://daltile.com/factors-to-consider.cfm.

TRIM (Available in Unpolished only)

	TYPE	NUMBER	SIZE	PCS. PER CARTON
	Gradino Step Tread***	S6CF6	12 x 24	6
	Cove Base*■	S-36C9T	6 x 12	30
	Bullnose*	S-43F9	3 x 24	10
	Cove Corner*	SC-36C9T	1 x 6	15

* Stocked items
** Special Order with 2 week lead time
*** Special Order with 6-8 week lead time

■ Cove Base trim is intended to coordinate with floor field tile in the standard 90-degree installation position.

SHADE VARIATION

HIGH (V3)
Color variation from tile to tile and within each tile.

INSTALLATION

THICKNESS	GROUT JOINT RECOMMENDATION
5/16"	1/8" (3/16" when rectangular sizes are used in a staggered brick-joint pattern, where the overlap does not exceed 33%)

DYNAMIC C.O.F. (WET) : 1-2

The higher the rating, the higher the slip resistance.

1	< 0.42 (Light Polished)
2	≥ 0.42 (Textured & Unpolished)

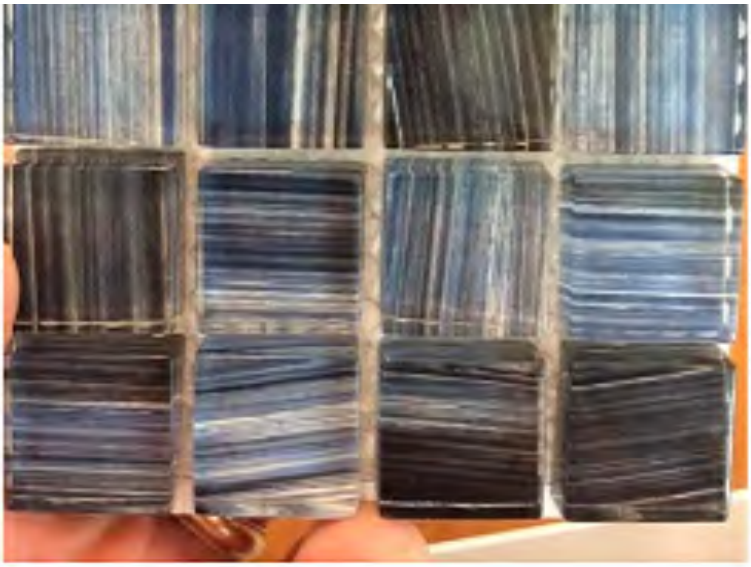
STATIC C.O.F. (WET) : 1-2

1	0.50 - 0.59 (Light Polished)
2	≥ 0.60 (Textured & Unpolished)

TEST RESULTS

	ASTM#	TEXTURED	UNPOLISHED	POLISHED
Water Absorption	C373	< .05%	< .05%	< .05%
Breaking Strength	C648	> 450 lbs	> 450 lbs	> 450 lbs
Scratch Hardness	MOHS	8	8	8
Chemical Resistance	C650	Resistant	Resistant	Resistant
Dynamic C.O.F.	A137.1	Wet: ≥ 0.42	Wet: ≥ 0.42	Wet: < 0.42
Static C.O.F.	C1028	Wet: ≥ 0.65 Dry: ≥ 0.80	Wet: ≥ 0.60 Dry: ≥ 0.70	Wet: 0.50 - 0.59 Dry: ≥ 0.70

Dynamic C.O.F. (Wet) value as measured by the DCOF AcuTest™ helps to assess a product's suitability for a commercial environment. For more information, visit our website at www.daltile.com/DCOF.




HIT 143 BC1001 1X1
HORIZON Italian TILE
Special Order
SHOWROOM / CORPORATE
1617 Hi Line Drive, #450
Dallas, TX 75207 USA
214.741.4447


HIT 143 BC2051 1X1
HORIZON Italian
special order

OPTIMA™ Open Plan
Square Lay-in & Tegular

Fiberglass

▼ fine texture

Special Performance

Optima Vector

Detail and Grid Intersections

OPTIMA Square Lay-in

OPTIMA Open Plan with PeakForm PRELUDE 24mm (15/16") Exposed Tee Grid

Typical Applications

- Open Plan offices
- Computer rooms
- Corridors
- Auditoriums
- Healthcare
- Areas with indirect lighting systems

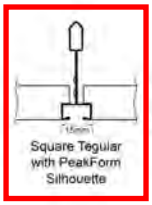
Key Selection Attributes

- Outstanding acoustical performance for open plan areas, both Articulation Class (180-200) and NRC (0.90-1.00)
- Smooth, clean, durable finish – Washable, Impact-resistant, Scratch-resistant, Soil-resistant
- Energy-saving high light-reflective finish
- 30-Year Limited System Warranty against visible sag, mold/mildew, and bacterial growth
- Non-directional visual reduces installation time and scrap
- Ceilings qualify for LEED credits
- Non-asbestos

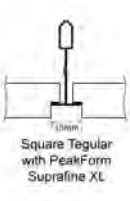
Recycled Content : 82%

Color

White (WH)

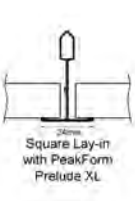


Square Tegular with PeakForm Silhouette



Square Tegular with PeakForm Supraline XL

Square Tegular with PeakForm Prelude XL



Square Lay-in with PeakForm Prelude XL

OPTIMA™ Open Plan
Square Lay-in, Tegular & Tegular

Relative Installed Cost

$	$$	$$$	$$$$

▼ fine texture

Visual Selection

Performance Selection

GRID FACE	EDGE PROFILE	ITEM NUMBER	DIMENSIONS	UL Classified ACOUSTICS NRC	AC	CAC	FIRE RESIST	SAG RESIST	LIGHT REFLECT	ANTI-MICROBIAL (INHERENT)	DURABLE WASH / IMPACT / SCRATCH / SOIL
OPTIMA† Open Plan Square Lay-in											
15/16" 24mm	Square Lay-in	3150 3150M	24 x 24 x 3/4" 600 x 600 x 19mm	0.90	180	–	Class A		0.90	√	√
		3152 3152M	48 x 48 x 1" 600 x 600 x 25mm	0.95	190	–	Class A		0.90	√	√
		3159	24 x 24 x 1-1/2"	1.00	200	–	Class A		0.90	√	√
		3352** 3352M**	24 x 24 x 1" 600 x 600 x 25mm	0.90	200	26	Class A		0.90	√	√
		3151 3151M	24 x 48 x 3/4" 600 x 1200 x 19mm	0.90	180	–	Class A		0.90	√	√
		3153 3153M	24 x 48 x 1" 600 x 1200 x 25mm	0.95	190	–	Class A		0.90	√	√
		3155	24 x 48 x 1-1/2"	1.00	200	–	Class A		0.90	√	√
		3353** 3353M**	24 x 48 x 1" 600 x 1200 x 25mm	0.90	200	26	Class A		0.90	√	√
		3356** 3356M**	24 x 48 x 1-1/2" 600 x 1200 x 38mm	0.95	200	26	Class A		0.90	√	√
		3156	20 x 60 x 1"	0.95	190	–	Class A		0.90	√	√
		3158	30 x 30 x 1"	0.95	190	–	Class A		0.90	√	√
OPTIMA Open Plan Tegular†											
9/16" 15mm	Square Tegular	3251 3251M	24 x 24 x 1" 600 x 600 x 25mm	0.95	190	–	Class A		0.90	√	√
		3355** 3355M**	24 x 24 x 1" 600 x 600 x 25mm	0.90	200	26	Class A		0.90	√	√
		3254	24 x 24 x 1-1/2"	1.00	200	–	Class A		0.90	√	√
		3257	24 x 48 x 1"	0.95	190	–	Class A		0.90	√	√
		3259	30 x 30 x 1"	0.95	190	–	Class A		0.90	√	√
		3263	12 x 24 x 1"	0.95	190	–	Class A		0.90	√	√
15/16" 24mm	Square Tegular	3250	24 x 24 x 1"	0.95	190	–	Class A		0.90	√	√
		3354**	24 x 24 x 1"	0.90	200	26	Class A		0.90	√	√
		3253	48 x 48 x 1-1/2"	1.00	200	–	Class A		0.90	√	√
		3252 3252M	24 x 48 x 1" 600 x 1200 x 25mm	0.95	190	–	Class A		0.90	√	√
		3258	30 x 30 x 1"	0.95	190	–	Class A		0.90	√	√
		3264	12 x 24 x 1"	0.95	190	–	Class A		0.90	√	√

** CAC Backing
† U.S. Patent 5,674,594

High Acoustical Performance

Sag Resistance
4 drops / RH100
3 drops / RH99/RH95

High Light Reflectance

Physical Data

Material
All items – Fiberglass with DuraBrite® acoustically transparent member (Except 3352, 3353, 3354, 3355, 3356)
3352, 3353, 3354, 3355, 3356 – Fiberglass with DuraBrite® acoustically transparent membrane; CAC backing

Surface Finish
DuraBrite with factory-applied latex paint

Flame Spread/Fire Resistance
US:Class A-Flame Spread 25 or under BS476 part 6 & 7 Class 0/Class 1 Conforms with BCA Spec. C1.10 and tested to AS/NZS 3837:1998 - Group 1 AS/NZS 1530.3

ASTM E 1264 Classification
Type XII, Form 2, Pattern E

Insulation Value
3150, 3151 :
R Factor – 3.0 (BTU units)
R Factor – 0.53 (Watts units)

3152, 3153, 3156, 3158, 3250, 3251, 3252, 3257, 3258, 3259, 3263, 3264, 3352, 3353, 3354, 3355 :
R Factor – 4.0 (BTU units)
R Factor – 0.70 (Watts units)

3155, 3159, 3253, 3254, 3356 :
R Factor – 6.0 (BTU units)
R Factor – 1.05 (Watts units)

Acoustical Details
Items 3352, 3353, 3354, 3355 and 3356 have CAC backing. CAC backing is available on all products as a special order.

Weight
3150, 3151 – 0.44 lbs/SF (2.16 kgs/m²)
3152, 3153 – 0.45 lbs/SF (2.21 kgs/m²)
3155, 3159, 3356 – 0.61 lbs/SF (3.0 kgs/m²)
3156, 3158 – 0.47 lbs/SF (2.30 kgs/m²)
3250, 3251, 3252, 3257, 3263, 3264 – 0.55 lbs/SF (2.70 kgs/m²)
3253, 3254 – 0.78 lbs/SF (3.82 kgs/m²)
3258, 3259 – 0.53 lbs/SF (2.60 kgs/m²)
3352, 3353 – 0.46 lbs/SF (2.25 kgs/m²)
3354, 3355 – 0.57 lbs/SF (2.79 kgs/m²)

Anti Mold/Mildew & Bacteria
Fiberglass substrate is inherently resistant to the growth of mold, mildew and bacteria.

Warranty
See warranty details in the back of this catalog

Application Consideration
Products with CAC backing are not recyclable.

Item 3356 is not UL Classified. Items 3263, 3264 – 12" x 24" products are intended for use with 12" x 24" recessed light fixtures and are not UL Classified for acoustics.

Recommended Suspension System

ITEMS	SUSPENSION SYSTEM
3150, 3151, 3152, 3153, 3155, 3156, 3158, 3159, 3352, 3353, 3356	24mm (15/16") PeakForm 888 / PeakForm PRELUDE
3251, 3254, 3257, 3259, 3263, 3355	15mm (9/16") PeakForm SUPRAFINE 15mm (9/16") PeakForm SILHOUETTE
3250, 3252, 3253, 3258, 3264, 3354	24mm (15/16") PeakForm 888 / PeakForm PRELUDE

Armstrong Sales Offices :
Hong Kong Tel: (852) 2585 7845 Fax: (852) 2598 7113
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Singapore Tel: (65) 9233 6839 Fax: (65) 6285 6008
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www.armstrong-asia.com
DP-OPTIMA-01-2011

Standard EXCELON®

Imperial® Texture • Imperial Texture Rave® • MultiColor™

Vinyl Composition Tile (VCT)

COMMERCIAL FLOORING

Market-leading performance, quality and durability in VCT products all from Armstrong, the industry leader in VCT for decades. Composed of 85% North American limestone and manufactured in three US locations, Armstrong® Imperial Texture is a responsible choice. Rave provides bold, eye-catching colors while MultiColor offers three base colors with four accent colors that coordinate with Imperial Texture. All three products are true through-pattern construction.

PRODUCT INFORMATION	
Construction	Vinyl Composition Tile
Product Line	Imperial Texture, Imperial Texture Rave, MultiColor
International Product Specifications	ASTM F 1066 Class 2 – Through Pattern, ISO 10595, Type II
Overall Thickness	1/8 in. (3.2 mm); 3/32 in. (2.4 mm) – Imperial Texture only
Wear Layer Thickness	1/8 in. (3.2 mm); 3/32 in. (2.4 mm) – Imperial Texture only
Finish	Fast Start Factory Finish
Installation	Full Spread Adhesives –S-515 High-Moisture, S-525 High-Moisture, S-700 Thin Spread, S-750 Premium
Maintenance Options	Polish
PACKAGING	
Tile Sizes	12 in. x 12 in. (305 mm x 305 mm)
Tiles Per Carton	45 – 45 sq. ft.
Shipping Weight	63 lbs. (28.6 kg) per carton

	PERFORMANCE	TEST METHOD	MINIMUM REQUIREMENT	PERFORMANCE VS. REQUIREMENT
ASTM F 1066	Thickness	ASTM F 386	Nominal ± 0.005 in.	Meets
	Size	ASTM F 2055	± 0.016 in. per linear foot	Exceeds
	Squareness	ASTM F 2055	0.010 in. max	Exceeds
	Indentation – One Minute	ASTM F 1914	≥ 0.006 in. to ≤0.015 in.	Meets
	Indentation at 115° F	ASTM F 1914	< 0.032 in.	Exceeds
	Impact	ASTM F 1265	No cracks beyond limit	Exceeds
	Deflection	ASTM F 1304	1.0 in. minimum	Exceeds
	Dimensional Stability	ASTM F 2199	≤ 0.024 in. per linear foot	Exceeds
	Chemical Resistance	ASTM F 925	No more than slight change in surface dulling, attack or staining	Meets or Exceeds
	Resistance to Heat	ASTM F 1514	ΔE ≤ 8	Exceeds
Supplementary	Static Load Limit	ASTM F 970	≤ 0.005 in.	125 psi
	Fire Test Data – Flame Spread	ASTM E 648	0.45 watt/cm² or more Class I	Meets
	Fire Test Data – Smoke Evolution	ASTM E 662	450 or less	Meets
	Regional Materials	LEED® MR5.0	Meets Guidelines	Meets
	Recycled Content	LEED MR4.0	Meets Guidelines	Meets
	Certified Low Emitting Product	LEED EQ4.3	Meets Guidelines	Meets
	Certified Low Emitting Adhesive	LEED EQ4.1	Meets Guidelines	Meets
	Indoor Air Quality	FloorScore™	Meets Certification Guidelines	Certified
	Indoor Air Quality	CHPS 01350	Meets Certification Guidelines	Certified
	NSF/ANSI 332	Sustainability Assessment	Meets Certification Guidelines	Gold Level Certified

WARRANTY
5-Year Commercial Warranty when installed in accordance with Armstrong's Guaranteed Installation Systems manual, F-5061.
LINKS
Installation Instructions – www.armstrong.com/pdbupimages/200839.pdf
Maintenance Information – www.armstrong.com/pdbupimages/197969.pdf
View the full line – www.armstrong.com/commflooringna/products/vct
Email Techline – www.armstrong.com/commflooringna/contact_techline.jsp

Inspiring Great Spaces™

Armstrong®

PRODUCT SPEC PAGE

Vinyl Composition Tile (VCT)

EXCELON® Flooring

Raffia™ Tile | ChromaSpin™ Tile | Stonetex® Tile | Companion Square® Tile

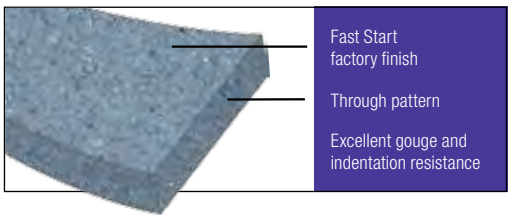
Sustainability

Performance	Certification/Credits	Minimum Requirement	Performance vs. Requirement
Regional Materials	LEED® MR5.0	Meets Guidelines	Meets
Recycled Content	LEED MR4.0	Meets Guidelines	Meets
Low Emitting Product	LEED EQ/CDPH SM v1.1-2010	TVOC <0.5 mg/m3	Meets
Certified Low Emitting Adhesive	LEED EQ4.1	Meets Guidelines	Meets
Indoor Environmental Quality/Low Emitting	FloorScore®	Product and adhesive certified	Certified
Environmental Product Declaration	ISO 14025	EPD 3rd party certified	Certified
NSF/ANSI 332	Sustainability Assessment	Meets Certification Guidelines	Gold Level Certified

Links

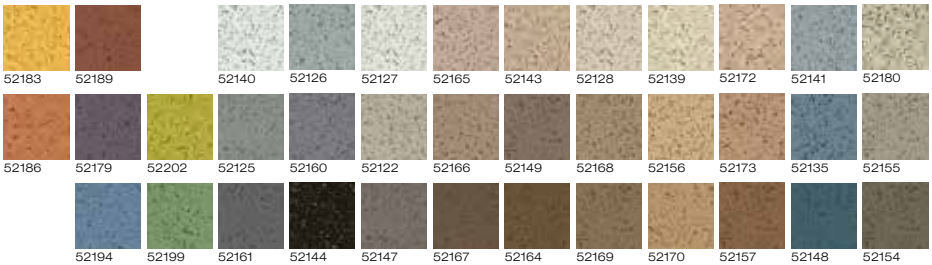
Installation Instructions	www.armstrong.com/pdbupimages/200839.pdf
Maintenance Information	www.armstrong.com/pdbupimages/197969.pdf
View the full line	www.armstrong.com/commflooringna/products/vct
Email Techline	www.armstrong.com/commflooringna/contact_techline.jsp
Visit Floor Expert	www.floorexpert.com

Product Structure

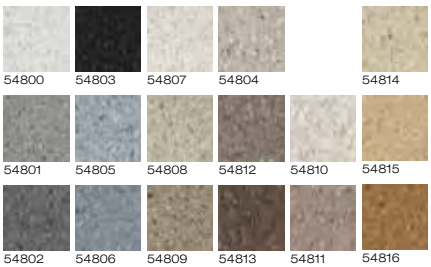


Raffia

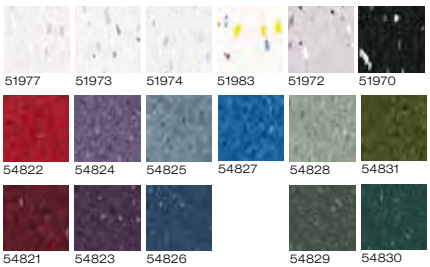
Stonetex



ChromaSpin



Companion Square



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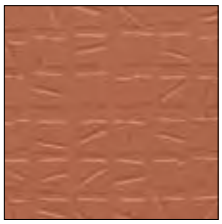
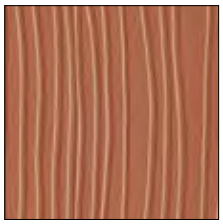
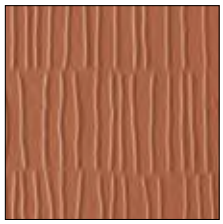
Printed in United States of America

RUBBER TILE TEXTURES

Textures shown in one-half actual size.


Artistic Square (ART)


Bamboo† (BMRT)

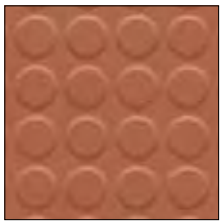

Chopped Bamboo (CBMRT)

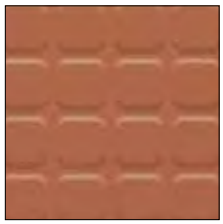

Cubis† (CRT)

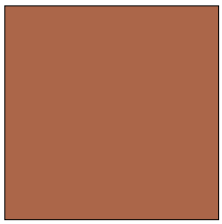

Flagstone (FRT)


Hammered† (HRT)


Pebbles (PRT)


Raised Round† (RT)


Raised Square† (RT)


Smooth (RET)


Weathered (WRT)

Circulinity™ textures shown on pages 20-21.

Folio™ textures shown on pages 22-23.

† Available in coordinating rubber tread with integrated riser. See pages 148.

RUBBER TILE TEXTURE AVAILABILITY

TEXTURES	TILE PATTERNS							SIZES	
	Solid Color see page 17	1/8" MicroTone™ Speckled Rubber Tile see page 36	.080" / 2 mm MicroTone™ Speckled Rubber Tile and Mesto see page 36	Prima® Olio® and Prima Marbleized Tile see page 26	Metallurgy see page 28	CorkTones™ see page 44	Eco-Shell™ with Cork see page 42	12" X 12" (305 mm X 305 mm)	24" X 24" (610 mm X 610 mm)
Arbor**	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Artistic Square	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Bamboo	STD	STD	N/A	SO	N/A	SO	SO	N/A	STD
Bamboo Leaf**	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Botany**	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Branches**	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Chopped Bamboo	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Cubis	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Effervescent*	STD	SO	N/A	SO	N/A	N/A	N/A	N/A	STD
Fast Lane*	STD	SO	N/A	SO	N/A	N/A	N/A	N/A	STD
Flagstone	STD	SO	N/A	SO	N/A	N/A	N/A	SO	STD
Hammered	STD	STD	STD	STD	STD	STD	STD	SO	STD
Pebbles	STD	SO	N/A	SO	N/A	N/A	N/A	N/A	STD
Raised Round	STD	STD	N/A	SO	N/A	SO	SO	N/A	STD
Raised Square	STD	STD	N/A	SO	N/A	SO	SO	N/A	STD
River Cane**	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Rice Paper**	STD	STD	STD	STD	N/A	SO	SO	SO	STD
Round-A-Bout*	STD	SO	N/A	SO	N/A	N/A	N/A	N/A	STD
Seasons**	STD	SO	N/A	SO	N/A	SO	SO	N/A	STD
Smooth (for accents & borders)	STD	N/A	N/A	STD	N/A	N/A	N/A	SO	STD
Tic-Tac-Toe*	STD	SO	N/A	SO	N/A	N/A	N/A	N/A	STD
Tricycle*	STD	SO	N/A	SO	N/A	N/A	N/A	N/A	STD
Weathered	STD	SO	SO	SO	N/A	SO	SO	SO	STD

STD = Standard SO = Special Order N/A = Not Available

* See Circulinity details on pages 20. ** See Folio details on pages 22.

ColorMatch®
color palette A
rubber | wall base | accessories

Color plays a key role in Balanced Choice. After all, color has the power to motivate students. Or calm patients. It can stimulate sales or prevent a bad fall. By coordinating all of our solutions across a single, harmonized palette, you can create the kind of environments where happiness – and productivity – thrive.

To help you more easily choose and select colors, we offer unique color capabilities:

Color Foundations™

Color Foundations are neutrals that coordinate over our whole system of rubber, vinyl, VCT, VET, SVT and linoleum flooring, finishing borders (wall base), stair treads and accessories. We've identified Color Foundations neutrals in the following way: **WB** (warm beige), **CB** (cool beige), **WG** (warm grey), **CG** (cool grey), **B** (black), **W** (white). Hundreds of choices in 6 neutral palettes and a guarantee: You'll always have options within each palette and each product line forever. Guaranteed.

Color Coordination

Color Coordination is at the heart of Balanced Choice. An integrated palette across our full range of solutions makes selection simple and compromise a distant memory. So you can be sure the waiting room is aesthetically connected to the nurses' station, which flows into the patient rooms – no matter what color palette you choose.

ColorMatch®

Color Palette A represents our ColorMatch collection. ColorMatch is a designer palette of 36 leading colors that are scientifically precise. Our exacting standards allow you to confidently mix and match a color across all Johnsonite Rubber and Vinyl Flooring Products, Finishing Borders and Finishing Accessories.

Customization

When you don't see your perfect color, create it. Get started by using our Design a Space Pro Visualizer at **tarkettna.com**. While there, experiment with different textures. We offer customized colors in the quantity you want, when you want it, at a reasonable cost.

Selects ◆

The red diamond signifies colors in our Selects palette, a specific set of colors supporting specific Millwork® wall base profiles and accessories.

All colors shown in this card, including chips and photographs, approximate the actual flooring colors as accurately as possible.

01 Snow White **W** ◆	**24** Grey Haze **WG** ◆	**55** Silver Grey **WG**	**32** Pebble **WG** ◆
29 Moon Rock **WG** ◆	**48** Grey **WG**	**21** Platinum **CG**	**38** Pewter **CG**
28 Medium Grey **CG**	**20** Charcoal **WG** ◆	**63** Burnt Umber **B** ◆	**40** Black **B** ◆
34 Almond **W** ◆	**22** Pearl **CB** ◆	**31** Zephyr **CB** ◆	**80** Fawn **CB** ◆
09 Clay **WB** ◆	**49** Beige **WB** ◆	**45** Sandalwood **WB** ◆	**283** Toast ◆
129 Silk **WB** ◆	**11** Canvas **WB** ◆	**42** Sable **WB**	**76** Cinnamon ◆
130 Sisal ◆	**132** Espresso	**85** Burgundy	**47** Brown ◆
150 Wetlands ◆	**86** Hunter Green	**167** Fudge ◆	**44** Dark Brown **B** ◆
71 Storm Cloud **CG**	**58** Windsor Blue	**92** Blue Lagoon	**18** Navy Blue

Armstrong® COMMERCIAL FLOORING

12 shadow gray

69 light gray

61 graphite gray

71 mid gray

65 soft white

64 fresh taupe

70 flaxen

80 stone

73 parchment

03 bisqueware

16 sand

75 desert sand

22 satin

20 oyster

21 edelweiss

04 butterscotch

46 conch

47 cabernet

48 rosehip

45 violet petal

92 cadet blue

52 blue spruce

06 olivine

Color-Integrated WALL BASE Vinyl and Rubber Product Availability Chart

PRODUCT	GAUGE	SIZE	WT. NOM. (lbs/ctn.)	PIECES/CTN
VINYL	1/8 in.	2-1/2 in. x 48 in. (6.35 cm x 121.9 cm)	30 (14 kg)	30
	(3.2 mm)	4 in. x 48 in. (10.16 cm x 121.9 cm)	46 (21 kg)	30
		6 in. x 48 in. (15.24 cm x 121.9 cm)	54 (25 kg)	24
		4 in. x 120 ft. (10.16 cm x 36.58 m)	46 (21 kg)	1 roll – 1 pc.
		6 in. x 96 ft. (15.24 cm x 29.26 m)	54 (25 kg)	1 roll – 1 pc.
		4 in. (10.16 cm) coved external corners	7 (3 kg)	30
VINYL	0.080 in.	4 in. x 48 in. (10.16 cm x 121.9 cm)	34 (15 kg)	30
	(2.0 mm)	4 in. x 160 ft. (10.16 cm x 48.77 m)	45 (20 kg)	1 roll – 1 pc.
		2-1/2 in. x 48 in. (6.35 cm x 121.9 cm)	22 (10 kg)	30
		6 in. x 48 in. (15.24 cm x 121.9 cm)	39 (18 kg)	24
RUBBER	1/8 in.	2-1/2 in. x 48 in. (6.35 cm x 121.9 cm)	30 (14 kg)	30
	(3.2 mm)	4 in. x 48 in. (10.16 cm x 121.9 cm)	46 (21 kg)	30
		6 in. x 48 in. (15.24 cm x 121.9 cm)	54 (25 kg)	24
		4 in. x 120 ft. (10.16 cm x 36.58 m)	46 (21 kg)	1 roll – 1 pc.
		4 in. (10.16 cm) coved external corners	7 (3 kg)	30

Color-Integrated WALL BASE


23 milk


13 shale


02 iron


63 silver gray


54 black brown


60 jet black


14 turtledove


15 zinc


72 mouse gray


43 silk


76 deep brown


24 cocoa


01 malt


25 blush

83 peach tone


08 buttercream

74 shoreline

19 sweet cream

18 buttercup


17 yolk


49 dark lavender


44 cappuccino


94 midnight


50 atlantis


51 deep sea blue


53 dark aqua


97 gray green


55 thyme


56 pine

62 powder green

shaw contract group®

embellish tile
collection: Homage

tile specifications

style name	embellish tile
style number	59573
construction	multi-level pattern loop
fiber	eco solution q® nylon
dye method	89% solution dyed / 11% yarn dyed

	english	**metric**
pattern repeat	none	
tufted weight	22.0	745.93 g/m²
gauge	1/10	39.37 per 10 cm
stitches per inch	11.0	43.31 per 10 cm
finished pile thickness	0.098	2.49 mm
total thickness	0.237	6.02 mm
average density	8082	15.05 kilotex
product size	24" x 24"	60.96 cm x 60.96 cm
primary backing	synthetic	
secondary backing	ecoworx® tile	
protective treatments	ssp® shaw soil protection	
gsa approved product	yes	

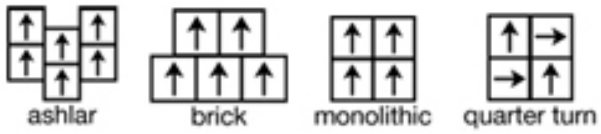
testing

radiant panel	Class I
nbs smoke	less than 450
electrostatic propensity	less than 3.5 kv

warranties

lifetime commercial limited

installation method



coordinating products

craft tile, block print tile, smp embellish tile, sewn, shibori

environmental certification

green label plus certification number	glp9968
nsf140 platinum	
cradle to cradle silver certified	

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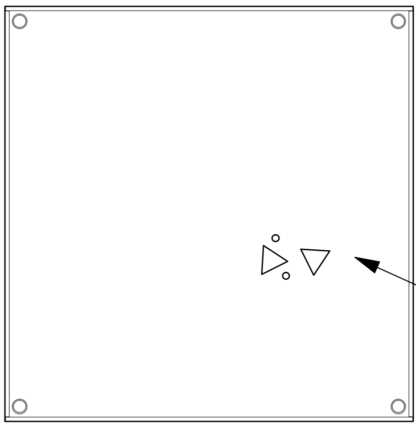

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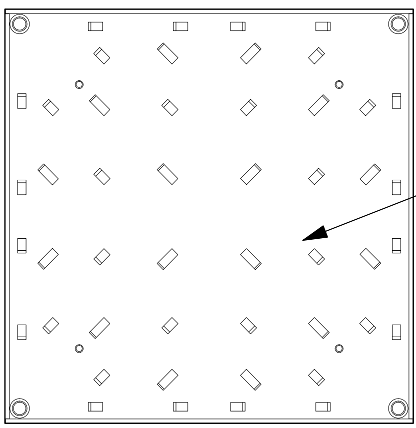

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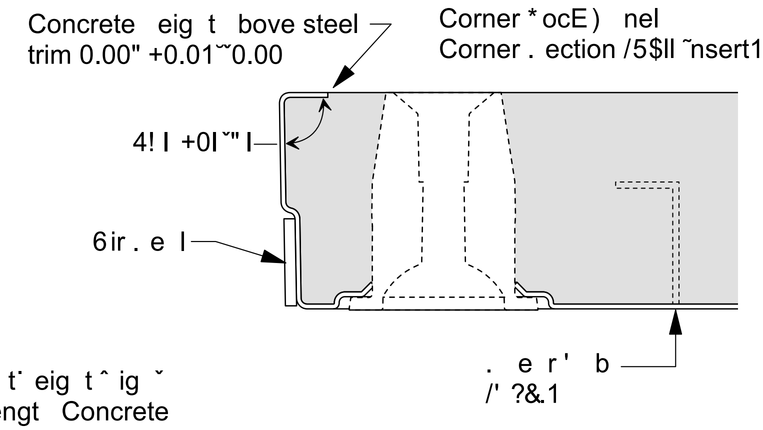

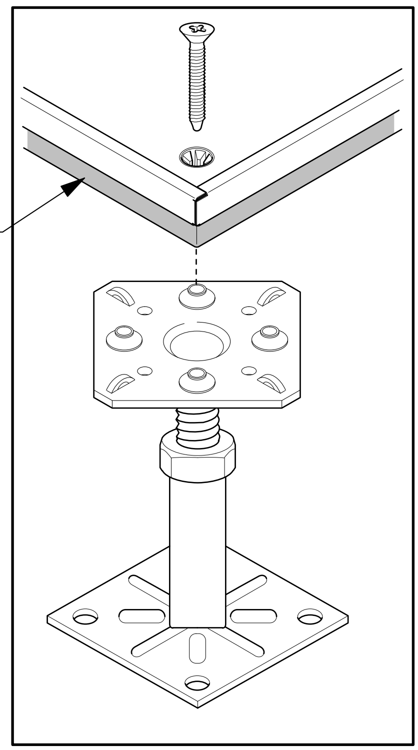

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Specifications:

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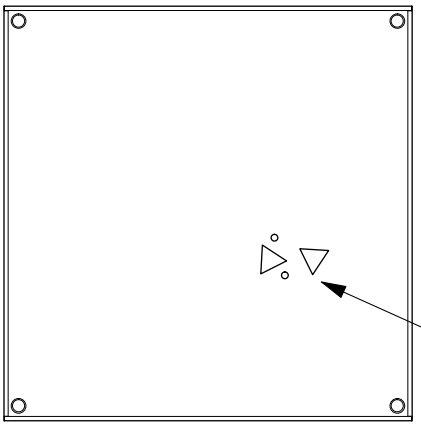

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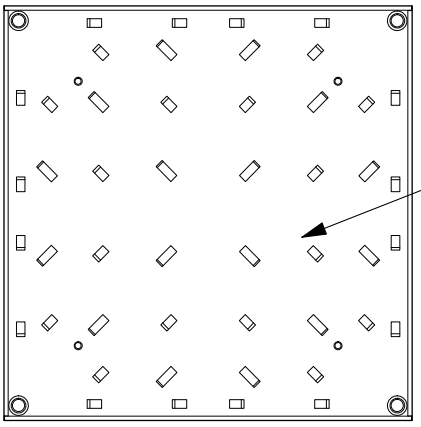

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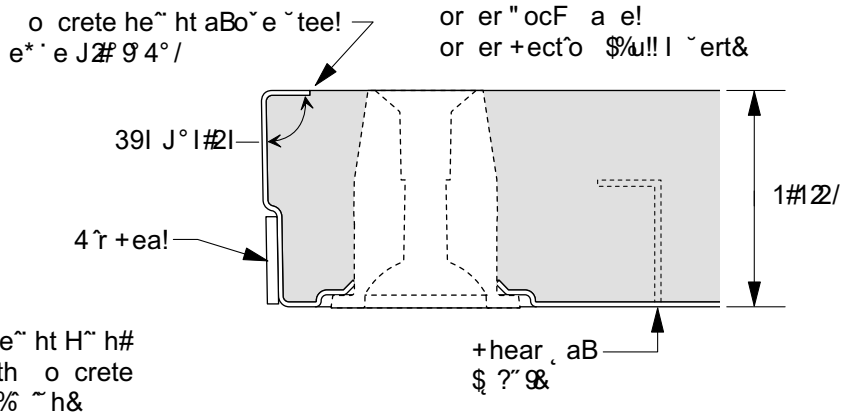

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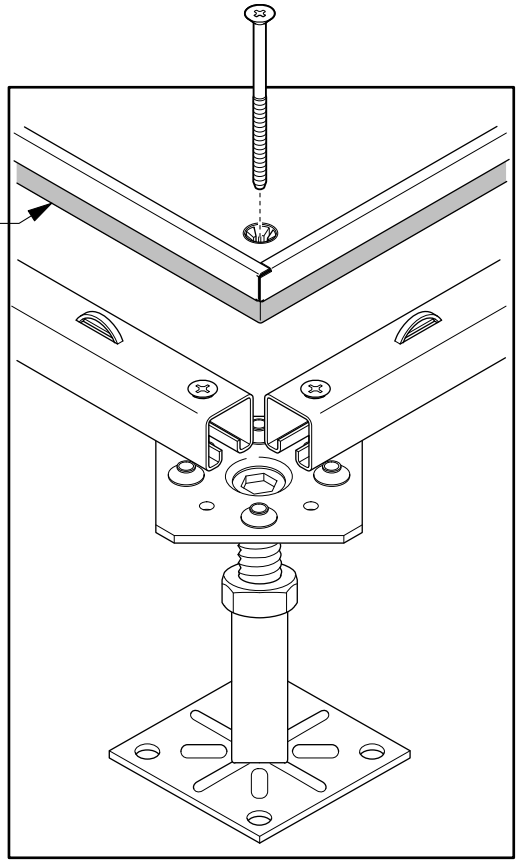

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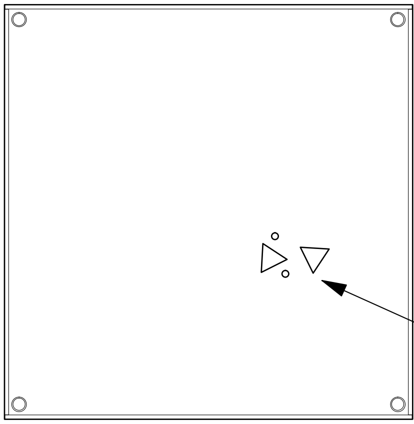
Haworth
O e Haworth e ter, MI 49423

HAWORTH®

TecCrete™ 500 are Panel



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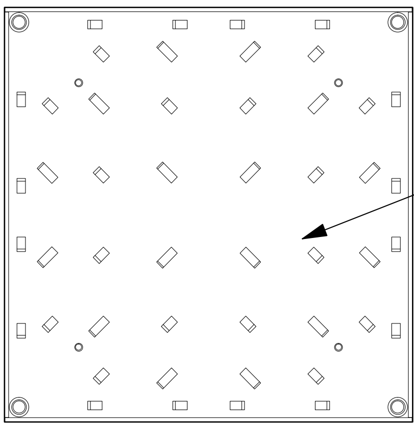

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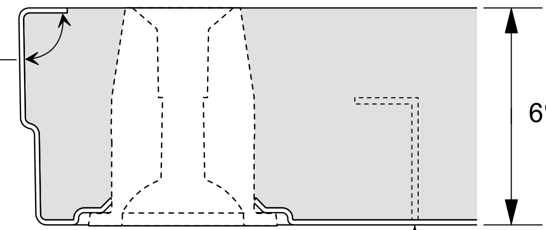

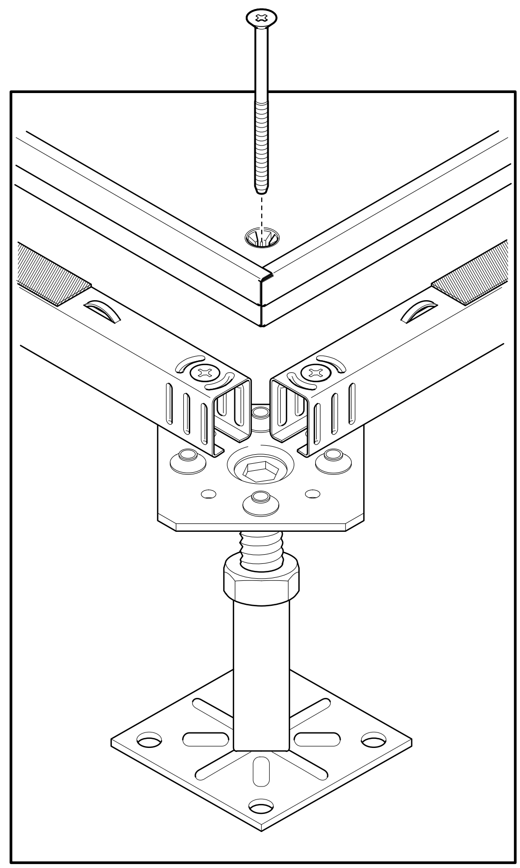

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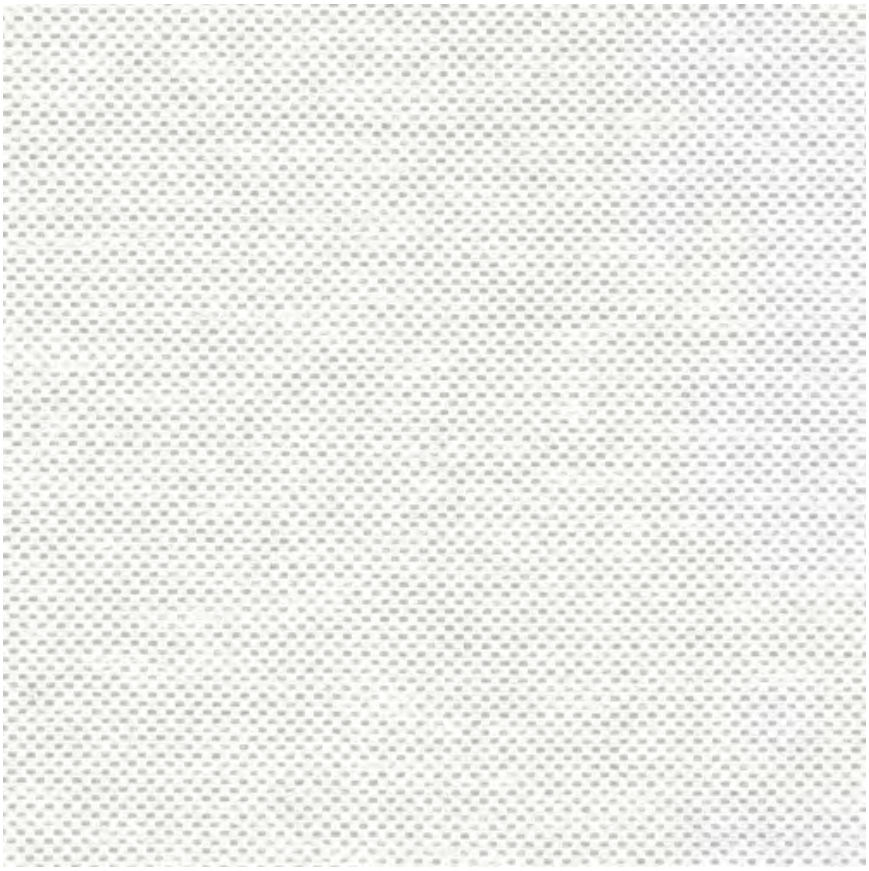
Haworth
One Haworth Center, ˘ ˇ ˆ ˙ ˆ ˝

Reflect

KnollTextiles

Reflect in Ice

Item #W8841A



Overview

A beautiful environmental panel fabric made of 100% recycled polyester, this high luster, piece-dyed fabric comes in a broad range of colors, from saturated tones to neutrals.

Primary Use

Panel

Designer

KnollTextiles

Content

100.0% Post Industrial Recycled Polyester

Select a Color: Ice

Color rendition online varies by computer manufacturer and model. Memo samples provide a more accurate representation of color and texture.

Renderings and textile application are for demonstration purposes only, and do not denote approvals on specific styles of furniture.

1A Ice *2A Titanium* *3A Sterling* *4A Steel* *5A Ecru*

6A Brass *7A Solar* *8A Peridot* *9A Ember* *10A Target*

EMBASSY CABINET DOOR STYLES BY JL INDUSTRIES

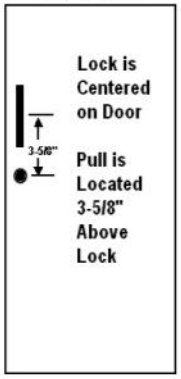
V - Vertical duo panel

S21- Solid

W - Vertical duo panel w/pull & Saf-T-Lok®

L22 - Solid with pull & Saf-T-Lok®

E,G, L22, W.3 & B10 Door Styles w SAF-T-LOK™



Note: If lock o is selected, lo centered verti on door, and t center of the l dle will be 3-5 above the loc most cases.

Please allow f this when pos ing cabinet fo stallation.

SUBMITTAL: FIRE EXTINGUISHERS

Qty	Model	Type	Nominal Capacity	Shipping Weight	Cylinder Diameter	Overall Height	Overall Width	Shipping Vol.	UL Rating
	Grenadier-P	Press. H_2O	2-1/2 gal.	7.75 lbs. «	7"	24-1/2"	9"	1.1 cu.ft.	2A
	Cosmic 2-1/2E*	ABC Dry Chemical	2-1/2 lbs.	5.5 lbs.	3-3/8"	15-1/2"	5-3/4"	.2 cu.ft.	1A-10BC
	Cosmic 5E		5 lbs.	10 lbs.	4-1/4"	16-3/8"	7-1/4"	.35 cu.ft.	3A-40BC
	Cosmic 6E		6 lbs.	12.75 lbs.	5"	16"	7-3/4"	.5 cu.ft.	3A-40BC
	Cosmic 10E		10 lbs.	18.25 lbs.	5-1/8"	21"	7-3/4"	.65 cu.ft.	4A-80BC
	Cosmic 20E (FE20C)		20 lbs.	33.5 lbs.	7-1/2"	21-1/4"	8-3/4"	1.0 cu.ft.	10A-120BC
	Cosmic 20E (FE20A)		20 lbs.	38 lbs.	7"	24"	10-1/4"	1.0 cu.ft.	10A-120BC
	Cosmic Wheeled		50 -125 lbs.	See Separate Submittal					
	Sentinel 5	Carbon Dioxide	5 lbs.	14 lbs.	5-1/4"	17-3/4"	8-1/4"	.65 cu.ft.	5BC
	Sentinel 10		10 lbs.	28.25 lbs.	7"	24"	12"	1.3 cu.ft.	10BC
	Sentinel 15		15 lbs.	37.75 lbs.	7"	30"	12"	1.0 cu.ft.	10BC
	Sentinel 20		20 lbs.	50.75 lbs.	8"	30"	13"	2.1 cu.ft.	10BC
	Galaxy 2-1/2*	BC Dry Chemical	2-1/2 lbs.	5/5 lbs.	3-3/8"	15-1/2"	5-3/4"	.2 cu.ft.	10BC
	Galaxy 5		5 lbs.	9.25 lbs.	4-1/4"	15-1/4"	5-1/2"	.35 cu.ft.	10BC
	Galaxy 5-1/2		5-1/2 lbs.	10.5 lbs.	4-1/4"	16-3/8"	7-1/4"	.4 cu.ft.	40BC
	Galaxy 6		6 lbs.	13.75 lbs.	5"	16-1/4"	8-1/2"	.5 cu.ft..	40BC
	Galaxy 10 (FG10C)		10 lbs.	18.25 lbs.	5-1/8"	21"	7-3/4"	.65 cu.ft.	40BC
	Galaxy 10 (FG10A)		10 lbs.	18 lbs.	5"	20"	7-3/4"	.65 cu.ft.	60BC
	Galaxy 20		20 lbs.	38 lbs.	7-1/2"	23-1/4"	10-1/4"	1.0 cu.ft.	120BC
	Galaxy Wheeled		50-150 lbs.	See Separate Submittal					
	Mercury 2-1/2*	Halotron®	2-1/2 lbs	5.25 lbs	3-3/8"	15-1/2"	6-3/8"	.25 cu.ft.	2BC
	Mercury 5		5 lbs	9.5 lbs	4-1/4"	16-3/8"	7-1/4"	.3 cu.ft.	5BC
	Mercury 11 (FM11C)		11 lbs	21.25 lbs	7"	17-1/2"	8-5/8"	1.0 cu.ft.	1A-10BC
	Mercury 11 (FM11A)		11 lbs	22.5 lbs	6"	21-7/8"	9-1/4"	1.0 cu.ft.	1A-10BC
	Mercury 15-1/2 (FM15C)		15-1/2 lbs	25.75 lbs	7"	17-1/2"	8-5/8"	1.0 cu.ft.	2A-10BC
	Mercury 15-1/2 (FM15A)		15-1/2 lbs	27.5 lbs	6"	21-7/8"	9-1/4"	1.0 cu.ft.	2A-10BC
	Saturn 15	Class K Wet Chemical	1.8 gal	22.5 lbs	7"	19-1/4"	9"	.9 cu.ft.	Class K
	Saturn 25		2.5 gal	33.5 lbs.	7"	24-1/2"	9"	1.1 cu.ft.	Class K
	270	Water Mist	1.75 gal	7 lbs. «	7"	24-1/2"	11"	1.1 cu. ft.	2AC
	272		2.5 gal	8 lbs. «	7"	27-1/2"	11"	1.3 cu ft.	2AC

*** INDICATES MARK BRACKET STANDARD. J HOOK WALL BRACKET STANDARD WITH ALL OTHER EXTINGUISHERS.**

«JL extinguishers are shipped fully charged with the exception of the Grenadier P, 270 & 272. **Note:** NFPA regulations also require extinguishers to be inspected when initially p
and tagging requirements must be adhered to. All fire extinguisher sizes are nominal. Contact Customer Service For More Information About Ordering Tagged Extinguishers in Y

JL INDUSTRIES

ACTIVAR INC. www.activarcpg.com
Construction Products Group

PLEASE DOWNLOAD MOST CURRENT SUBMITTAL FROM WEBSITE BEFORE ORDERING

Distributor:	Quantity:
Contractor:	Approved By:
Model #:	Architect:
Project:	Date:

HEADQUARTERS & JL INDUSTRIES: 4450 WEST 78TH ST CIRCLE, BLOOMINGTON, MN 55435-5416 **PH**: 800-554-6077 **FAX:** 952-835-2218 **EMAIL:** SALES@ACTIVAR
ACPG WEST COAST/SAMSON: COMMERCE, CA **WAREHOUSES:** FORT MYERS FL, DALLAS TX, LANCASTER PA, ATLANTA GA, CHICAGO, IL, SEATTLE WA, OMAHA N

Nailor® Industries Inc.

ALUMINUM FLOOR "SWIRL" DIFFUSERS
ROUND • SIZE 8 AND 10
UNDERFLOOR AIR DISTRIBUTION SYSTEMS
MODELS: ANFD, ANFD-VAV

Performance Data

Size	Airflow, cfm	40	50	60	70	80	90	100	110	120
8	Plenum Pressure	.014	.021	.031	.042	.054	.069	.085	.103	0.122
	Vertical Projection, ft. @ 150, 100, 50 fpm	< .5	< .5	1.0-1.5-2.0	2.0-2.5-3.0	2.5-2.5-3.0	2.5-3.0-4.0	3.0-3.5-4.5	3.0-4.0-5.0	3.5-4.0-5.0
	Horizontal Spread, ft. @ 150, 100, 50 fpm	1.0-1.5-2.0	2.0-2.0-2.5	1.5-2.0-4.5	2.0-2.5-5.5	2.0-2.5-6.0	1.5-2.0-6.5	1.0-1.5-6.5	1.0-1.5-6.5	1.0-1.5-7.0
	NC	–	–	–	–	–	–	15	18	20
	Airflow, cfm	55	70	85	100	115	130	145	160	175
10	Plenum Pressure	0.012	0.019	0.028	0.039	0.052	0.066	0.082	0.100	0.119
	Vertical Projection, ft. @ 150, 100, 50 fpm	1.0-1.0-1.5	1.0-1.5-2.5	1.0-1.5-2.5	1.5-1.5-2.5	1.5-2.0-3.0	1.5-2.0-3.5	2.0-3.0-5.0	2.5-3.5-5.0	3.0-3.5-6.0
	Horizontal Spread, ft. @ 150, 100, 50 fpm	1.0-1.5-1.5	1.0-1.0-2.5	1.5-1.5-2.5	2.0-2.0-2.5	2.0-2.0-3.0	2.0-2.0-3.5	2.0-2.5-3.5	2.0-2.5-3.5	2.5-3.0-4.0
	NC	–	–	–	–	–	15	18	21	26

Selection Data

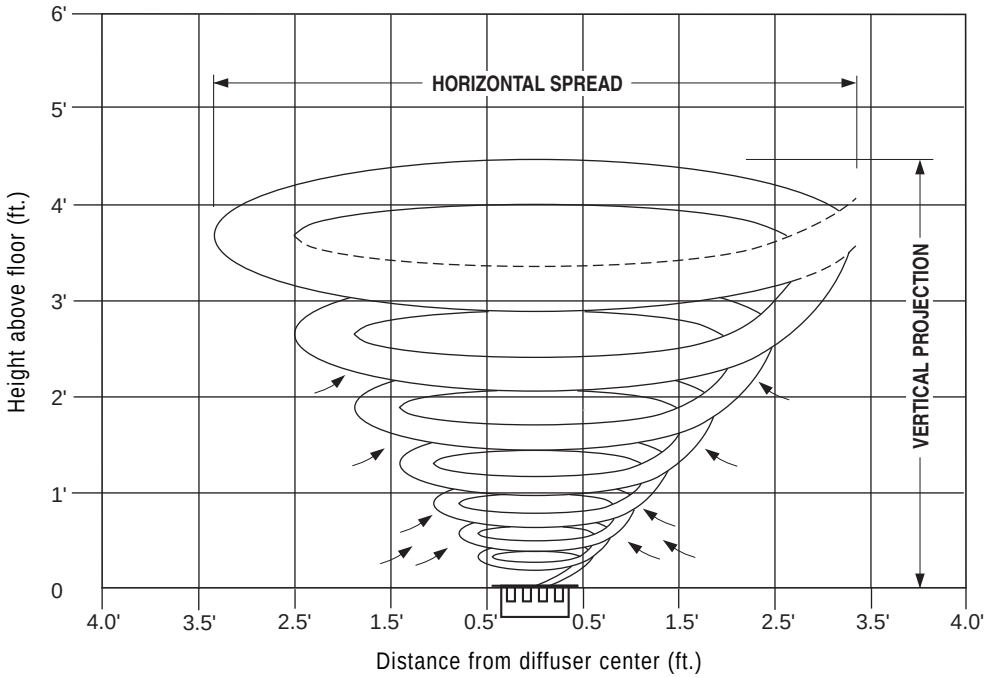
Size	Plenum Pressure	.03	.04	.05	.06	.07	.08	.09	.10	.11
8	Airflow, cfm	59	69	77	84	91	97	103	108	114
10	Airflow, cfm	88	101	113	124	134	143	152	160	168

Correction Factors for other supply air temperature differentials.

ΔT (°F)	-6	-8	-10	-12	-14	-16
Projection, ft.	x 1.33	x 1.11	x 1.00	x 0.96	x 0.92	x 0.91
Spread, ft.	x 0.87	x 0.94	x 1.00	x 1.06	x 1.11	x 1.16

Performance Notes:

1. Projection and Spread data were determined in a room with a 11' ceiling height and 10°F ΔT, between supply air and averaged occupied room temperature.
2. Vertical projection (throw) is the maximum height above the floor where terminal velocities of 150, 100 and 50 fpm were observed. Horizontal Spread is the total width of the isovel where terminal velocities of 150, 100 and 50 fpm were observed.
3. Noise Criteria (values) based on 10 dB room absorption, re 10^{-12} watts. Dash (-) in space denotes an NC value of less than 15.
4. Pressure is in inches w.g..
5. Tests conducted with dirt basket/damper installed. Damper fully open. Size 8 Ak = 0.104. Size 10 Ak = 0.142.
6. Data derived from independent tests conducted in accordance with ANSI/ASHRAE Standard 70 – 1996.



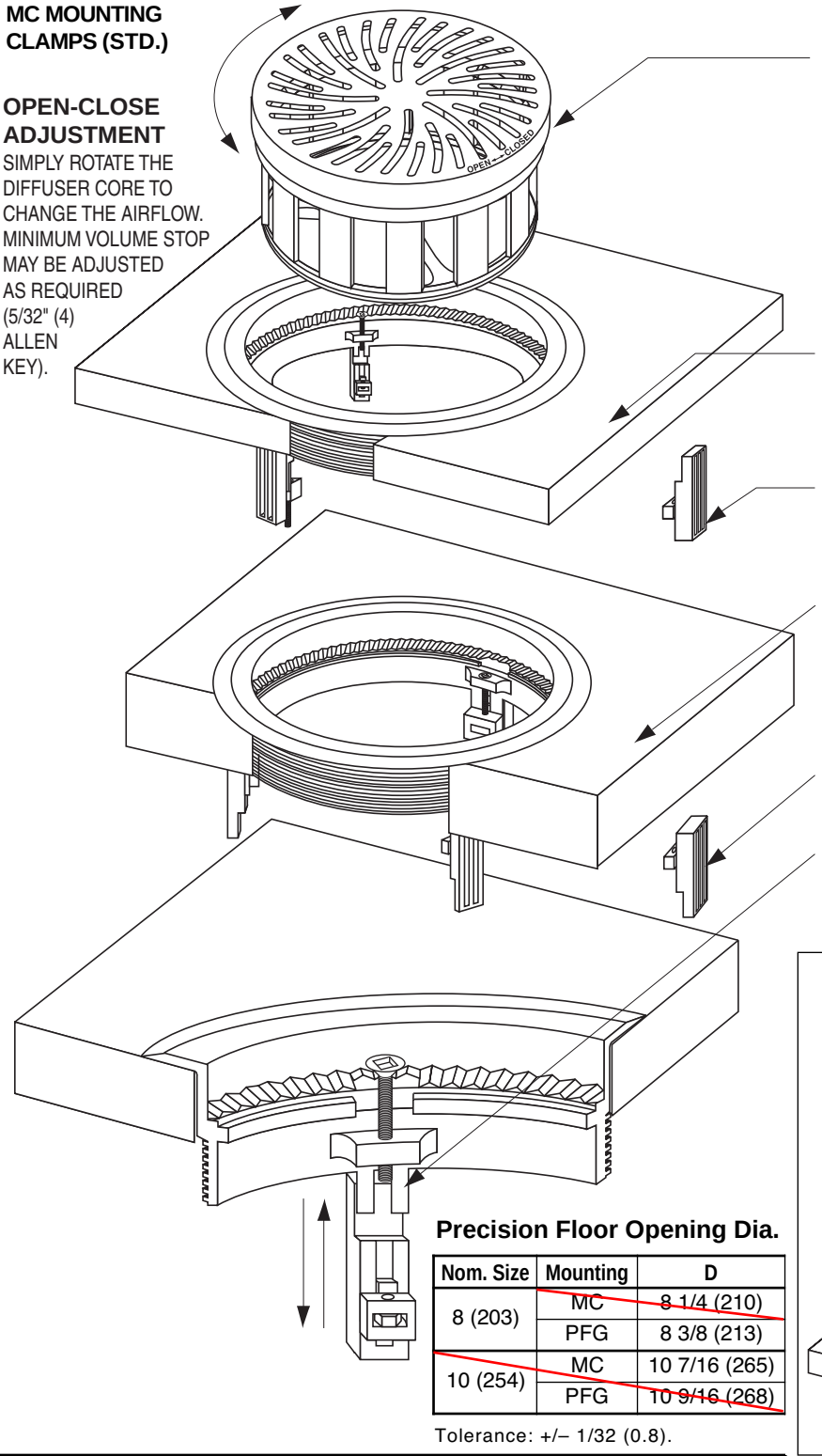
ANFD Size 8 High induction "Swirl" Pattern. 100 cfm supply @10°F ΔT. Outline indicates maximum room air velocity of 50 fpm.

SCHEDULE TYPE		Dimensions are in inches (mm).		
PROJECT	609 MAIN			
ENGINEER		DATE	B SERIES	SUPERSEDES	DRAWING NO.
CONTRACTOR		1 - 20 - 11	NFD	2 - 26 - 04	ANFD-2

Nailor® Industries Inc.

FLOOR "SWIRL" DIFFUSER INSTALLATION INSTRUCTIONS

ROUND • SIZE 8 AND 10 (COMPLETE ASSEMBLY)
FASTENING: MC OR PFG
MODELS: ANFD AND NFD



MC MOUNTING CLAMPS (STD.)

OPEN-CLOSE ADJUSTMENT
SIMPLY ROTATE THE DIFFUSER CORE TO CHANGE THE AIRFLOW. MINIMUM VOLUME STOP MAY BE ADJUSTED AS REQUIRED (5/32" (4) ALLEN KEY).

CORE ASSEMBLY. DIFFUSER CORE FLOW REGULATOR AND COLLECTION BASKET
SIMPLY DROP IN PLACE AFTER TRIM RING INSTALLATION. ENSURE THE THREE LUGS ON THE BASKET ALIGN WITH THE RECESSES IN THE TRIM RING SO THAT THE FACE OF THE CORE IS FLUSH WITH THE TRIM RING. (THE DIFFUSER CORE MAY ALSO BE INSTALLED ON ITS OWN WITHOUT THE DAMPER AND/OR BASKET).

TRIM RING ASSEMBLY OPTION 1 WHEN FLOOR IS 1/4" (6) – 1 1/2" (38)

INSTALL THE THREE MOUNTING CLAMPS WITH THE LONG EXTENSION FACING UPWARDS.

ASSEMBLY OPTION 2 WHEN FLOOR IS 1 1/2" (38) – 2" (51)

INSTALL THE THREE MOUNTING CLAMPS WITH THE SHORT EXTENSION FACING UPWARDS.

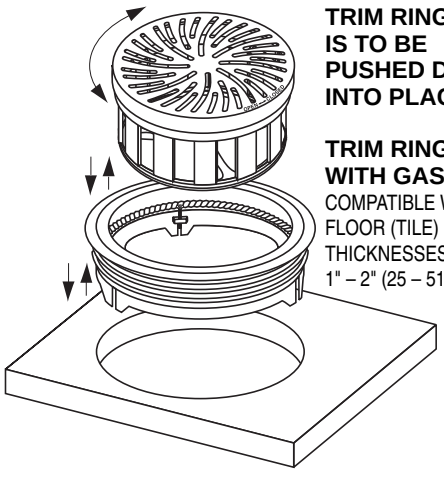
DETAIL OF 1ST ASSEMBLY OPTION

Precision Floor Opening Dia.

Nom. Size	Mounting	D
8 (203)	MC	8 1/4 (210)
	PFG	8 3/8 (213)
10 (254)	MC	10 7/16 (265)
	PFG	10 9/16 (268)

Tolerance: +/– 1/32 (0.8).

PFG PRESS FIT GASKET (OPTIONAL)



TRIM RING IS TO BE PUSHED DOWN INTO PLACE

TRIM RING WITH GASKET
COMPATIBLE WITH FLOOR (TILE) THICKNESSES OF 1" – 2" (25 – 51).

Dimensions are in inches (mm).

SCHEDULE TYPE:				
PROJECT: 609 MAIN				
ENGINEER:	**DATE**	**B SERIES**	**SUPERSEDES**	**DRAWING NO.**
CONTRACTOR:	**2 - 10 - 11**	**NFD**	**9 - 28 - 09**	**NFD-3**

Nailor® Industries Inc.

VAV FLOOR "SWIRL" DIFFUSER WITH ACTUATOR

UNDERFLOOR AIR DISTRIBUTION SYSTEMS

ALUMINUM • VAV • COOLING ONLY

MODEL: ANFD-VAV • SIZE 8 AND 10

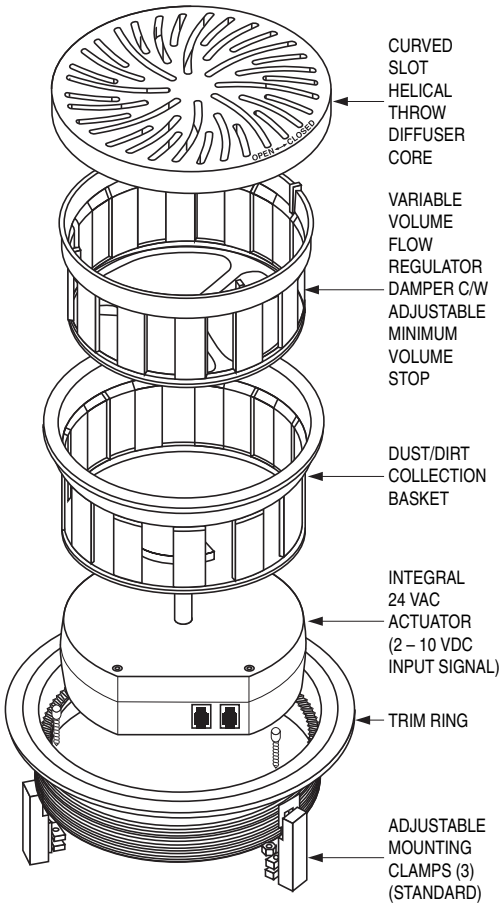
DESCRIPTION:

The Nailor ANFD-VAV aluminum floor diffuser with actuator is designed for use in raised access floor air distribution systems, where the floor cavity is used as a pressurized supply air plenum. An integral modulating actuator provides variable air volume control in cooling applications for precise zone temperature control. The ANFD-VAV core design produces a low velocity helical "swirl" discharge air pattern. The design achieves high induction rates of room air which optimizes mixing for maximum comfort conditions.

FEATURES:

- **Meets all the requirements of NFPA 90A.**
- Complete assembly including actuator is UL tested and classified in accordance with UL standard 2043.
- Diffuser & components constructed of cast aluminum.
- Available in 8" (203) and 10" (254) dia. nominal sizes. Low profile design.
- Dust/dirt collection basket catches anything that might fall through diffuser face. Removable for cleaning.
- Variable volume flow regulator damper, features visual open/closed indication and includes built in end stops.
- Compact 24 VAC direct drive proportional actuator.
- Minimum and maximum airflow limits are achieved by limiting the range of the control signal.
- Actuator features two RJ12 ports for simple interconnection using modular plenum rated cables. Multiple units can be 'daisy-chained' together.
- Optional thermostat, thermostat cable and power supply modules are available (see next page).
- Low pressure drop core/damper assembly design.
- Architecturally pleasing face design compliments contemporary decor and lies flush with trim ring flange.
- Rugged trim ring design secures carpet and prevents edges from fraying.
- Unique adjustable mounting clamp design adapts to any floor panel thickness and provides simple and secure installation. Permits installation from above the floor without removal of the floor panel or carpet.
- A PVC ribbed Press Fit Gasket is also available as a "labor saving" mounting option.
- Standard finish is GRT Gray or BKT Black Textured baked enamel.

NAILOR INDUSTRIES INC.
FLOOR DIFFUSER
"AS TO HEAT RELEASE RATE AND SMOKE OPTICAL DENSITY ONLY"
R21545 25KU

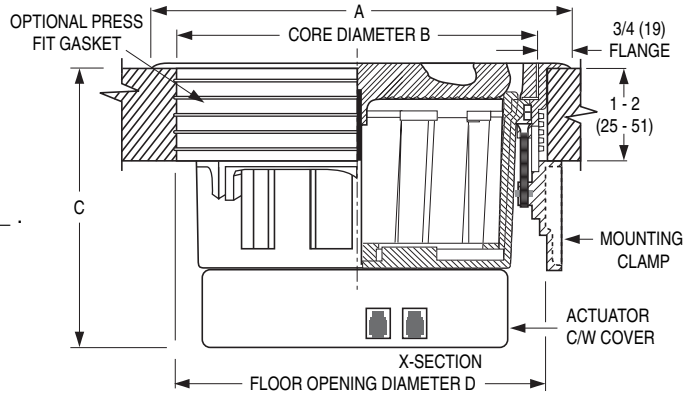


SELECTION:

1. Mounting:
   - ❑ ~~MC Mounting Clamps (standard)~~
   - ❑ PFG Press Fit Gasket (optional)
2. Actuator Cable:
   - ❑ 12 12 ft. long (standard)
   - ❑ ~~20 20 ft. long (optional)~~
3. Finish:
   - ❑ GRT Gray ❑ BKT Black
   - ❑ SP Special (custom color by architect) Specify _____ .

~~4. Special Features:~~

~~❑ _____ .~~



Precision Floor Opening Diameter

Nominal Size	Mounting	D
8 (203)	MC	8 1/4 (210)
	PFG	8 3/8 (213)
~~10 (254)~~	~~MC~~	~~10 7/16 (265)~~
	~~PFG~~	~~10 9/16 (268)~~

Tolerance: +/– 1/32 (0.8).

Dimensional Data

Nominal Size	A	B	C
8 (203)	9 5/16 (237)	7 3/4 (197)	6 1/8 (156)
~~10 (254)~~	~~11 1/2 (292)~~	~~9 15/16 (252)~~	7 3/8 (187)

SCHEDULE TYPE:		Page 1 of 2 Dimensions are in inches (mm).			
PROJECT:	609 MAIN				
ENGINEER:		**DATE**	**B SERIES**	**SUPERSEDES**	**DRAWING NO.**
CONTRACTOR:		**2 - 10 - 11**	**NFD**	**6 - 26 - 09**	**ANFD-VAV-1**

Nailor® Industries Inc.

VAV FLOOR "SWIRL" DIFFUSER CONTROL DIAGRAM

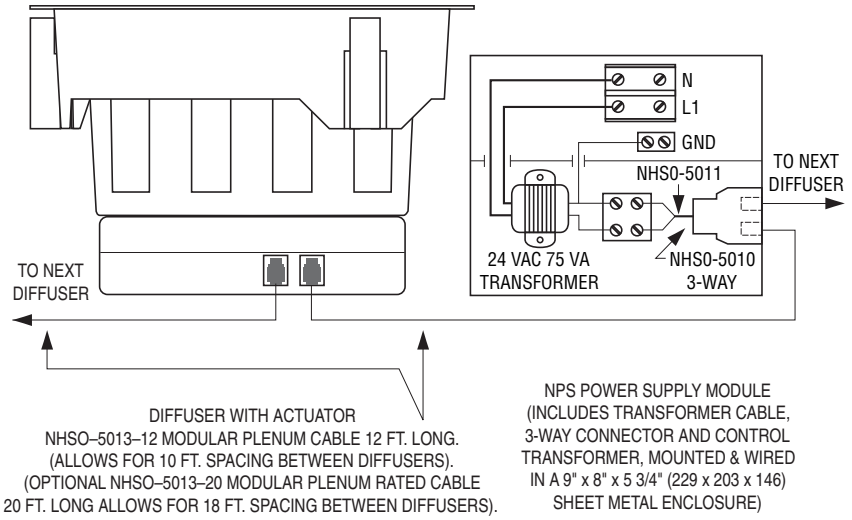
UNDERFLOOR AIR DISTRIBUTION SYSTEMS
ALUMINUM • VAV • COOLING ONLY
MODEL: ANFD-VAV • SIZE 8 AND 10

DESCRIPTION:

The Nailor ANFD-VAV aluminum floor diffuser is designed to provide VAV control in cooling applications. Advanced micro-computer electronics and P+I control algorithms provide precise temperature control.

CONTROL FEATURES:

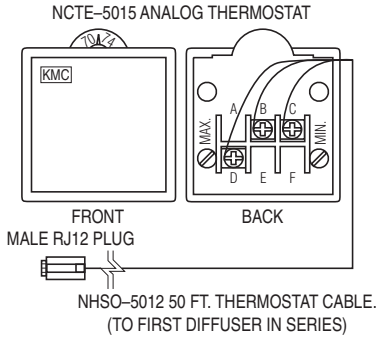
- Fast connection/wiring between units with RJ12 (phone jack) connections. Allows units to be quickly installed or relocated.
- Compact direct-drive 24 VAC actuator utilizes a 2 – 10 VDC control signal for precise airflow control.
- Standard 12 ft. modular plenum rated cables, for interconnection between diffusers, allows diffusers to be spaced on 10 ft. intervals (20 ft. cables optional).
- Power supply modules allow connection of up to 12 units on each line voltage connection (6 diffusers on each side) (8 units total or 4 on each side with opt. 20 ft. cables).
- Each thermostat can control a maximum of 3 power supplies.
- Minimum and maximum airflow limits are adjusted underneath the thermostat cover.



DETAIL A

ACCESSORIES:

1. ~~Thermostat~~
   - ❑ ~~NCTE-5015-10 °F Scale~~
   - ❑ ~~NCTE-5015-11 °C Scale~~
2. ~~Cables:~~
   - ❑ ~~NHSO-5012 50 ft. Thermostat Cable~~
3. Power Supply (includes NHSO-5011 transformer cable, NHSO-5010 3-way connector and transformer mounted & wired in a sheetmetal enclosure):
   - ❑ NPS-120 120 Volt Supply Voltage
   - ❑ ~~NPS-277 277 Volt Supply Voltage~~
   - ❑ ~~NPS-240 240 Volt Supply Voltage~~
   - ❑ ~~NPS-480 480 Volt Supply Voltage~~
4. ~~Special Features:~~ ❑ _____.



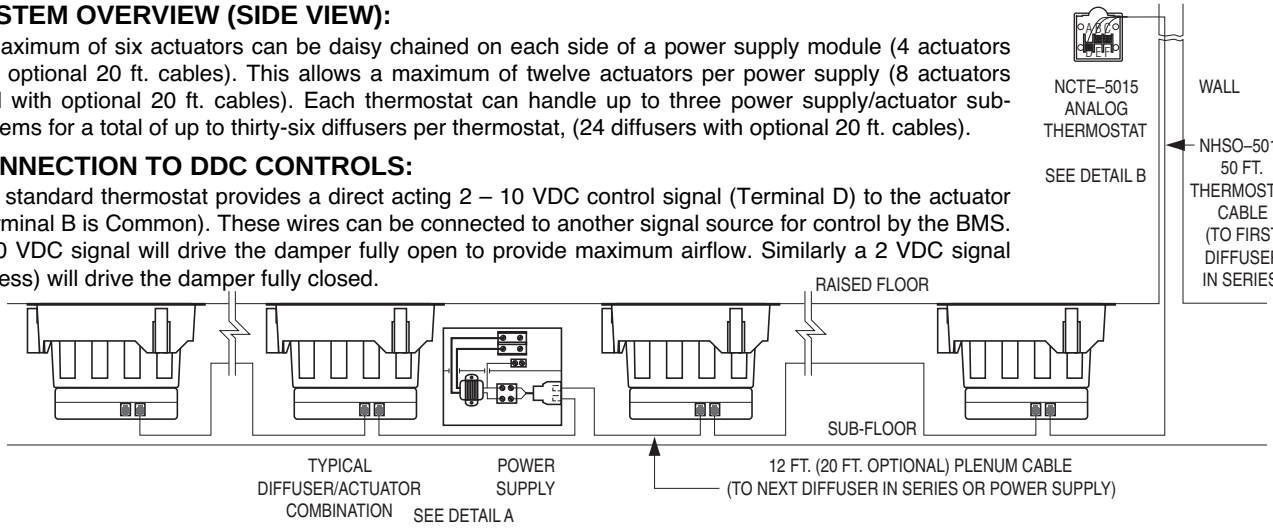
DETAIL B

SYSTEM OVERVIEW (SIDE VIEW):

A maximum of six actuators can be daisy chained on each side of a power supply module (4 actuators with optional 20 ft. cables). This allows a maximum of twelve actuators per power supply (8 actuators total with optional 20 ft. cables). Each thermostat can handle up to three power supply/actuator sub-systems for a total of up to thirty-six diffusers per thermostat, (24 diffusers with optional 20 ft. cables).

CONNECTION TO DDC CONTROLS:

The standard thermostat provides a direct acting 2 – 10 VDC control signal (Terminal D) to the actuator (Terminal B is Common). These wires can be connected to another signal source for control by the BMS. A 10 VDC signal will drive the damper fully open to provide maximum airflow. Similarly a 2 VDC signal (or less) will drive the damper fully closed.



SCHEDULE TYPE:		Page 2 of 2 Dimensions are in inches (mm).			
PROJECT:	609 MAIN				
ENGINEER:		**DATE**	**B SERIES**	**SUPERSEDES**	**DRAWING NO.**
CONTRACTOR:		**2 - 10 - 11**	**NFD**	**6 - 26 - 09**	**ANFD-VAV-1**

Nailor® Industries Inc.

ALUMINUM FLOOR "SWIRL" DIFFUSERS
ROUND • SIZE 8 AND 10
UNDERFLOOR AIR DISTRIBUTION SYSTEMS
MODELS: ANFD, ANFD-VAV

Performance Data

Size	Airflow, cfm	40	50	60	70	80	90	100	110	120
8	Plenum Pressure	.014	.021	.031	.042	.054	.069	.085	.103	0.122
	Vertical Projection, ft. @ 150, 100, 50 fpm	< .5	< .5	1.0-1.5-2.0	2.0-2.5-3.0	2.5-2.5-3.0	2.5-3.0-4.0	3.0-3.5-4.5	3.0-4.0-5.0	3.5-4.0-5.0
	Horizontal Spread, ft. @ 150, 100, 50 fpm	1.0-1.5-2.0	2.0-2.0-2.5	1.5-2.0-4.5	2.0-2.5-5.5	2.0-2.5-6.0	1.5-2.0-6.5	1.0-1.5-6.5	1.0-1.5-6.5	1.0-1.5-7.0
	NC	–	–	–	–	–	–	15	18	20
10	Airflow, cfm	55	70	85	100	115	130	145	160	175
	Plenum Pressure	0.012	0.019	0.028	0.039	0.052	0.066	0.082	0.100	0.119
	Vertical Projection, ft. @ 150, 100, 50 fpm	1.0-1.0-1.5	1.0-1.5-2.5	1.0-1.5-2.5	1.5-1.5-2.5	1.5-2.0-3.0	1.5-2.0-3.5	2.0-3.0-5.0	2.5-3.5-5.0	3.0-3.5-6.0
	Horizontal Spread, ft. @ 150, 100, 50 fpm	1.0-1.5-1.5	1.0-1.0-2.5	1.5-1.5-2.5	2.0-2.0-2.5	2.0-2.0-3.0	2.0-2.0-3.5	2.0-2.5-3.5	2.0-2.5-3.5	2.5-3.0-4.0
	NC	–	–	–	–	–	15	18	21	26

Selection Data

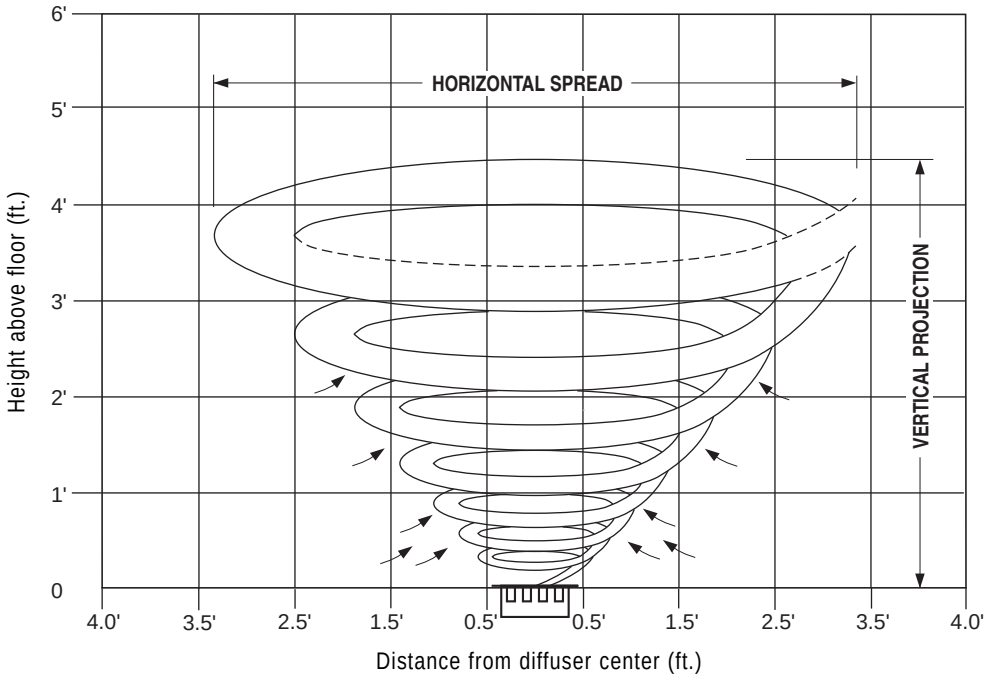
Size	Plenum Pressure	.03	.04	.05	.06	.07	.08	.09	.10	.11
8	Airflow, cfm	59	69	77	84	91	97	103	108	114
10	Airflow, cfm	88	101	113	124	134	143	152	160	168

Correction Factors for other supply air temperature differentials.

ΔT (°F)	-6	-8	-10	-12	-14	-16
Projection, ft.	x 1.33	x 1.11	x 1.00	x 0.96	x 0.92	x 0.91
Spread, ft.	x 0.87	x 0.94	x 1.00	x 1.06	x 1.11	x 1.16

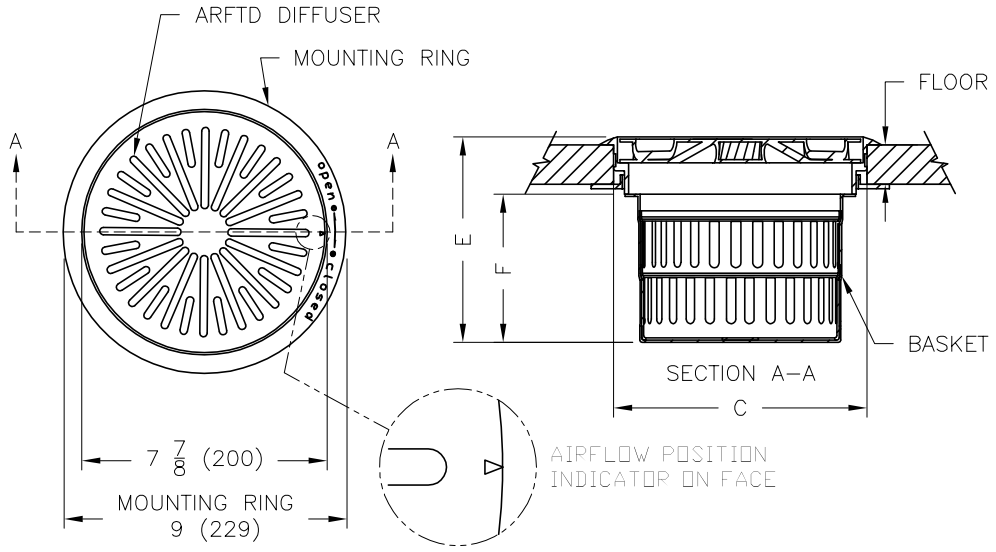
Performance Notes:

1. Projection and Spread data were determined in a room with a 11' ceiling height and 10°F ΔT, between supply air and averaged occupied room temperature.
2. Vertical projection (throw) is the maximum height above the floor where terminal velocities of 150, 100 and 50 fpm were observed. Horizontal Spread is the total width of the isovel where terminal velocities of 150, 100 and 50 fpm were observed.
3. Noise Criteria (values) based on 10 dB room absorption, re 10^{-12} watts. Dash (-) in space denotes an NC value of less than 15.
4. Pressure is in inches w.g..
5. Tests conducted with dirt basket/damper installed. Damper fully open. Size 8 Ak = 0.104. Size 10 Ak = 0.142.
6. Data derived from independent tests conducted in accordance with ANSI/ASHRAE Standard 70 – 1996.



ANFD Size 8 High induction "Swirl" Pattern. 100 cfm supply @10°F ΔT. Outline indicates maximum room air velocity of 50 fpm.

SCHEDULE TYPE		Dimensions are in inches (mm).		
PROJECT	609 MAIN			
ENGINEER		DATE	B SERIES	SUPERSEDES	DRAWING NO.
CONTRACTOR		1 - 20 - 11	NFD	2 - 26 - 04	ANFD-2

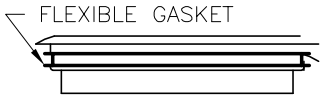


FLOOR TILE PRECISION OPENING–C

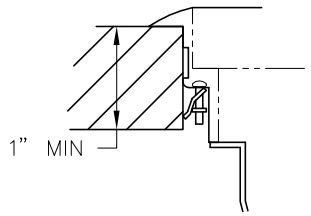
RC	8.307 ± .040 (211 ± 1)
RPF	8.464 ± .040 (214 ± 1)

FASTENING OPTIONS

☐ RPF = RING PRESS FIT



☐ RC = RING CLAW



BASKET HEIGHT DIMENSIONS

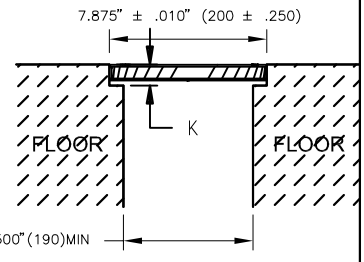
	TYPE	E	F	DESCRIPTION
☐	DBA	5.75" (146)	5.00" (127)	Distributor Basket with Face Adjustable Damper
☐	B	5.75" (146)	5.00" (127)	Distributor Basket no Damper
☐	BS	5.75" (146)	5.00" (127)	Short Basket no Damper
☐	DB	5.75" (146)	5.00" (127)	Distributor Basket with Damper
☐	DBS	2.75" (70)	2.00" (51)	Short Basket with Damper
☐	DBAS	2.75" (70)	2.00" (51)	Short Basket with Face Adjustable Damper
☐	DBV	7.31" (186)	6.56" (167)	Variable Volume Basket (See Submittal 243333)
☐	MDBA*	4.75" (120)	4.00" (101)	Metal Distributor Basket with Face Adjustable Damper
☐	MBD	4.75" (120)	4.00" (101)	Metal Distributor Basket with Damper
☐	MB	4.75" (120)	4.00" (101)	Metal Distributor Basket

*MDBA IS STANDARD

MATERIAL:
DIFFUSER & MOUNTING RING – ALUMINUM
BASKET – POLYCARBONATE, UL/ULC 94V–0 FIRE RATED
METAL BASKET – GALVANIZED STEEL
NOTES:
COMPONENTS SHIPPED ASSEMBLED

FINISH:
☐ MILL = MILL FINISH
(OPTIONAL FINISHES AVAILABLE)

STEPPED BORE DETAILS



K = 0.800" (WITHOUT BASKET)
K = 0.925" (WITH METAL BASKET)
K = 0.875" (WITH PLASTIC BASKET)

ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PROJECT:		price®
ENGINEER:		DS
CUSTOMER:		237694
SUBMITTAL DATE:	**SPEC. SYMBOL:**	2011/04/18

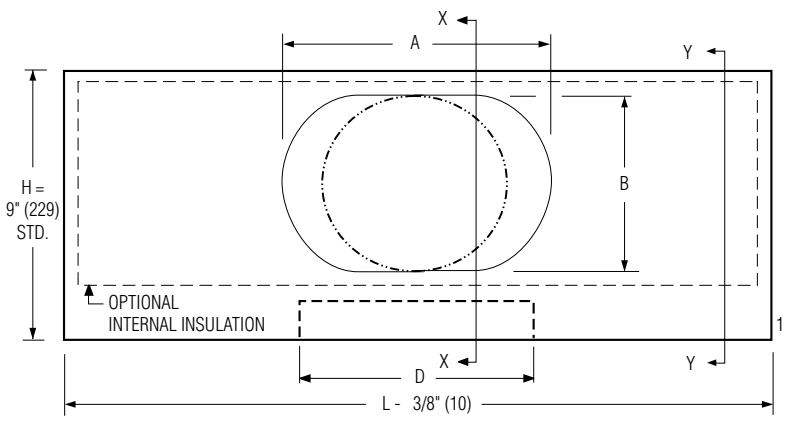
ARFTD
ALUMINUM
ROUND FLOOR
TURBULENT
DIFFUSER

SHEET 1 OF 1 REV H

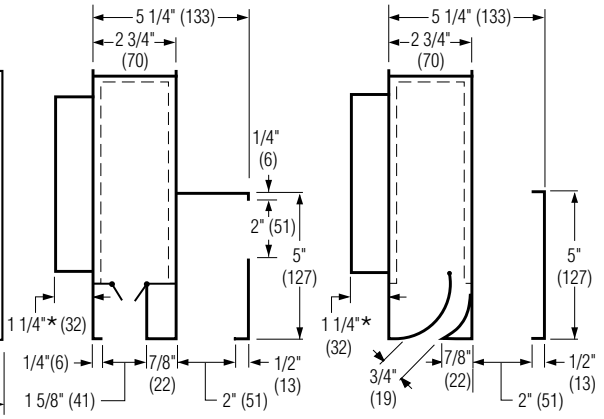
Nailor® Industries Inc.

N SERIES PLENUM SLOT DIFFUSER

SUPPLY / RETURN • PREMIUM PERFORMANCE
HORIZONTAL / VERTICAL DISCHARGE
MODEL: 59NDR(I)



* 4" (102) WITH OPTIONAL ID INLET DAMPER



SECTION X-X
SR STANDARD SIDE INLET RETURN ILLUSTRATED

SECTION Y-Y
TR OPTIONAL TOP INLET RETURN ILLUSTRATED

Nominal Length L		Available Down-Blow Slot Dim. D	Available Inlet Sizes
Imperial Modules	Metric Modules		
24 (610)	600	8, 12 (203, 305)	6, 8, 10 (152, 203, 254)
36 (914)	900	12, 15 (305, 381)	
48 (1219)	1200	12, 15, 18 (305, 381, 457)	
60 (1524)	1500	15, 18, 21 (381, 457, 533)	

Nominal Inlet Size	Std. Dimension H = 9		Opt. Dimension H = 11		Opt. Dimension H = 7	
	A	B	A	B	A	B
~~6 (152)~~	—	~~5 7/8 (149)~~	—	~~5 7/8 (149)~~	~~7 (178)~~	~~4 (102)~~
8 (203)	9 (229)	5 7/8 (149)	—	7 7/8 (200)	10 1/8 (257)	4 (102)
~~10 (254)~~	~~12 1/8 (308)~~	~~5 7/8 (149)~~	~~11 (279)~~	~~7 7/8 (200)~~	~~13 1/4 (337)~~	~~4 (102)~~

Inlets are round or oval as dimensioned.

DESCRIPTION:

1. The 59NDR Supply/Return Plenum Slot Ceiling Diffusers have been designed for standard lay-in T-Bar application.
2. The 59NDR design provides two air patterns and premium performance in perimeter curtain wall application. An aerodynamic extruded aluminum pattern controller provides a fixed horizontal discharge and produces a tight blanket of air into the room, maximizing coanda effect and induction of room air. A central down-blow section which incorporates two pattern controllers (shipped in wide open position), provides an adjustable vertical discharge along the wall or glass in perimeter applications.

   An integral return air section returns room air into the ceiling plenum, with minimal short-circuiting of supply air. Standard (SR) side inlet return section also acts as a light shield and prevents see through.
3. The design is excellent for VAV, heating and cooling applications.
4. Standard nominal lengths are 24", 36", 48" and 60" to suit imperial ceiling grids. Metric units are available. Standard H9 plenum height is 9" (229). Standard inlet sizes are 6" round, 8" and 10" flat oval.
5. Plenum is corrosion resistant steel.
6. Finish: BK Black pattern controllers and exposed edges.

OPTIONS (see submittal 59N_BS-ACC for details):

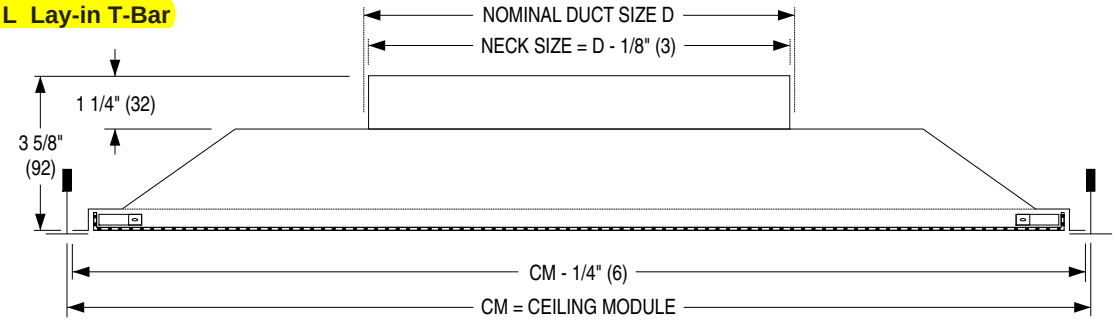
~~1.~~ ❑ ~~EX~~ ~~External Foil Back Insulation~~
~~2.~~ ~~a.~~ ❑ ~~Internal Insulation. Model 59NDRI~~
~~b.~~ ❑ ~~FGI 1/4" (6) Coated Fiberglass (default)~~
❑ ~~FFI 3/8" (10) Fiber-Free Foam~~
~~3.~~ ❑ ~~ID~~ ~~Inlet Damper~~
~~4.~~ ❑ ~~PF~~ ~~Plaster Frame~~
~~5.~~ ~~Supplementary T-Bars~~
❑ ~~T1~~ ~~One (inlet side)~~
❑ ~~T0~~ ~~One (opposite inlet side)~~
❑ ~~T2~~ ~~Two (Both sides)~~
~~6.~~ ~~Mounting Clips~~
❑ ~~M1~~ ~~One side (2 opposite inlet side)~~
❑ ~~M2~~ ~~Both sides (4)~~
~~7.~~ ~~Fineline/Bolt Slot T-Bar Ceiling Construction~~
~~(24" [610] and 48" [1219] nominal length only)~~
~~Cross notch not available~~
~~T-Bar Height~~
❑ ~~FNLA 1 3/4" (44)~~
❑ ~~FNLC 1 5/8" (41)~~
❑ ~~FNLD 1 25/32" (45)~~
~~8.~~ ❑ ~~EQT Earthquake Tabs~~
9. ❑ EC 3" (76) Extended inlet collar w/bead
10. ❑ TR Top inlet return section
11. Non-standard Plenum Height
❑ H7 7" (178) high
❑ ~~H11~~ ~~11" (279) high~~
~~12.~~ ❑ ~~FS~~ ~~Diamond Flow Sensor w/extended collar bead. Requires H11 option. 6" (152) and 8" (203) round inlet sizes only. (Not available on models with internal insulation).~~
~~13.~~ ❑ ~~SP~~ ~~Special features~~ _____ .

SCHEDULE TYPE:		Dimensions are in inches (mm).		
PROJECT:	609 MAIN			
ENGINEER:	**DATE**	**B SERIES**	**SUPERSEDES**	**DRAWING NO.**
CONTRACTOR:	**4 - 28 - 14**	**5900**	**5 - 11 - 09**	**59NDR**

Nailor® Industries Inc.

PERFORATED CEILING DIFFUSERS
RETURN • FLUSH FACE • ROUND OR SQ. NECK
MODELS: 4360, 4360A, 4360AA

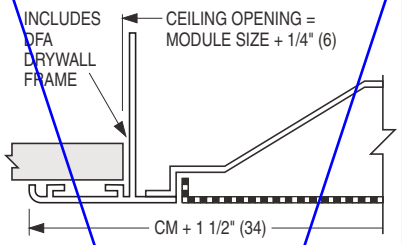
❑ **TYPE L Lay-in T-Bar**



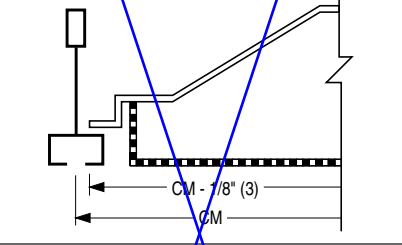
Available Combinations of Ceiling Module vs. Neck Size

Ceiling Module CM		Nominal Duct Size D			
		Round Neck		Square Neck	
Imperial Modules	Metric Modules	Imperial Units (in.)	Metric Units (mm)	Imperial Units (in.)	Metric Units (mm)
12 x 12	300 x 300	6, 8	152, 203	6 x 6 8 x 8	152 x 152 203 x 203
16 x 16	400 x 400	6, 8, 10, 12	152, 203, 254, 305	6 x 6, 8 x 8, 10 x 10, 12 x 12	152 x 152, 203 x 203, 254 x 254, 305 x 305
24 x 12	600 x 300	6, 8	152, 203	6 x 6, 8 x 8, 18 x 6	152 x 152, 203 x 203, 457 x 152
20 x 20	500 x 500	6, 8, 10, 12, 14	152, 203, 254, 305, 356	6 x 6, 8 x 8, 10 x 10, 12 x 12, 14 x 14	152 x 152, 203 x 203, 254 x 254, 305 x 305, 356 x 356
24 x 24	600 x 600	6, 8, 10, 12, 14, 15, 16, 18	152, 203, 254, 305, 356, 381, 406, 457	6 x 6, 8 x 8, 10 x 10, 12 x 12, 14 x 14, 15 x 15, 16 x 16, 18 x 18	152 x 152, 203 x 203, 254 x 254, 305 x 305, 356 x 356, 381 x 381, 406 x 406, 457 x 457
48 x 24	1200 x 600	6, 8, 10, 12, 14, 15, 16, 18	152, 203, 254, 305, 356, 381, 406, 457	6 x 6, 8 x 8, 10 x 10, 12 x 12, 14 x 14, 15 x 15, 16 x 16, 18 x 18	152 x 152, 203 x 203, 254 x 254, 305 x 305, 356 x 356, 381 x 381, 406 x 406, 457 x 457

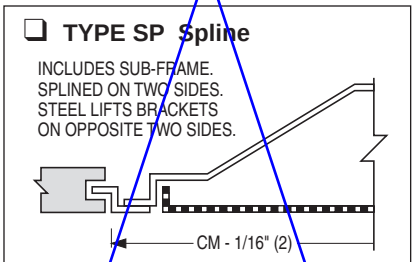
❑ **TYPE S Surface Mount**



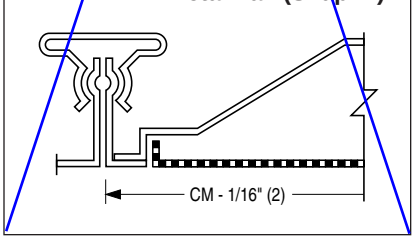
❑ **TYPE F Fineline® T-Bar**



❑ **TYPE SP Spline**



❑ **TYPE M Metal Pan (Snap-in)**



DESCRIPTION:

1. Material: Corrosion-resistant steel. (Model 4360 is standard).
2. Designed to match supply air models 4320, 4320CB, 4320F and 4320M in appearance and construction detail, except that the air pattern controllers are not required and are omitted. This version is for ducted return applications; for connection to flexible or rigid round duct or square duct.
3. Removable face has concealed latches for easy access to optional damper.
4. Perforated face has 3/16" (5) diameter holes on 1/4" (6) staggered centres.
5. Standard finish is AW Appliance White.

OPTIONS:

❑ ~~Aluminum perforated face/steel backpan. (Model 4360A).~~
❑ ~~Aluminum perforated face and backpan. (Model 4360AA).~~
❑ ~~EX External Foil Back Insulation, installed - R 4.2 (24 x 24 max.)~~
❑ ~~EXB External Foil Back Insulation, ships loose - R 4.2 (24 x 24 max.)~~
❑ ~~MIB Molded Insulation Blanket - R 6.0 (24 x 24 only)~~

~~Finish:~~

❑ ~~BA Black back pan and deflectors with Appliance White face.~~
❑ ~~SP Special _____.~~

Fineline® is a registered trademark of USG Interiors Inc.

Dimensions are in inches (mm).

SCHEDULE TYPE:					
PROJECT:	609 MAIN				
ENGINEER:		**DATE**	**B SERIES**	**SUPERSEDES**	**DRAWING NO.**
CONTRACTOR:		**8 - 30 - 13**	**4300**	**11 - 5 - 07**	**4360-2**

American Standard
Style That Works Better

BARRIER FREE

STUDIO™ UNDERCOUNTER SINK
VITREOUS CHINA

STUDIO™ UNDERCOUNTER SINK

- Rectangular undercounter mount sink
- Made from vitreous china
- Front overflow
- Supplied with mounting kit (047194-0070A) and template

❑ **0614.000 Unglazed Rim**
540 x 387mm
(21-1/4" x 15-1/4")

NO LOGO

❑ **0614.300 Glazed underside**

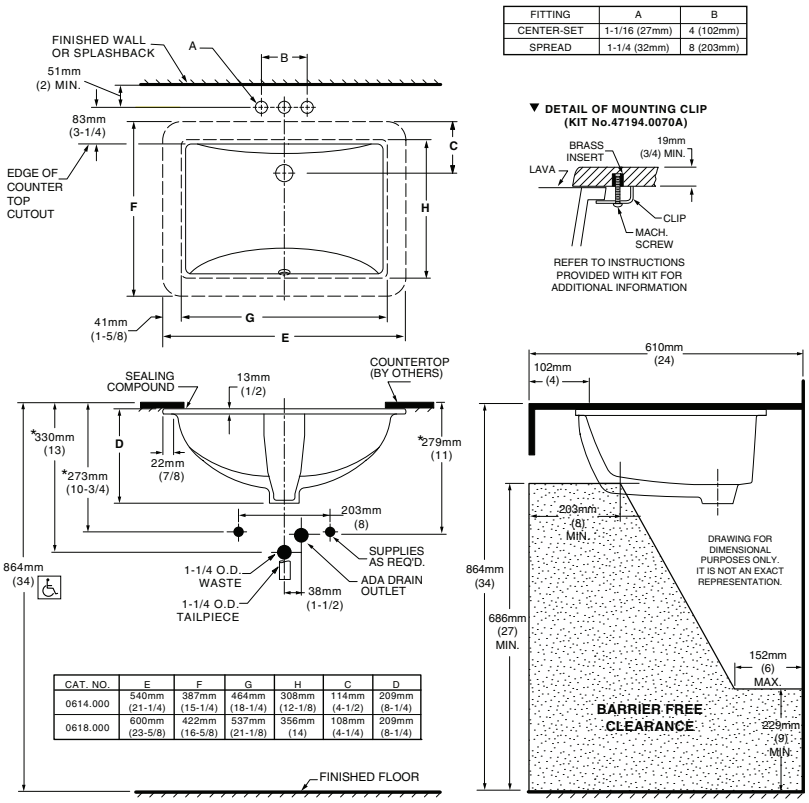
Bowl size:
464mm (18-1/4") wide
308mm (12-1/8") front to back
171mm (6-3/4") deep

❑ **0618.000 Unglazed Rim**
600 x 422mm
(23-5/8" x 16-5/8")

❑ **0618.300 Glazed underside**

Bowl size:
537mm (21-1/8") wide
356mm (14") front to back
152mm (6") deep

Compliance Certifications - Meets or Exceeds the Following Specifications:
- ASME A112.19.2M for Vitreous China Fixtures
- CAN/CSA B45 series



FITTING	A	B
CENTER-SET	1-1/16 (27mm)	4 (102mm)
SPREAD	1-1/4 (32mm)	8 (203mm)

▼ DETAIL OF MOUNTING CLIP (KIT No.47194.0070A)

REFER TO INSTRUCTIONS PROVIDED WITH KIT FOR ADDITIONAL INFORMATION

CAT. NO.	E	F	G	H	C	D
0614.000	540mm (21-1/4)	387mm (15-1/4)	464mm (18-1/4)	308mm (12-1/8)	114mm (4-1/2)	209mm (8-1/4)
0618.000	600mm (23-5/8)	422mm (16-5/8)	537mm (21-1/8)	356mm (14)	108mm (4-1/4)	209mm (8-1/4)

To Be Specified:
- ❑ Color: ❑ White ❑ Bone ❑ Linen ❑ Black
- ❑ Faucet*:
- ❑ Faucet Finish:
- ❑ Supplies:
- ❑ 1-1/4" Trap:

* See faucet section for additional models available

MEETS THE AMERICANS WITH DISABILITIES ACT GUIDELINES AND ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES - CHECK LOCAL CODES.
● Countertop 864mm (34") from finished floor. Lavatory installed 102mm (4") from front edge of countertop. Countertop thickness to be 25mm (1") maximum.

NOTES:
WE RECOMMEND USING BASIN AS A TEMPLATE TO DETERMINE PROPER CONTOUR. CUT COUNTERTOP 38MM (1-1/2") INSIDE BASIN CONTOUR.
* DIMENSIONS SHOWN FOR LOCATION OF SUPPLIED AND "P" TRAP ARE SUGGESTED.
▼ UNDERCOUNTER MOUNTING KIT SUPPLIED WITH SINK.
FITTINGS NOT INCLUDED WITH FIXTURE AND MUST BE ORDERED SEPARATELY.
SEALING COMPOUND SUPPLIED BY OTHERS.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2.
These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.

American Standard
Style That Works Better

MOMENTS SELECTRONIC™
ELECTRONIC PROXIMITY LAVATORY FAUCET
CAST BRASS SPOUT

GENERAL DESCRIPTION:
Electronic faucet with proximity operation. Vandal-resistant solid brass construction single post mounting. Operates on DC (battery) or AC permanent power. Water pressure range from 20 to 125 psi. Single inlet 15" flexible stainless steel hose with 3/8" compression fitting for spout connection.

PRODUCT FEATURES:
Power Options;

- **Battery -** Includes CR-P2 lithium battery. Battery Life-Approximately 200,000 cycles (4 years @ 4,000 cycles per month).
- **Plug-In AC -** Includes universal low voltage plug-inpower supply with 6 foot long cord. Inlet Voltage: 80 - 250 VAC, 50 - 60 Hz. Outlet Voltage: 6 VDC. One power supply can run up to 15 faucets and/or flush valves at one time.
- **Hard-Wired AC -** Includes universal low voltage hard-wired transformer. Inlet Voltage: 80 - 250 VAC, 50 - 60 Hz. Outlet Voltage: 6 VDC. One transformer can run up to 15 faucets and/or flush valves at one time.

Easy & Flexible Installation; Single post mounting with optional 4" deck plate. Water resistant solenoid enclosure mounts to wall.

Durable Vandal-Resistant Brass Body; Ideal for high-use commercial applications.

Easy to Service Integrated Strainer; Patented integrated strainer protects solenoid from debris. Strainer is enclosed in removable debris cup for easy service.

Optional Purge Feature; Faucet can be programmed to open at a pre-determined time after the last use to purge the faucet and water lines.

Safety Timer; Helps prevent vandalism by turning off the faucet if the sensor is covered for more than 1 minute.

Low Lead; Faucet contains ≤ 0.25% total lead content by weighted average.

MODEL NUMBER:

DC POWERED; single inlet

❑ **2506.155** with cast spout, 0.5 GPM pressure compensating, vandal-resistant non-aerated spray. Battery included.

❑ **2506.153** with cast spout, 1.5 GPM pressure compensating, vandal-resistant aerator. Battery included.

PLUG-IN AC POWERED; single inlet

❑ **2506.165** with cast spout, 0.5 GPM pressure compensating, vandal-resistant non-aerated spray. Includes Plug-In AC power supply.

❑ **2506.162** with cast spout, 1.5 GPM pressure compensating, vandal-resistant aerator. Includes Plug-In AC power supply.

HARD-WIRED AC POWERED; single inlet

❑ **2506.195** with cast spout. 0.5 GPM pressure compensating, vandal-resistant non-aerated spray. Includes UL-approved Hard-Wired AC transformer (electrical box by others).

❑ **2506.192** with cast spout. 1.5 GPM pressure compensating, vandal-resistant aerator. Includes UL-approved Hard-Wired AC transformer (electrical box by others).

MULTI AC POWERED; single inlet LESS LOGO

❑ **2506.175** with cast spout. 0.5 GPM pressure compensating, vandal-resistant non-aerated spray. One power supply or transformer (sold separately) can operate up to 15 faucets and/or flush valves. 10' extension cable included.

❑ **2506.172** with cast spout. 1.5 GPM pressure compensating, vandal-resistant aerator. One power supply or transformer (sold separately) can operate up to 15 faucets and/or flush valves. 10' extension cable included.

OPTIONAL Mixing Valve

❑ 605XTMV or 605XTMV1070 Thermostatic mixing valve, flex hoses 3/8" compression 20" hose length.

RECOMMENDED SPECIFICATION
Electronic Proximity Lavatory shall feature vandal resistant all brass body with single inlet, and in-line strainer. Shall also feature a low energy use electronically operated solenoid valve and microprocessor controlled proximity sensors. Shall meet ANSI A112.18.1M and ANSI 117.1 codes. Fitting shall be American Standard Model # 2506.____.

AFWALL® MILLENIUM™ FloWise® 1.28 GPF FLUSHOMETER TOILET SYSTEM

with EVERCLEAN® SELECTRONIC® FLUSH VALVE

BARRIER FREE

AFWALL® MILLENIUM™ FloWise® 1.28 GPF FLUSHOMETER TOILET SYSTEM with EVERCLEAN®

❑ **3351.528** 1.28 gpf Exposed Top Spud Bowl and Selectronic® Flush Valve

LESS LOGO

BOWL:

- Wall-mounted elongated flushometer valve toilet
- Vitreous china
- High Efficiency. Operates in the range of 1.1 gpf to 1.6 gpf (4.2 Lpf to 6.0 Lpf)
- Permanent EverClean® surface inhibits the growth of stain and odor-causing bacteria, mold, and mildew on the surface
- Condensation channel
- Powerful direct-fed siphon jet action
- 1-1/2" inlet spud
- Fully-glazed 2-1/8" trapway
- 10" x 12" water surface area
- 100% factory flush tested
- Bolt caps and seat not included
- Model 3351.101

SELECTRONIC® FLUSH VALVE:

- Electronic flush valve with Selectronic® proximity system for “Hands Free” operation
- Self-Cleaning Piston operation helps prevent clogging and reduces maintenance
- Positive seal ensures leak-free performance
- Fully mechanical Manual Override Button canflush toilet during a power outage
- Range can be adjusted manually or by remote control
- Sensor & electronic controls are fully enclosedand water resistant
- Automatically flushes after 24 hours of non-use to maintain trap seal
- 3-second Flush Delay
- Battery life up to 4 years/approx. 200,000 cycles
- Low Battery indicator
- Battery can be changed without turning off the water
- Factory-installed 6V lithium battery included
- Adjustable tailpiece for rough-in flexibility
- Can be installed left or right hand
- Model 6065.121.002

Includes:

- 047007-0070A Inlet Spud (furnished with bowl)
- 1" I.P.S. angle stop with back-flow prevention and vandal-resistant cap
- Sweat solder kit including cover tube and wall flange
- Outlet includes 1-1/2" vacuum breaker with adjustable tail piece, spud coupling & flange

SEE REVERSE FOR ROUGHING-IN DIMENSIONS

High-Efficiency Toilet Systems:

- 20% water savings when compared to a 1.6 gpf toilet system

System MaP* Score:

- 1,000 grams of miso @ 1.28 gpf

* Maximum Performance (MaP) testing performed by IAPMO R&T Lab. MaP Report conducted by Veritec Consulting, Inc. and Koeller and Company.

Operating Pressure:

Overall Range: 20-125 psi**
Recommended: 25 psi (flowing)-80 psi (static)
** Water pressure over 80 psi is not recommended for most plumbing fixtures.

Flow Requirement:

25gpm (94.6 L/min.)

Nominal Fixture Dimensions:

660 x 356 x 381mm (26" x 14" x 15")

To Be Specified:

❑ Color: ❑ White
❑ Seat:
- ❑ American Standard #5901.100 Heavy duty open front less cover
- ❑ American Standard #5905.100 Extra heavy duty open front less cover

EVERCLEAN® Surface

WATER EFFICIENT PRODUCT

American Standard
Style That Works Better

COMMERCIAL TOILET SEATS

COMMERCIAL TOILET SEATS

- Open front toilet seat less cover
- Injection molded solid polypropylene
- Fits elongated bowl
- Features large molded-in bumpers
- External check hinge with 304 Series stainless steel hinge posts stops seat 11° beyond vertical
- Our new EverClean® surface inhibits the growth of stain- and odor-causing bacteria, mold, and mildew on the surface. EverClean® surface does not protect against disease causing bacteria, viruses, germs or other disease causing organisms.

5901

❑ **5901.100** Elongated Heavy Duty bowl open front seat less cover
❑ **5901.100SS** Same as 5901.100 with self-sustaining hinge
❑ **5901.110** Same as 5901.100 with EverClean® Surface

5905

❑ **5905.100** Elongated Extra Heavy Duty bowl open front seat less cover
☑ **5905.100SS** Same as 5905.100 with self-sustaining hinge
❑ **5905.110** Same as 5905.100 with EverClean® Surface

To Be Specified:
❑ Color: ☑ White

❑ **5910.100** Elongated Extra Heavy Duty Plus bowl open front seat less cover
❑ **5910.110** Same as 5910.100 with EverClean® Surface

To Be Specified:
❑ Color: ❑ White ❑ Linen ❑ Bone ❑ Silver
❑ Fawn Beige ❑ Black

5910

SEE REVERSE FOR ROUGHING-IN DIMENSIONS

American Standard
Style That Works Better

BARRIER FREE

WASHBROOK® FloWise® 0.125 GPF ULTRA HIGH EFFICIENCY URINAL SYSTEM

SELECTRONIC® FLUSH VALVE

WASHBROOK® FloWise® 0.125 GPF ULTRA HIGH EFFICIENCY URINAL SYSTEM

☑ **6590.525** 0.125 gpf Exposed Top Spud Urinal and Selectronic® Urinal Flush Valve

LESS LOGO

URINAL:

- Vitreous china
- Ultra High Efficiency, Low Consumption. Operates in the range of 0.125 gpf to 1.0 gpf (0.5 Lpf to 3.8 Lpf)
- Flushing rim
- Elongated 14" rim from finished wall
- Washout flush action
- Extended sides for privacy
- 3/4" inlet spud
- Outlet connection threaded 2" inside (NPTF)
- Strainer included
- Meets ASME flush requirements at 0.125 gpf
- Model 6590.001 top spud

SELECTRONIC® FLUSH VALVE:

- Integral flow regulator delivers consistent flush volume regardless of inlet water pressure
- Electronic flush valve with Selectronic® proximity system for “Hands Free” operation
- Self-Cleaning Piston operation helps prevent clogging and reduces maintenance
- Positive seal ensures leak-free performance
- Fully Mechanical Manual Override Button can flush urinal during a power outage
- Stadium Feature: Valve automatically switches to water conservation mode during periods of heavy usage
- Range can be adjusted manually or by remote control
- Sensor & electronic controls are fully enclosed and water resistant
- Automatically flushes after 24 hours of non-use to maintain trap seal
- 3-second Flush Delay
- Low Battery indicator
- Battery can be changed without turning off the water
- Factory-installed 6V lithium battery included
- Adjustable tailpiece for rough-in flexibility
- Can be installed left or right hand
- Battery life up to 4 years/approx. 200,000 cycles
- Model 6063.013 for 3/4" top spud urinals, 0.125 gpf

Includes:

- 2 Wall hangers
- 3/4" I.P.S. angle stop with back-flow protection and vandal-resistant cap
- Sweat solder kit including cover tube and wall flange
- 3/4" vacuum breaker, spud coupling and flange

To Be Specified:
❑ Color: ☑ White

SEE REVERSE FOR ROUGHING-IN DIMENSIONS

Operating Pressure:

Overall Range: 20-125 psi**
Recommended: 20 psi (flowing)-80 psi (static)

** Water pressure over 80 psi is not recommended for most plumbing fixtures.

Flow Requirement:

8gpm (30.3 L/min.)

Nominal Fixture Dimensions:

360 x 480 x 664mm (14-1/8" x 18-7/8" x 26-1/8")

Fixture Compliance Certifications - Meets or Exceeds the Following Specifications:

- ASME A112.19.2-2008/CSA B45.1-08 for Vitreous China Fixtures

Valve Listings:

- ASSE 1037
- ANSI/ASME A112.19.2
- ADA Compliant

WaterSense Meets EPA Criteria Certified by IAPMO R&T
WATER EFFICIENT PRODUCT

N19

American Standard
Style That Works Better

SELECTRONIC™ FloWise® URINAL FLUSH VALVE

BATTERY POWERED, SENSOR OPERATED,0.125 GPF

WATER EFFICIENT PRODUCT

GENERAL DESCRIPTION:
Exposed, Battery Powered, Sensor Operated Selectronic™ Urinal Flush Valve for 3/4" top spud urinals.
Inlet includes 3/4" I.P.S. angle stop with back-flow protection, vandal-resistant cap, sweat solder kit, cover tube and wall flange.
Outlet includes 3/4" vacuum breaker with adjustable tailpiece, spud coupling and flange.

PRODUCT FEATURES:
- Exclusive Pressure Compensation feature allows the flush valve to deliver a constant flush volume regardless of water pressure.
- Flush Valve can not be adjusted to deliver more or less water, ensuring water savings & performance.
- Electronic flush valve with Selectronic™ proximity system for "Hands Free" operation.
- Self-Cleaning Piston with integral wiper spring prevents clogging and reduces maintenance.
- Piston operation delivers superior flush accuracy and repeatability.
- Fully Mechanical Manual Override Button can operate for an unlimited time without power.
- Valve remains closed and does not need to be reset after loss of power or water pressure.
- Sanitary Flush: Valve automatically flushes after 24 hours of non-use to clean fixture & maintain trap seal.
- Stadium Feature: Valve automatically switches to water savings mode during periods of high usage.
- Sensor & electronic controls are fully encloses and water resistant.
- Range can be adjusted manually or with optional remote control.
- Chemical resistant EPDM seals are unaffected by chloramines & other chemicals.
- Adjustable tailpiece.
- Factory-installed CR-P2 lithium battery included.
- No external volume adjustment.
- Can be installed left or right handed.

MODEL NUMBER:

☑ **6063.013.002** Flush Valve for 3/4" top spud urinals, 0.125 gpf.

☐ **6063.513.002** Retrofit for Existing Flush Valves, 0.125 gpf. Replaces industry standard manual and electronic valves. Does not include the vacuum breaker assembly, angle stop or sweat solder kit.

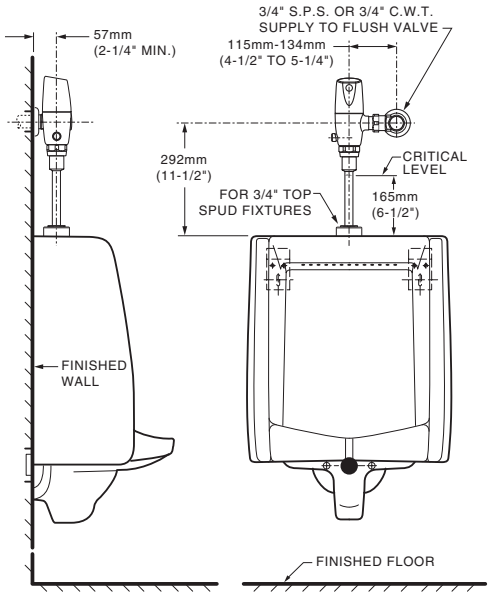
OPERATING PRESSURE:
Overall Range: 20-125 psi**
Recommended: 20 psi (Flowing)-80 psi (static)

FLOW REQUIREMENT:
8gpm (30.3 L/min.)

** Water pressure over 80 psi is not recommended for most plumbing fixtures.

BATTERY LIFE:
200,000 cycles (4 years @ 4000 cycles per month)

ACCESSORIES:
- Cast wall flange (3/4")



RECOMMENDED SPECIFICATION:
Electronic proximity infrared sensor activated urinal flush valve shall feature self-cleaning piston valve with integral wiper spring in refill orifice to prevent clogging. Includes a fully mechanical manual over-ride that can provide a complete flush without battery power. Includes cast brass valve body and metal cover with chrome finish, vandal resistant stop cap and lithium battery. Angle stop with back-flow protection and vacuum breaker included. 0.13 gpf / 0.5 Lpf Flush valve shall be American Standard Model # 6063._13.002.

Liebert.

EMERSON. Network Power

LIEBERT LIQUI-TECT® 460 KITS

Zone Leak Detection Module With Cable

Product Specification Sheet

Description

The Liebert Liqui-tect 460 (LT460) provides zone detection of leaks, protecting equipment by constantly monitoring the area for leaking liquids. The LT460 is the ideal solution for perimeter sensing or serpentine coverage of areas requiring up to 100 feet of cable.

Selectable modes of operation provide flexible alarming options and protection for the cable. The LT460 constantly monitors a zone for leaks, internal faults and power failures and warns of any abnormal conditions. Top cover LEDs provide status indication and also ensure the cable is properly installed and operational under raised floors.

Two independent outputs provide a signal to a local alarm panel, Liebert environmental unit, remote building management system or external equipment, such as motorized water shut-off valves.

The LT460 kit is ideally suited for the following:

Applications

- Glycol, Condenser Water and Chilled Water Cooling Piping Leak
- Humidification Feed Water Piping
- Condensate Pumps and Drains
- Unit and Ceiling Auxiliary Drip Pans
- Overhead Piping Troughs

Locations

- Large-Scale Network Control Centers
- Data Centers
- MRI, CAT Scan Rooms
- Server Rooms - Closets
- Unattended Remote Shelters
- Sensitive Areas With Overhead Piping
- Mechanical Equipment Rooms
- Industrial Process Control Rooms

Components

Liqui-tect 460 Module

The LT460 consists of a metal enclosure with a hinged top door providing access to the internal circuit board for wiring termination and configuration of DIP switches. The LT460 will monitor up to 100 feet of connected LT500Y leak detection cable.

LT500Y Leak Detection Cable

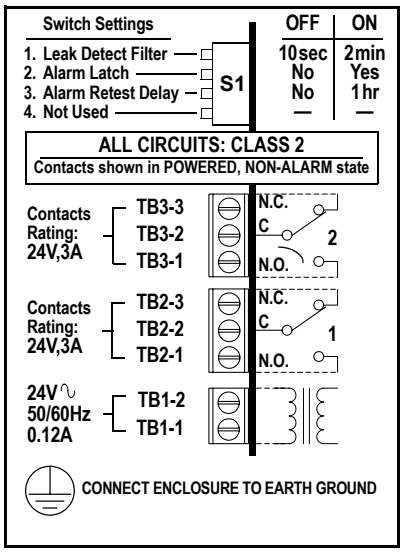
The cable material and construction allow the cable to lie flat when used with hold-down clips. The LT500Y is plenum-rated and UL-listed for safe operation.

- **If obtained separately,** cables are available in lengths of 15, 35 and 50 feet. These cables can be connected incrementally to monitor from 15 feet up to 100 feet. An end terminator and hold-down clips (two clips required for each 6-8 ft. of cable) must be ordered separately.
- **If obtained in a kit,** cables are available in lengths of 20, 25, 30, 35 and 45 feet. Cables in kits cannot be lengthened. Hold-down clips are provided.

  Refer to the matrix on page 2 (**Prepackaged Sizes for Liebert Units**) to select a preconfigured kit sized to specific lengths for Liebert environmental units.

Configuration Switch Settings

A four-position DIP switch is used to select two alarm (filter) delays and three mutually exclusive alarm modes. The switches are located next to the wiring termination blocks.

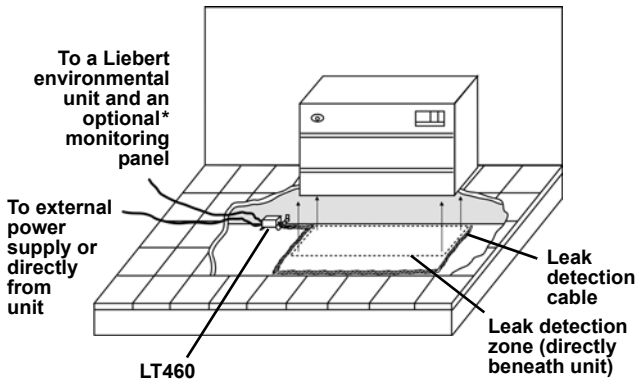


Specifications

Liqui-tect 460 Module	
Power requirements	24 VAC 120 mA, 50/60 Hz 3 VA (max.)
Enclosure dimensions W x D x H	5.35" x 3.23" x 3.5" (135.9mm x 82mm x 88.9mm)
Mounting hole dimensions	See diagrams at right
Weight (assembled)	2.0 lb. (0.9 kg)
Sensing cable compatibility	All Liebert LT500 sensing cables
Maximum length of sensing cable	100ft (30.5m)
Metal enclosure	NEMA 1, IP 30
Environmental Conditions	
Operating temperature	50°F to 104°F (10°C to 40°C)
Operating humidity	10% to 95% relative humidity (non-condensing)
Operating altitude	0 to 10,000 ft. (0 to 3,048m)
Output Relays	
Contact rating	2 Form-C, 3 A rating at 24 VAC
Agency Listings	
UL	UL916
C-UL	C22.2, No. 205-M1983
CE	Yes
FCC Compliance	47 CFR, Part 15

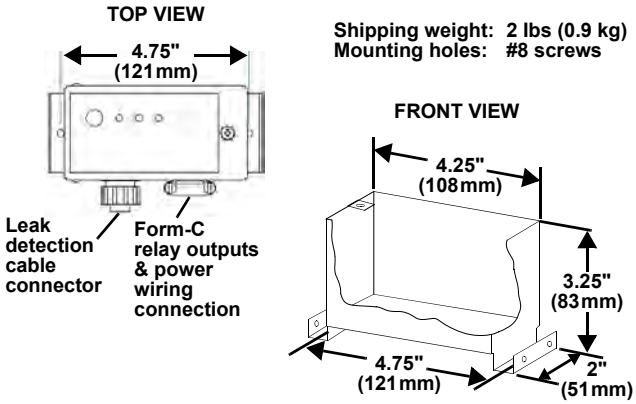
Placement on Subfloor

Under Cooling Support Equipment



* Output connections to external alarm monitoring panels such as the Liebert contact closure alarm panels

Dimensions - Top & Front Views



Prepackaged Sizes for Liebert Units

Leak Detection Kit Installation Suggestions

	Scenarios			
	Upflow Unit Detection around entire unit	**Upflow Unit** Detection on sides and in front of unit	**Downflow Unit** Detection around entire unit	**Downflow Unit** Detection on sides and in front of unit
Note: ▯ indicates placement of LT460 module	2' clearance in front	2' clearance in front	6' clearance in front	6' clearance in front
Distance:	**Distance From Unit**			
In back On sides In front	2 ft 2 ft 2 ft	(No cable) 2 ft 2 ft	1 ft 1 ft 6 ft	(No cable) 1 ft 6 ft
Unit (footprint-in.)	**PART NUMBER**			
Challenger (32.5 x 32.5)	LT460-Z30	LT460-Z20	LT460-Z30	LT460-Z25
Himod (69 x 35)	LT460-Z35	LT460-Z20	LT460-Z35	LT460-Z25
Deluxe System/3				
(50 x 35)	LT460-Z30	LT460-Z20	LT460-Z35	LT460-Z25
(74 x 35)	LT460-Z35	LT460-Z20	LT460-Z35	LT460-Z25
(99 x 35)	LT460-Z45	LT460-Z25	LT460-Z45	LT460-Z30
(122 x 35)	LT460-Z45	LT460-Z25	LT460-Z45	LT460-Z30
DS				
(73 x 35)	LT460-Z35	LT460-Z20	LT460-Z45	LT460-Z30
(86 x 35)	LT460-Z35	LT460-Z20	LT460-Z45	LT460-Z30
(98 x 35)	LT460-Z45	LT460-Z25	LT460-Z45	LT460-Z30
(109 x 35)	LT460-Z45	LT460-Z25	LT460-Z45	LT460-Z30
(132 x 35)	LT460-Z45	LT460-Z25	LT460-Z45	LT460-Z30

Ordering Information

Packaging	Quantity	Product Number	Description	
Prepackaged Kits		LT460-Z20	Zone Leak Detection Kit With Cable and Hold-Down Clips	20-Foot Cable
		LT460-Z25	Zone Leak Detection Kit With Cable and Hold-Down Clips	25-Foot Cable
		LT460-Z30	Zone Leak Detection Kit With Cable and Hold-Down Clips	30-Foot Cable
		LT460-Z35	Zone Leak Detection Kit With Cable and Hold-Down Clips	35-Foot Cable
		LT460-Z45	Zone Leak Detection Kit With Cable and Hold-Down Clips	45-Foot Cable
Available Separately		LT460	Zone Leak Detection Module	
		LT500-15Y	Leak Detection Cable	15-Foot Cable
		LT500-35Y	Leak Detection Cable	35-Foot Cable
		LT500-50Y	Leak Detection Cable	50-Foot Cable
		LT500-ET	End Terminator for LT500Y Cable	
		HDC	Hold-Down Clips	

Power Wiring

The LT460 is rated for 24 VAC, 50/60 Hz and 0.12 amp.

Figure 1 24V from Liebert environmental units to LT460

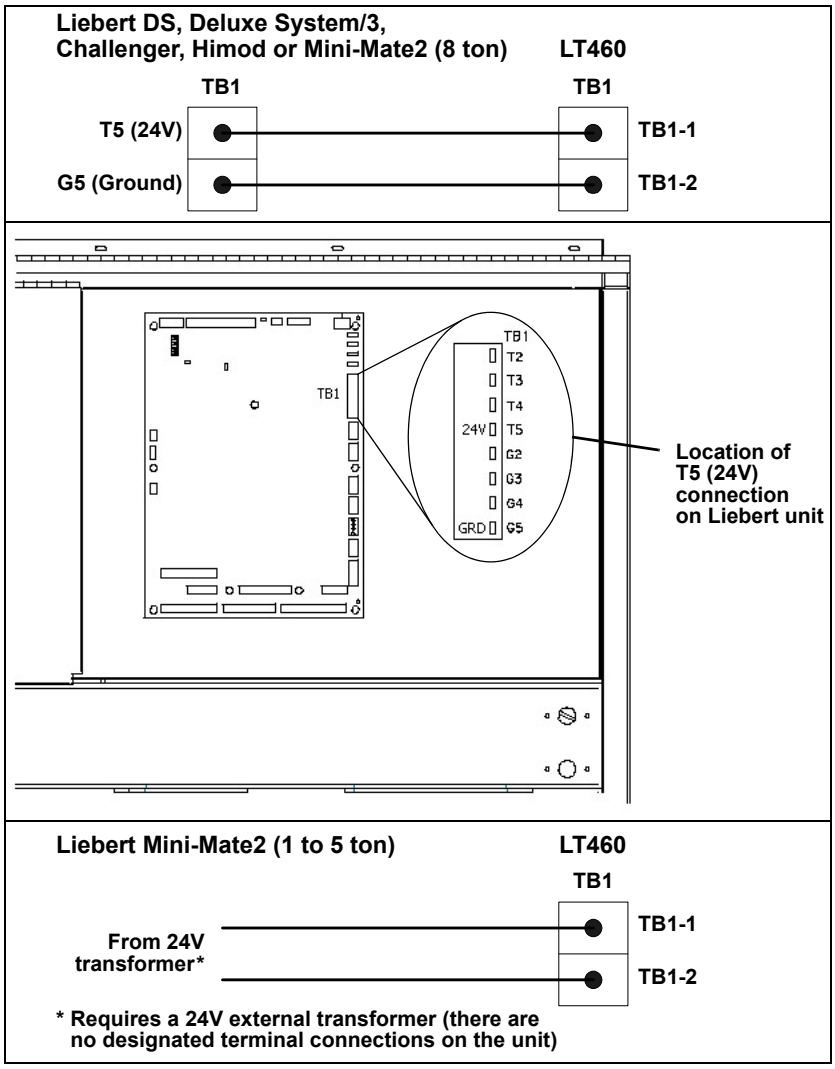
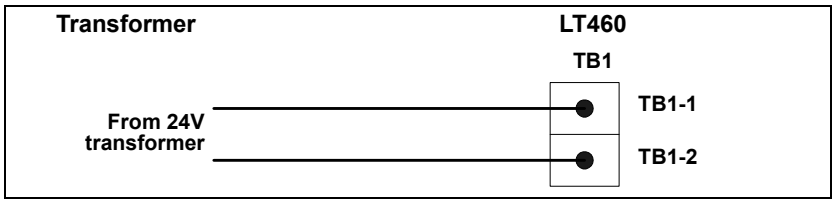


Figure 2 24V from transformer to LT460



Wiring to Auxiliary Alarm Panels

The LT460 has two Form-C dry contact alarm output contacts (TB2 & TB3). Each contact is rated for 24 VAC at 3 amp.

Figure 3 LT460 to Liebert environmental units

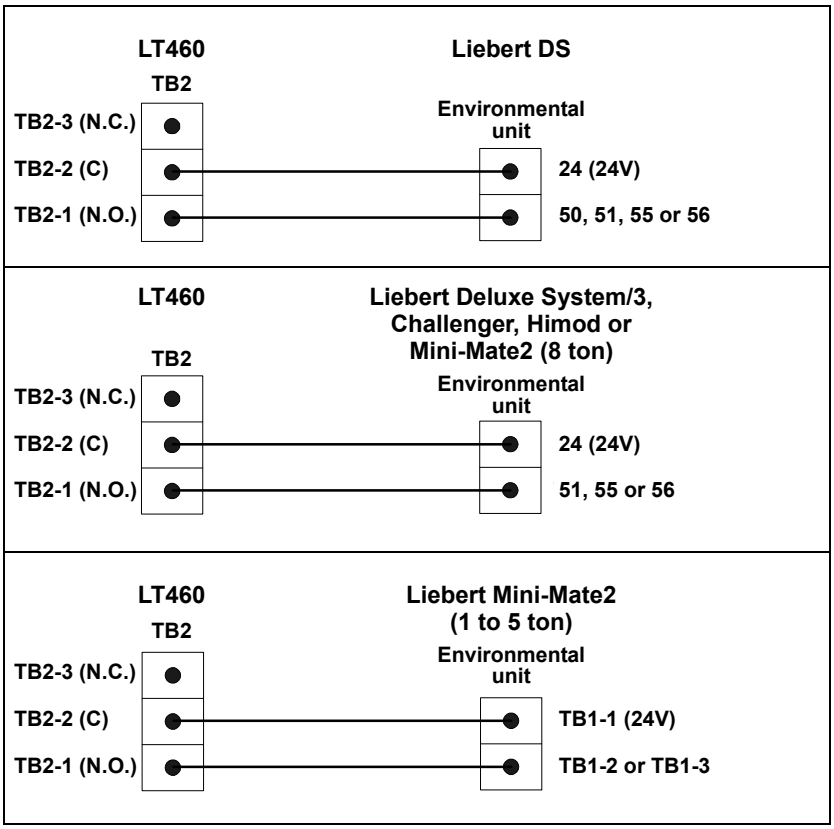
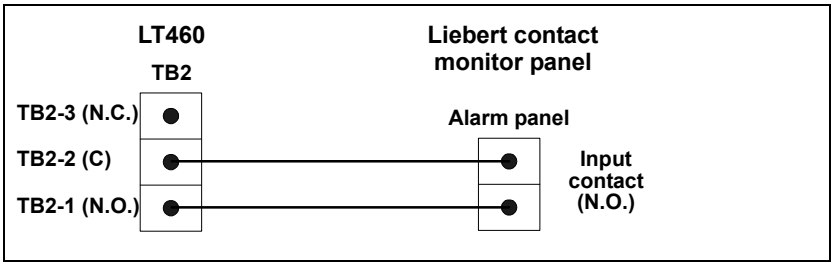


Figure 4 LT460 to Liebert contact monitor panel



Liebert Corporation
1050 Dearborn Drive
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Columbus, OH 43229
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Facsimile: 1-614-841-6022
www.liebert.com

SL-31052_REV0_06-07

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

TECHNICAL DATA

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Mirage® Standard and Quick Response Concealed Pendent Sprinkler VK462 and HP Sprinkler VK463 are thermosensitive glass-bulb spray sprinklers designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile cover assembly that provides up to ½" (12.7 mm) of vertical adjustment. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler.

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approval: Class 2015

NYC Approved: MEA 89-92-E, Volume 32

VdS Approved: Certificate G4080021

LPCB Approved: Ref. No. 096e/12

CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2032

Refer to Approval Chart 1 on page 54c and Design Criteria on page 54d for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria on page 54e for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Available since 2006.

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: Sprinkler VK463 is rated for use with water working pressures ranging from the minimum 7 psi (0.5 bar) up to 250 psi (17.2 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. Sprinkler VK462 is rated to a maximum 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 5.6 U.S. (80.6 metric†)

Glass-bulb fluid temperature rated to -65°F (-55°C)

Patents Pending

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

†Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:

Sprinkler Body: Brass UNS-C84400

Deflector: Copper UNS-C19500 for Sprinkler VK462
Phosphor Bronze UNS-C51000 for Sprinkler VK463

Deflector Pins: Stainless Steel Alloy

Bulb: Glass, nominal 3 mm diameter

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Button: Brass UNS-C36000

Screws: 18-8 Stainless Steel

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Yoke: Phosphor Bronze UNS-C51000

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

VIKING®

TECHNICAL DATA

MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Microfast® and MicrofastHP® Quick Response Upright and Conventional (Old Style) Sprinklers are small, thermosensitive, glass-bulb spray sprinklers available in several different finishes, temperature ratings, and K-Factors to meet design requirements. The special Polyester, Polytetrafluoroethylene (PTFE), and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM Global approves the ENT coating as corrosion resistant.** FM Global has no approval classification for PTFE and Polyester coatings as corrosion resistant.)

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Classes 2002 and 2020

NYC Approved: Calendar Number 219-76-SA and MEA 89-92-E, Volume 16

ABS Certified: Certificate 04-HS407984B-PDA

VdS Approved: Certificates G4060054, G4060056, G4880046, G4930039, and G4980020

LPC Approved: Ref. No. 096e/03, TE30401, and TE30872

CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001, 0832-CPD-2003, 0786-CPD-40131, 0786-CPD-40171, and 0786-CPD-40278

MED Certified: Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008

NOTE: Other International approval certificates are available upon request.

Refer to Approval Chart 1 and Design Criteria on pages 51c-d for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria on page 51e for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

Specifications:

Available since 1987.

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: Sprinklers VK315 and VK340 are rated for use with water working pressures ranging from the minimum 7 psi (0.5 bar) up to 250 psi (17 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. All other Part Nos. not mentioned above are rated to a maximum 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Testing: U.S.A. Patent No. 4,831,870

Thread size: Refer to the Approval Charts

Nominal K-Factor: Refer to the Approval Charts

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: Refer to the Approval Charts

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass for Sprinklers 12978, 06766B, 07060, and 12281. Brass UNS-C84400 for all other sprinklers.

Deflector: Brass UNS-C23000 or Copper UNS-C19500 for Sprinklers 12978, 06764B, and 12281. Copper UNS-C19500 for Sprinklers 06665B, 07060, and 14817. Brass UNS-C26000 for all other Sprinklers.

Bushing (for Sprinklers 06719B, 06717B, and 12286): Brass UNS-C36000

Bulb: Glass, nominal 3 mm diameter

SIEMENS

Technical Specification Sheet
Document No. 149-408
September 6, 2013

MD Model Power Meter

Description

Siemens Industry's MD Model Power Meter is a submetering device designed to provide real time, accurate electricity metering to enable proper control over energy costs. The meter can capture kWh/kW energy and demand data, as well as virtually all relevant energy parameters for diagnostics and monitoring on three-phase or single-phase circuit installations. The meter's flexibility, size, and ease-of-use make them ideal tools for gathering detailed consumption information in commercial, industrial, governmental, and retail environments.

The meter uses direct connections to each phase of the voltage and various interchangeable current transformer (CT) options such as split-core CTs or flexible Rogowski Coils (for large loads or large cables and bussbars) to monitor current on each phase. All of Siemens' current transformers are internally shunted for intrinsically safe operation on energized conductors.

The power meter makes over 50 total electrical measurements which are derived from the voltage and current inputs. Electrical load diagnostic parameters such as power factor (both Apparent and Displacement) and line frequency are captured in addition to energy and demand values.

The Siemens MD Model Power Meter requires no external power and the power supply can accommodate service voltages ranging from 80 to 600V (phase-to-phase). The simple installation is accomplished by connecting the color-coded voltage leads and clearly labeled CTs. A three-LED indicator display confirms proper CT-to-phase installation. The meter automatically adjusts for CT orientation—greatly reducing set-up time and all but eliminating installation errors.

Features

- Monitors voltage, current, power, energy, and many other electrical parameters on single and three-phase electrical systems.
- RS-485 serial connection communications interface.
- Uses either BACnet or Modbus protocol and features two digital pulse output ports.
- Mix-and-match Split-Core or Rogowski-style CTs.
- LED indicators ensure correct CT orientation during installation.
- Line-powered: 80 to 600V Phase-Phase Power Supply (Use on 120/240V, 480/277V, 580/355V, or 380/220V services. 50 or 60 Hz.
- Data updates occur every 0.5 seconds.
- UL and CE Mark.
- ANSI C12.20-2010 Class 0.2.

Features (Continued)

Siemens MD Model Power Meter uses interchangeable CT options such as split-core or flexible Rogowski-style CTs. The meter has embedded Rogowski Coil CT amplifier/integrator circuitry, so there is no need to provide external power to the CTs.

Communications interface to the meter is through an RS-485 serial connection using the industry standard BACnet or Modbus protocol. The meter is shipped as a BACnet device (default), but can be easily reconfigured into a Modbus device through simple hardware steps.

Siemens MD Model Power Meter can use either the BACnet Master Slave Token Passing (MS/TP) protocol or Modbus protocol for sending commands and retrieving data. The MD Power Meter is BACnet Testing Labs certified as a smart sensor (B-SS) device. Up to 127 meters may be connected to a single BACnet client for monitoring and recording power usage at multiple locations within a single site. Up to 247 meters may be connected to Modbus.

Applications

- Tenant submetering
- Data Center monitoring
- Commercial
- Retail
- Industrial

Specifications

Technical	Service types	Single Phase, Three Phase-Four Wire (WYE), Three Phase-Three Wire (Delta)
	Power	From L1 Phase to L2 Phase, 80 to 600Vac CAT III 50/60 Hz, 70 mA maximum. Non-user replaceable 0.5A internal fuse protection
	3 Voltage channels	80 to 346V AC Line-to-Neutral, 600V Line-to-Line, CAT III
	Current channels	0 to 5,000+ Amps, depending on CT
	Maximum current input	666 mVac (200% of current transducer rating)
	Measurement rating	True RMS using high-speed digital signal processing (DSP)
	Line frequency	50/60 Hz
	Waveform sampling	12 kHz voltage and current
	Channel sampling rate	500 milliseconds
	Parameter update rate	5 seconds
	Measurements	Volts, Amps, kW, kWh, kVAR, kVARh, kVA, kVAh, Apparent Power Factor (aPF), Displacement Power Factor (dPF). All Parameters for each phase and for system total.
	Accuracy	0.2% (<0.1% typical) ANSI, C12-20-2010 Class 0.2.
	Resolution	0.01 Amp, 0.1 Volt, 0.01 watt, 0.01 VAR, 0.01 VA, 0.01 Power Factor depending on scalar setting
	LED indicators	Bi-color LED (red and green): 1 LED to indicate communication, 3 LEDs for correct CT-to-phase installation. Two Digital Channel Indicators.
	Pulse output	Open Collector, 75 mA maximum current, 40V maximum open voltage

Communications	Direct	User selectable Modbus or BACnet Master Slave Token Passing protocol (MS/TP). BACnet Testing Labs certified smart sensor (B-SS) device.
	Maximum distance	1200 meters with Data Range of 100K bits/second or less
	Baud rate	9600 (Modbus default), 19200, 38400, 57600, 76800 (BACnet default), 115200
	Data bits	8
	Parity	None, Even, Odd
	Stop bit	1, 2
	Data formats	Modbus RTU or BACnet (MS/TP) protocol
Mechanical	Operating temperature	20°F to 140°F (-7°C to 60°C)
	Humidity	5% to 95% non-condensing
	Enclosure	ABS Plastic, 94-V0 flammability rating
	Weight	12.6 ounces (357 g) exclusive of CTs
	Dimensions	8.6" × 2.3" × 1.6" (21.8 cm × 5.8 cm × 4.0 cm)
	Communications port	One USB to RS-485 converter required
	Hard drive	50 MB minimum available
	Processor	Pentium Class 1 GHz or better recommended.
Safety	Certifications	UL Listed to UL Standard 61010-1
		cUL certified to CAN/CSA Standard C22.2 No. 61010-1
	CE Conformity	CE Low Voltage and EMC Directives

CURRENT TRANSFORMERS

FLEXIBLE CHOICE OF CURRENT TRANSFORMERS

All current transformers are internally shunted and, therefore, inherently safe compared to other commercially available CTs.
Choose from three types: **Split-Core**, **RōCoil™** and **Clamp-On** (not pictured).

AVAILABLE CURRENT TRANSFORMERS

	High Accuracy SHS-0005	**Small Split Core** SCS-0050, -0100	**Medium Split Core** SCM-0100, -0200, -0400, -0600	**Large Split Core** SCL-0600, 1000	**RōCoil™** R16, R24, R36
					
KEY SPECIFICATIONS					
WINDOW SIZE	1.0 cm (0.4")	1.9 cm (.75")	3.2 cm (1.25")	5.1 cm (2.0")	16": 13 cm (5") 24": 19 cm (7") 36": 26 cm (10")
OUTPUT SIGNAL	333 mV at rated current	333mV at rated current	333 mV at rated current	333 mV at rated current	131 mV/1000A @ 60 Hz 110mV/1000A @ 50 Hz
USEFUL CURRENT RANGE	0.05-7 Amps	5-65, 10-130 Amps	10-130, 20-260, 40-520, 60-780 Amps	60-780, 100-1200 Amps	PS3: 25-5000A PS18: 25-3500A
ELECTRICAL SPECIFICATIONS					
NOMINAL RATING	5 Amps	50, 100 Amps	100, 200, 400, 600 Amps	600, 1000 Amps	N/A
ACCURACY	+/- 1% at 0.5% to 140% of rated current	+/- 1% at 10% to 130% of rated current	+/- 1% at 10% to 130% of rated current	+/- 1% at 10% to 130% of rated current	+/- 1% reading
PHASE SHIFT	<1° at rated current	<2° at rated current	<2° at rated current	<2° at rated current	< 1° at 50/60 Hz
FREQUENCY RANGE	10 Hz to 10 KHz	50 Hz to 400 Hz	50 Hz to 400 Hz	50 Hz to 400 Hz	40 Hz to 5000 Hz
DIELECTRIC STRENGTH	5000V around the case 600V rated leads	5000V around the case 600V rated leads	5000V around the case 600V rated leads	5000V around the case 600V rated leads	7400 VAC around coil 1000 VAC rated leads
MECHANICAL SPECIFICATIONS					
DIMENSIONS	6.4 x 2.5 x 5.1 cm (2.5 x 1.0 x 2.0")	5.08 x 5.34 x 1.55 cm (2.0 x 2.1 x 0.6")	8.26 x 8.6 x 2.54 cm (3.3 x 3.4 x 1.0")	12.07 x 12.70 x 3.05 cm (4.8 x 5.0 x 1.2")	Length 16" (40 cm) Length 24" (60 cm) Length 36" (90 cm)
WEIGHT	136 g (4.8 oz)	136 g (4.8 oz)	340 g (12 oz)	748 g (26 oz)	16": 184 g (6 oz) 24": 216 g (7 oz) 36": 312 g (11 oz)
POLARITY	White lead is positive	White lead is positive	White lead is positive	White lead is positive	Brown lead is positive
OUTPUT LEAD	Leads 2.7 m (8 ft) twisted pair, 22 AWG	Leads 2.7 m (8 ft) twisted pair, 22 AWG	Leads 2.7 m (8 ft) twisted pair, 22 AWG	Leads 2.7 m (8 ft) twisted pair, 22 AWG	2 m (6 ft) shielded cable
OPERATING TEMPERATURE	-20° to 50 °C (-4° to 122 °F)	Maximum 105 °C (220 °F)	Maximum 105 °C (220 °F)	Maximum 105 °C (220 °F)	-10° to +80 °C (+14° to +176 °F)
STORAGE TEMPERATURE	Maximum 105 °C (220 °F)	Maximum 105 °C (220 °F)	Maximum 105 °C (220 °F)	Maximum 105 °C (220 °F)	Maximum 80 °C (176 °F)
CASE PROTECTION	Epoxy encapsulated housing or Plastic ABS/PVS	Epoxy encapsulated housing	Epoxy encapsulated housing	Epoxy encapsulated housing	Thermoplastic Rubber
SAFETY SPECIFICATIONS					
SAFETY REQUIREMENTS	Compliant with IEEE C57.13-1993 CE Mark	Compliant with IEEE C57.13-1993 CE Mark	Compliant with IEEE C57.13-1993 CE Mark	Compliant with IEEE C57.13-1993 CE Mark	CE Mark, Double Insulation, EN-61010 UL 94V0
WORKING VOLTAGE	Maximum 600 Vrms	Maximum 600 Vrms	Maximum 600 Vrms	Maximum 600 Vrms	Maximum 1000 Vrms CAT III

Transformers

Sentron Harmonic Mitigating Transformers (HM1 & HM2)

Selection

Description

The Sentron Harmonic Mitigating Transformers (HMTs) are designed to meet the needs of modern power distribution systems that contain a large percentage of non-linear equipment that produces harmonics. Some examples of this type of equipment are computers, printers, fax machines, scanners, copiers, uninterruptible power supplies, ballast and variable frequency drives (VFD). This type of equipment generates harmonic voltages and currents because they contain AC to DC power conversion rectifiers. Harmonic voltages and currents can cause a variety of problems ranging from poor power factor, voltage distortion, capacitor resonance and motor failures to overloaded transformers and conductors.

The Sentron HMTs are specially designed to operate under high non-linear load conditions and have the additional benefit of improving the overall power system reliability.

Application

One of the most effective ways to eliminate power system harmonics is to use a technique known as "phase shifting." In this method power system harmonics are eliminated by pairing together harmonics that have 180° relative angular displacement, which causes them to cancel one another out. This can be accomplished by a variety of means:

Single Output Harmonic Mitigating Transformer (0° or -30° primary-secondary angular displacement)

- The primary of this transformer has a delta connection and its secondary has a special double winding connection. Although there is only one secondary three phase output, the 3rd, 9th and 15th harmonic currents are prevented from circulating in the primary windings by canceling their magnetic fluxes at low impedance with the double winding secondary, reducing voltage distortions to the loads.
- When two transformers with this type of connection, 0° and -30° displacement, are used in parallel, the 3rd, 9th and 15th harmonic currents are canceled as previously described, and additionally the 5th and 7th harmonic currents are cancelled in the electrical supply common to both transformers due to their relative 30° phase shift.
- If a single harmonic mitigating transformer (0°) is used in an existing or new system utilizing standard delta-wye transformers (-30°), the 5th and 7th harmonic currents originating from the HMT transformer (0°) will attempt to cancel the 5th and 7th harmonic currents originating from the standard delta-wye transformer (-30°). This reduces the overall 5th and 7th harmonics present in the system, with the actual reduction dependent on the magnitudes of the secondary loads.

Double-Output Harmonic Mitigating Transformer (0° and -30° or -15° and -45° primary-secondary angular displacement)

- The primary of this transformer has a delta connection and its secondary has double-output, special double winding connections with 30° phase shift between outputs. This arrangement cancels the 3rd, 5th, 7th, 9th, and 15th harmonics at very low impedance on the secondary side. This greatly improves voltage distortion for the loads and the primary power factor. The advantage of this arrangement is that the reductions of harmonic currents are achieved with one transformer creating a 12 pulse load.
- If two of these transformers are used, with the primaries of each phase shifted 15° with respect to one another, then cancellation of harmonics up to the 19th are achievable creating a 24 pulse load.

Benefits

Elimination of undesirable harmonics by using the Siemens Sentron HMTs is an effective solution to the power quality problems encountered by today's power system professionals. By treating the harmonics at their source, using advanced technology, installation problems can be avoided and overall system reliability improved. The Sentron HMT product line provides many far reaching benefits such as lower operating cost, improved operating efficiency, reduced down-time due to outages caused by nuisance tripping, and increased equipment life due to low voltage distortions.

Design and Construction Features

The Sentron Harmonic Mitigating Transformers comply with all applicable ANSI/IEEE standards including C57.12.91, C57.96, C57.110, CSA # C22.2 No. 47 (CUL), UL506, UL1561 as well as NEMA ST-20. The design life is 25 years at 130 degree C rise, 30 years at 115C rise and 40 years for 80C rise models. Approvals and listings include UL, CSA. with CE approval available when requested. The Sentron HMTs have capability up to the load capability up to K-20, which is achieved by harmonic cancellations in the secondary and low flux density design for protection against heat in place of design enlargement protection only. Copper coil windings with full width copper foil electrostatic shield are standard and additional shield options are available for higher noise attenuation requirements. All HMTs have 130C rise with optional 115C and 80C winding rise designs available. All designs include vacuum impregnated polyester resin encapsulation of windings and NEMA 3R enclosures. A neutral sized at 200% of the ampacity of the secondary phase conductors for extra protection against triplens and unbalanced single phase loads. The Sentron HMT designs have TP1 energy efficient rating equal to that of a non K-Factor rated transformer. Siemens HMT designs have TP1 efficiency levels at 35% load @ ref temp. 75 degree C and also retain TP1 efficiency levels at 65% load @ reference temperature 85C. A ten-year pro-rated warranty with standard liability limitations applies to all Sentron HMTs.

SIEMENS

TYPICAL PERFORMANCE DATA

PART NUMBER: **3F3Y075FHM100**

RATING

Kva:	**75 (Dry Type)**
Voltage:	**480 Delta – 208Y/120**
Phases:	**3**
Cooling:	**ANN**
Frequency:	**60 Hz**
Insulation Class:	**220 C**
Temperature Rise:	**115 C**
Sound Level:	**50 dB**

TESTS

Ratio (volt meter method):……..per nameplate
Polarity (and phase relation):……....Dyl
No Load Loss (calculated):…….365 Watts
Load Loss (calculated):……...1281 Watts @ 75 C
Total Loss (calculated):……...1646 Watts @ 75 C
Impedance (calculated):……..3.10% @ 75 C
Regulation (calculated):…… .56% @ 1.0 pf (35% Load)
.90% @ 0.8 pf (35% Load)
1.63% @ 1.0 pf (100% Load)
2.58% @ 0.8 pf (100% Load)
Efficiency (calculated):……....97.71% @ 0.25 PU @ 75 C
98.09% @ 0.35 PU @ 75 C
98.26% @ 0.50 PU @ 75 C
98.18% @ 0.75 PU @ 75 C
97.95% @ 1.00 PU @ 75 C

SIEMENS

TYPICAL PERFORMANCE DATA

PART NUMBER: **3F3Y112FHM100**

RATING

Kva:	**112.5 (Dry Type)**
Voltage:	**480 Delta – 208Y/120**
Phases:	**3**
Cooling:	**ANN**
Frequency:	**60 Hz**
Insulation Class:	**220 C**
Temperature Rise:	**115 C**
Sound Level:	**50 dB**

TESTS

Ratio (volt meter method):……..per nameplate
Polarity (and phase relation):……....Dyl
No Load Loss (calculated):…….475 Watts
Load Loss (calculated):……...1905 Watts @ 75 C
Total Loss (calculated):……...2380 Watts @ 75 C
Impedance (calculated):……..3.4% @ 75 C
Regulation (calculated):…….0.63% @ 1.0 pf (35% Load)
1.118% @ 0.8 pf (35% Load)
1.83% @ 1.0 pf (100% Load)
3.18% @ 0.8 pf (100% Load)
Efficiency (calculated):……...97.91% @ 0.25 PU @ 75 C
98.20% @ 0.35 PU @ 75 C
98.29% @ 0.50 PU @ 75 C
98.13% @ 0.75 PU @ 75 C
97.84% @ 1.00 PU @ 75 C

SIEMENS

Selection and application guide

Panelboards

Type P1 Panelboards

P1 panelboards are pre-engineered to accept the most common modifications without increasing box height. The enclosure size is determined by the number of circuits as shown in the Main Lug Table P1-5 or the Main Circuit Breaker Table P1-3. All P1 main lug or main breaker panelboards have space built-in to accept either feed-thru lugs equal to the panel rating, one subfeed circuit breaker up to 250 amperes or a surge suppressor (TVSS) without increasing box height.

Note the following features, all found in the innovative P1 lighting panelboards:

- Symmetrical Interiors - No top or bottom! To change from top to bottom (or vice-versa), simply invert the interior. The deadfront labeling is always right-side up.
- First in the Industry Ratings of 125 through 400A main lug and main breaker. Field convertible from main lug to main breaker and vice versa – with no increase in enclosure height.
- Field adaptability of feed-thru lugs or subfeed circuit breaker without increasing enclosure size.
- Neutral system is field upgradeable to 200% capacity – another industry first.
- Three circuit sizes means only three box heights, regardless of main configuration through 250 amp and an additional three circuit version and boxes available at 400 amps.
- Suitable for use as service entrance given compliance with NEC.
- Bonding provisions are shipped with each panel.
- 240V and 480Y / 277V for versions utilize identical boxes and fronts.

Enclosure – Standard Type 1 enclosure is 20" wide x 5.75" deep. Box Height is determined only by the number of circuits, not by main lug or main circuit breaker. See chart P1-5 for box height.

Voltage – 480Y/277 Vac max.
250 Vdc max.

Amperage – 400 amp max.

Short Circuit Rating – 200 KAIC max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P1 panel is limited to 22 KAIC. Note that the main device may be mounted remote from the panel.

Bussing – The P1 panel meets the majority of the markets bussing requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of UL 67– the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P1 panel is temperature rated copper. The copper bus option for this panel is tin-plated.

Weight – Approximate
Total panelboard weight when filled with a normal quantity of breakers and accessories is about 3 lbs. (1 kg) per inch (54g per mm) of box height

Table P1-1 – Box Material Gauge

Width	Height (inches)	Gauge Steel
20”	32, 38, 44	#16
	56, 62, 68	

Table P1-2 – Trim Material Gauge

20”	32, 38, 44	#14
	56, 62, 68	

Selection and Application

3 Easy Steps for Selecting a Siemens P1 Panelboard

Step 1

Determine voltage, system, amperage and interrupting rating of branch devices, and modifications if any.

Example for standard lighting panelboard:

Amperage	250A
Voltage	208Y/120V
System	3Ø4W
Main	Main Lug
Branches	10K AIR, 42-20/1
Modifications	None
Feed Location	Top
Mounting	Surface

Step 2

Create a catalog number by following the Panelboard Catalog Numbering System on page 6. The BL branch breakers were selected from the branch breaker selection table on page 1-4.

1-P1C42ML250ATS
42-20/1 BL

Step 3

Select enclosure size by the number of circuits as shown in the panelboard dimensional chart on page 1-6.

1-P1C42ML250ATS
42-20 BL
Box size – 44” high

A unique feature of P1 panels is that they can accommodate either feed-thru lugs or one subfeed circuit breaker (up to 250A) without any addition to box height. For our example changing the branch circuits to 39-20/1 and 1-125/3, we have the following:

1-P1C42ML250ATS
39-20/1 BL
1-125/3 QJ2
Box size – 44” high

The QJ2 subfeed was selected from the table of subfeed breakers on page 1-5. The box height remains the same.

P2 Panelboards

Flexibility is the hallmark of the P2 panel. This panel offers a wide array of factory-assembled options to meet virtually any lighting panel application. The ability to mix breaker frames within the unit space up to 225 amps will also meet certain distribution panel requirements in a much smaller package. Bussing options for the P2 vary from a typical temperature rating of 750 A/Si aluminum, to 1000 A/Si copper. Standard bussing in the P2 panel is tin-plated. Silver-plated copper is offered as an option. Integrated time clocks, bus mounted contactors (as mains or sub mains), split bus, and subfeed lugs (up to 400 amps) are just a few of the options available in this unique panel.

As with our other lighting panelboards, the standard P2 panel set up includes 18, 30, 42 or 54 breakers. In specific applications, the panel can accept 66, 78 or 90 circuits. The 6" circuit increments allow the user to configure the smallest possible panel size. The P2 starts with 9" of unit space (18 circuits of 1 pole breakers). Breakers mounted in the unit space can be mixed and matched to meet customer requirements. The 1" pole devices (BL, BOD, NGB, ED) are mounted in 3" or 6" increments. Breaker frames above 125A are single mounted in a 6" space. An example of a minimum panel is as follows: (6) 20A, 1-pole, BL breakers (3" of unit space) and a 225A, 3-pole, QJ breaker (6" of unit space) equaling 9" of unit space can be configured in a P2 panel without any extra provisions or space required. FD 250 and JD 400A breakers are mounted outside the unit space.

Another unique feature of the P2 panel is that blank unit space can be added to allow for future expansion or modifications. All expansion or modifications must be in 3" increments. BL, BQD, NGB, and ED frame breakers have 3" or 6" pole kits, and can be mixed within unit space by these increments. Breakers of the same frame can cross from one mounting to another if contiguous. QJ frame breakers are mounted in 6" increments for two and three pole, single mounted units. Changes in the unit space length for BL, BQD, NGB or ED frame breakers require an addition deadfront, center strip kit. Check with sales or the factory for additional unit space kits.

Main Lug / Main Breaker
Enclosure – Standard Type 1 enclosure is 20" wide x 5.75" deep X. Box Height is determined by main device and unit space. See charts for box height.

Voltage – 600 Vac Max.
250 Vdc Max.

Amperage – 600 amp Max.

Short circuit rating – 200 KAIC Max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P2 panel is limited to 22 KAIC. Note that the main device may be mounted remote from the panel.

Bussing – The P2 panel has more options to meet market requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of UL 67 – the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P2 panel is: 750 A/Si aluminum, temperature rated copper, and 1000 A/Si copper. The copper bus option for this panel is tin-plated.

Weight – Approximate
Total panelboard weight when filled with a normal quantity of breakers and accessories is about 3 lbs. (1 kg) per inch (54g per mm) of box height.

Table P2-1 – Gauge Steel of Boxes Fronts, Surface and Flush

Dimensions in inches (mm)		Gauge Steel	
Width	Height	Box	Front
20" (508)	26 - 74 (660, 1880)	#16	#14

Selection and Application

Step 1
Determine configuration required.

Example:

Amperage	250A
Voltage	208Y/120V
System	3Ø4W
Main	Main Lug
Bus Material	ASI rated aluminum
Interrupt Rating	10 Ka
Branch Devices	(6) 20 amp, 1-pole (1) 225 amp, 3-pole
Feed Location	Top
Mounting	Surface

Step 2
Create a catalog number by following the Catalog Numbering System on page 6. Note that the number of circuits number (4th and 5th position) will be 18 for those panels with 6-18 circuits, 30 for those panels with 19-30 circuits, 42 for those panels 31 to 42 circuits and 54 for those panels 43 to 54 circuits. The most cost effective 20 amp 1-pole breaker for this application would be BL. However, a myriad of other breakers with options may be used in the P2 panel. The most cost effective 225 amp breaker for this application is the QJ2.

Check with sales or the factory for other options as we will be adding to our capabilities.

Based on the above
P2C18ML250ATS
(6) BL 20 amp 1-Pole
(1) QJ2 225 amp 3-pole

Step 3
Determine the enclosure size. The matrix on page 2-3 shows the enclosure sizes based on the amperage, main device and unit space required.

Type P3 Panelboards

The innovative P3 panelboard from Siemens is a smaller footprint distribution panel designed for applications that require more large-branch devices than typical lighting panels can support. This panel offers a wide array of factory-assembled options and has the ability to mix breaker frames in unit space up to 225 amps. Bussing options include standard, temperature-rated aluminum and temperature rated (750 ASI[1] and 1,000 AlSq") copper. All aluminum bussing in the P3 panel is tin-plated as a standard. Silver-plating is the default for copper bus with tin as an option. Integrated time clocks, bus mounted contactors as mains or sub-mains, split bus and sub-feed lugs (up to 400 amps) are just a few of the options available in this unique panel.

The panel configurations, defined by unit space, allow for given amperage, main device, and box height. The P3 panel starts with a 56" high box. Breakers in unit space can be mixed and matched to meet customer requirements. All 1"pole breakers (Bl, BOD, NGB, NEB, HEB and ED frames) are mounted in 3" or 6-pole increments. Breaker frames, rated 225 amps, are dual mounted in 6" increments in unit space. Also available are one or two 250 amp frame breakers or one 400 amp frame breaker, mounted as sub-feed devices outside the unit space.

Like other distribution panels, the P3 panel can include blank space for future expansion or modifications. Any expansions or modifications must be in 3"increments. BL, BQD, NGB, NEB, HEB, and ED frame breakers have 3" or 6-pole kits and can be mixed in unit space by these increments. Breakers of the same frame can cross from one mounting to another if contiguous. QJ frame breakers are mounted in 6" increments for two and three pole single and twin mounted units. Changes in the unit space length for Bl, BQD, NGB, NEB, HEB, and ED frame breakers require an additional deadfront center strip kit. Contact your Siemens representative for additional unit space kits.

Main Lug / Main Breaker
Enclosure – Standard Type 1 enclosure is 24" wide x 7.75" deep. X Box Height is determined by main device and unit space. See charts for box height.

Voltage – 600 Vac Max.
250 Vdc Max.

Amperage – 800 amp Max.

Short Circuit Rating – 200 KAIC Max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P3 panel is limited to 22 KAIC. Note that the main device may be mounted remote from the panel.

Bussing – The P3 panel has more options to meet market requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of UL 67 – the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P3 panel is: 750 A/si aluminum, temperature rated copper, and 1000 A/si copper. The copper bus option for this panel is tin-plated.

Weight – Approximate
Total panelboard weight when filled with a normal quantity of breakers and accessories is about 5 lbs. (1 kg) per inch (54g per mm) of box height.

Table P3-1 – Gauge Steel of Boxes Fronts, Surface & Flush

Dimensions in inches (mm)		Gauge Steel	
Width	**Height**	**Box**	**Front**
24" (610)	56 - 80 (1422, 2032)	#16	#14

[1] ASI = Amperes per square inch

Selection and Application

1) To specify a particular panelboard, first determine voltage, system, amperage and type main, amperage and type of branch devices, and modifications, if any. (Step 1)

2) List branch devices and modifications requiring space additions. List unit space requirements of each.

Note: Some units are twin mounted meaning two breakers occupy the same unit space.

Select appropriate enclosure height from selection chart on page 3-3, based on unit space requirements. (Step 2)

3) Select panelboard catalog number from appropriate table based upon voltage, system, amperage and unit space requirements. (Step 3)

Step #1

Amperage	400
Voltage	208Y/120
System	3 Phase, 4 wire
Main	Main Lug
Bus	Standard Aluminum
Branches	6-20A13, 2-225/3,
Modifications	None
Feed	Top
Mounting	Surface

Step #2

6-20A/3	3x3" = 6 poles = 9"
2-225/3 QJ2	6" = 6"
	15"

Enclosure is 56" from Table P3-2 (24" wide, 56" high, 7.75" deep).

Step #3

Panel - **P3C56ML400ATS**
Box - **24WD56**
Trim - **P3S56**

NOVA24 LED

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RECESSED ARCHITECTURAL LED 2X4

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LUMENWERX
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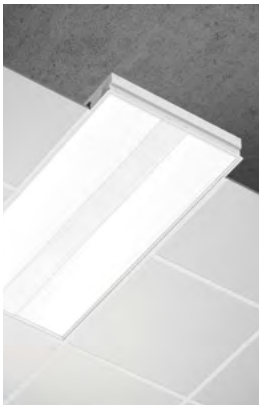

Grid ceiling


Drywall ceiling

DESCRIPTION

Nova is an efficient architectural LED troffer with a distinctive luminous shielding that distributes gentle brightness from the sides of its central optical element. Using advanced LED engines, Nova provides highly efficient illumination and offers comprehensive ceiling, electrical, and controls options in 2x2, 1x4, and 2x4 sizes. See separate spec sheets for other available mountings.

PROJECT: _____

TYPE: _____

NOTES: _____

up to 108 lm/w performance

IC RATED

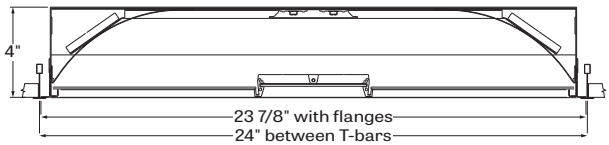
ORDER GUIDE

NOV	24	PMO	HLO	LED			
LUMINAIRE ID	**SIZE**	**CENTER OPTICS**	**SIDE OPTICS**	**LIGHT SOURCE**	**CRI**	**LUMEN PACKAGES**	**COLOR TEMP.**
NOV - nova	**24** - 2'x4'	**PMO** - Precision Micro-Prism Optic	**HLO** - High-Efficiency Lambertian Optic	**LED** - high performance LED	**80** - 80CRI **90** - 90CRI (consult factory)	**4000** - low output 4000lm **5500** - medium output 5500lm **6800** - high output 6800lm	**30** - 3000k **35** - 3500k **40** - 4000k

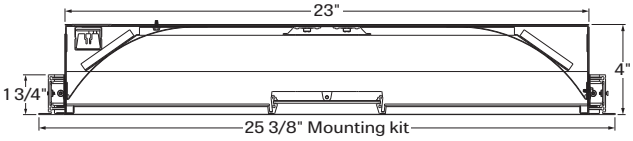
VOLTAGE	DRIVER	ELECTRICAL	MOUNTING	FINISH	CONTROLS	OPTIONS
120 - 120V **277** - 277V **UNV** - 120V-277V **347** - 347V	**D** - dimming 0-10V **DA** - Dali **LHL#** - Lutron Hi-Lume A **LEH** - Lutron EcoSystem H **LE5** - Lutron EcoSystem 5 **OTH** - other (consult factory)	**1** - 1 circuit **+EB** - emergency battery pack **+EM** - emergency light circuit **+NL** - night light circuit **+GTD** - generator transfer device **+M** - master (consult factory) **+S** - satellite (consult factory)	**TG9** - tegular 9/16" **TG15** - tegular 15/16" **TB9** - t-bar 9/16" **TB15** - t-bar 15/16" **ST** - screw slot t-bar **DF** - drywall kit	**W** - matte white **CF#** - custom finish specify RAL#	ONBOARD **OMS** - Motion Sensor & power pack **ODS** - Daylight Sensor & controller WIRELESS **EWC** - EnOcean Wireless Controller **LMC** - Lutron Motion Controller **LDC** - Daylight Controller	**FU** - fuse **FWC** - flexible whip cable (6' std) **AR** - air return (for grid only) **CP** - Chicago Plenum **CU** - custom

See page 2 for ordering code detailed information

CROSS SECTION



TB9 - t-bar 9/16



DF - drywall kit

OPTICS

HLO Side optics - High-Efficiency Lambertian

PMO Center optics - Precision Micro-Prism Optic

Intertek

NOVA24 LED

E.3.a
RECESSED ARCHITECTURAL LED 2X4

LUMENWERX
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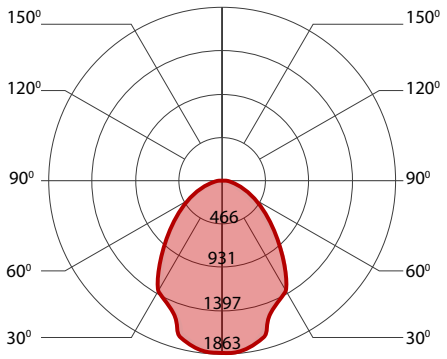
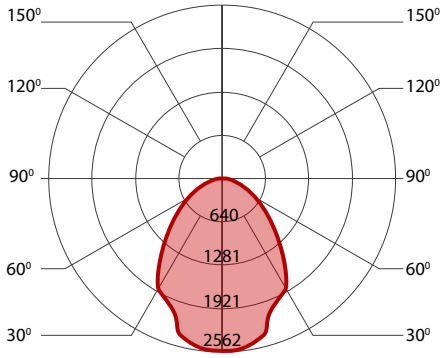
4000 LUMEN AT 80CRI - LOW OUTPUT



PERFORMANCE

LED output	Color Temp	Watts	Nominal Lumens	Efficacy LPW
low output	3000K	40	4000	101
low output	3500K	38	4000	104
low output	4000K	37	4000	108

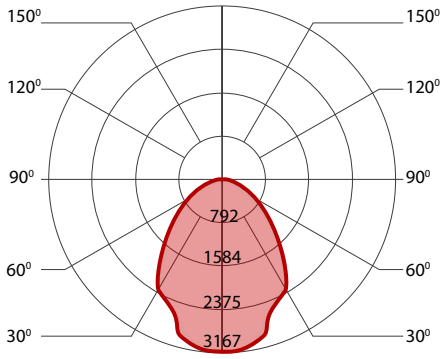
5500 LUMEN AT 80CRI - MEDIUM OUTPUT



PERFORMANCE

LED output	Color Temp	Watts	Nominal Lumens	Efficacy LPW
medium output	3000K	57	5500	97
medium output	3500K	55	5500	100
medium output	4000K	53	5500	103

6800 LUMEN AT 80CRI - HIGH OUTPUT



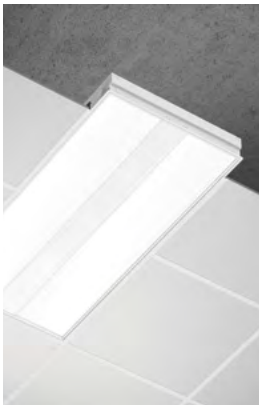
PERFORMANCE

LED output	Color Temp	Watts	Nominal Lumens	Efficacy LPW
high output	3000K	70	6800	97
high output	3500K	68	6800	100
high output	4000K	66	6800	103

NOVA24

E.3.b
RECESSED ARCHITECTURAL FLUORESCENT 2X4

LUMENWERX
WWW.LUMENWERX.COM


Grid ceiling


Drywall ceiling

DESCRIPTION

Nova is an efficient architectural troffer with a distinctive luminous shielding that distributes gentle brightness from the sides of its central optical element. Nova provides highly efficient illumination and offers comprehensive ceiling, electrical, and controls options in 2x2, 1x4, and 2x4 sizes. See separate spec sheets for LED and other available mountings.

PROJECT: _____

TYPE: _____

NOTES: _____

ORDER GUIDE

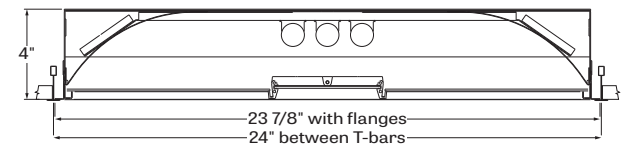
IC RATED

NOV	24	PMO	HLO				
LUMINAIRE ID	**SIZE**	**CENTER OPTICS**	**SIDE OPTICS**	**LIGHT SOURCE**	**NUMBER OF LAMPS**	**VOLTAGE**	**BALLAST**
NOV - nova	**24** - 2'x4'	**PMO** - Precision Micro-Prism Optic	**HLO** - High-Efficiency Lambertian Optic	**T5** - T5 lamp **T5HO** - T5HO lamp **T8** - T8 lamp	**1** - 1 lamp **2** - 2 lamps **3** - 3 lamps	**120** - 120V **277** - 277V **UNV** - 120V-277V **347** - 347V	**IN** - instant start **RS** - rapid start **D** - dimming 0-10V **ST** - step dimming **DA** - dali **LHL** - Lutron Hi-Lume A

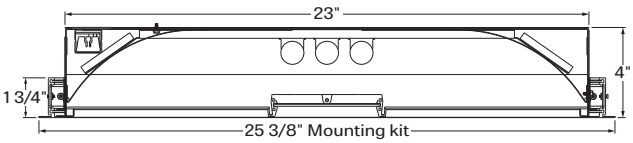
ELECTRICAL	MOUNTING	FINISH	CONTROLS	OPTIONS
1 - 1 circuit **2** - 2 circuits **+EB** - emergency battery pack **+EM** - emergency light circuit **+NL** - night light circuit **+GTD** - generator transfer device **+M** - master (consult factory) **+S** - satellite (consult factory)	**TG9** - tegular 9/16" **TG15** - tegular 15/16" **TB9** - t-bar 9/16" **TB15** - t-bar 15/16" **ST** - screw slot t-bar **DF** - drywall kit	**W** - matte white **CF#** - custom finish specify RAL#	ONBOARD **OMS** - Motion Sensor & power pack **ODS** - Daylight Sensor & controller WIRELESS **EWC** - EnOcean Wireless Controller **LMC** - Lutron Motion Controller **LDC** - Daylight Controller	**FU** - fuse **FWC** - flexible whip cable (6' std) **AR** - air return (for grid only) **CP** - Chicago Plenum **CU** - custom

See page 2 for ordering code detailed information

CROSS SECTION



TB9 - t-bar 9/16



DF - drywall kit

OPTICS

HLO Side optics - High-Efficiency Lambertian

PMO Center optics - Precision Micro-Prism Optic

Intertek

DUAL LITE

LE Series

Architectural Recessed-Mounted LED Edge-Lit Exit Sign

Catalog Number	
Comments	Type

FEATURES

Application
The LE Series provides bright, even letter illumination in an energy-saving LED edge-lit exit sign configuration. AC or Emergency operation with optional Spectron® self-test/self-diagnostic circuitry. Special Wording ("SW") option allows customizing the stencil field to convey important information.

Construction
Water-clear injection-molded acrylic EXIT plaque is available with clear, white or mirror backgrounds. High strength extruded aluminum trim available in six finishes. Exit face design in single or double face with red or green letters. Custom printed directional chevron arrows. Standard EXIT stencil with 6" letters and ¾" stroke; 8" letters for New York City requirements available as an option. Rough-in kit: galvanized steel, .036 (20 Ga.) housing, .060 (16 Ga.) mounting bars.

Installation
Universal rough-in box accommodates recessed installation of all models in wall, ceiling or end-mount applications. All mounting hardware is fully concealed.

Illumination
Exit face illumination is provided by energy saving, long life red or green LEDs. Exceeds UL 924 requirements for brightness and uniformity. 10 year LED life.

Compliances
UL 924 Listed
NFPA 70
NFPA 101

Warranty
AC models: 5 years full.
Emergency models: 5 years on unit and electronics. Battery: 1 year full, 9 year pro-rata.
Spectron-equipped models: 5 years on unit and electronics, lifetime warranty on battery.

Ceiling Mount

NEMA Premium

Wall Mount

End Mount

Special Wording Option

ACCESSORIES

URK Universal rough-in kit
URK2C Universal 2-circuit rough-in kit [1,2,3]

1 For use with AC models only.
2 Rough-in kit may not be ordered separately on models specified with -24K option.
c Must be ordered in conjunction with -2C option on exit sign

To Order Rough-In Kit Separately
To order rough-in kit only for field installation, add "XK" option suffix to exit model number and order "URK" or "URK2C" kit separately.

ORDERING GUIDE

LE [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] – [ ]

MODEL
LE

MOUNTING
C Ceiling mount
W Wall mount
E End mount

FACES
S Single
D Double*
* Not for use with wall mounted models.

LETTER COLOR
R Red
G Green

DIRECTIONAL ARROWS
X No arrows EXIT
R Right arrow* EXIT>
L Left arrow* <EXIT
D Double arrows <EXIT>
C L/R arrows** <EXIT/EXIT>
* Not for use with double face models. Use "C" L/R arrow designator
** Double face models only. Provides reversible right or left arrow indicator

TRIM/HOUSING FINISH
N Satin Aluminum
W White
C Chrome
B Black
S Satin brass
Z Dark Bronze

OPERATION
A AC only
E Emergency

SELF-DIAGNOSTIC
Blank None
I Spectron® self-testing/ self-diagnostic electronics*
* For use with emergency models only.

OPTIONS
SW See available special wording choices on page 3 [12,13,14]
2C 2 Circuit Operation [2,5]
FAP Fire alarm panel interface [3,5,6]
FM Flasher module [1,6]
AF Audble flasher module [1,6]
DC Remote DC operation [2,4,5]
24K 220-240VAC, 60Hz. operation [9]
XK Recessed mount exit sign less rough-in-kit [7,9]
W White plaque background
M Mirror-plaque background [8]
8L 8" letter plaque (red letters only) [10,11]

1 For use with emergency models only.
2 For use with AC models only.
3 Operates with 24-volt AC or DC fire alarm panels.
4 For emergency illumination of sign from remote 6-24VDC power sources.
5 -DC option may not be specified with -2C or -FAP options.
6 -AF, -FM and -FAP options may not be specified together.
7 Allows ordering of rough-in kit separately for recessed mount (LE) models. See "Accessories".
8 For use with single face models only. Standard on double face models.
9 Rough-in kit may not be ordered separately on models specified with -24K option.
10 LE exit models with 8" plaques registered under NY-BEC Calendar number 42135 for use in New York City.
11 Single face LE exit signs specified with the -8L option are supplied without backgrounds. Double face models specified with the -8L option are supplied with mirror backgrounds.
12 Specify special wording code from page 3 when ordering. Example: SW41
13 Special wording option not available with 8" letter plaque.
14 Some special wording signs not available with directional arrows.

HUBBELL
Hubbell Lighting, Inc.

ARCHITECTURAL LED EXIT SIGN

LE Series

Architectural Recessed-Mounted LED Edge-Lit Exit Sign

SPECIFICATIONS

Electronics

Available with AC, emergency and Spectron® self-test/self-diagnostic electronics option. Emergency and self-diagnostic models equipped with isolation transformer and fully automatic constant current solid state charger with sealed maintenance-free nickel-cadmium battery. All emergency models with 90-minute run-time. All components mounted inside housing. Includes test switch and AC-on indicator. Transient/surge protection, low voltage disconnect and AC lock-out features included. Battery re-charge within UL time standards. Includes pre-stripped AC input pigtail leads.

Power Consumption (120/277VAC)

	Single Face	Double Face
Red AC Only Models:	2.2 watts	3.4 watts
Green AC Only Models:	2.5 watts	4.0 watts
Red Emergency Models:	3.3 watts	4.5 watts
Green Emergency Models:	3.6 watts	5.0 watts

*Wattage figures include LED lamps, transformer and electronics power requirements.

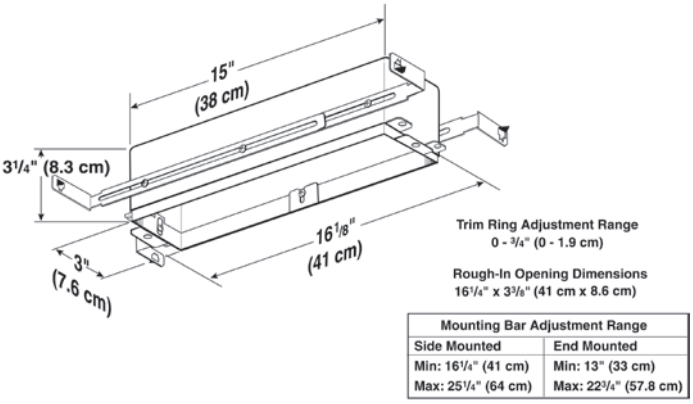
Power Factor, Average: .8 (lagging)

Battery Type: Maintenance-free sealed nickel cadmium battery

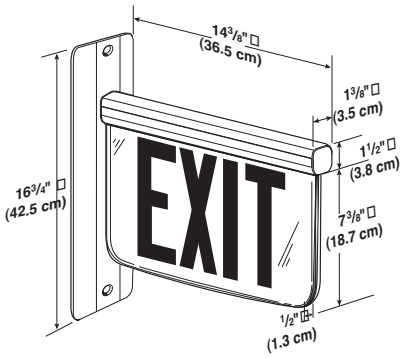
AC Input: 120/277VAC, 60 Hz. (all models)

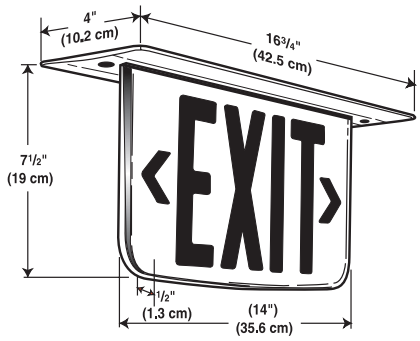
Operating Temperature Range: 20°C to 30°C (68°F to 86°F)

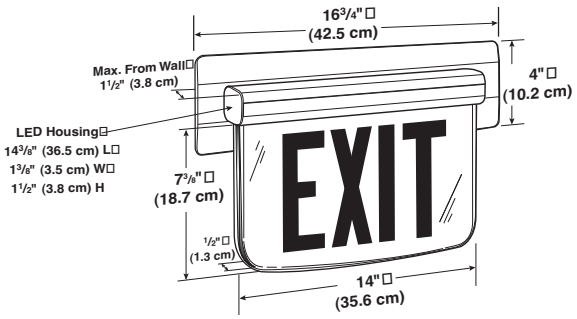
DIMENSIONS



Mounting Bar Adjustment Range	
Side Mounted	End Mounted
Min: 16¼" (41 cm)	Min: 13" (33 cm)
Max: 25¼" (64 cm)	Max: 22¾" (57.8 cm)





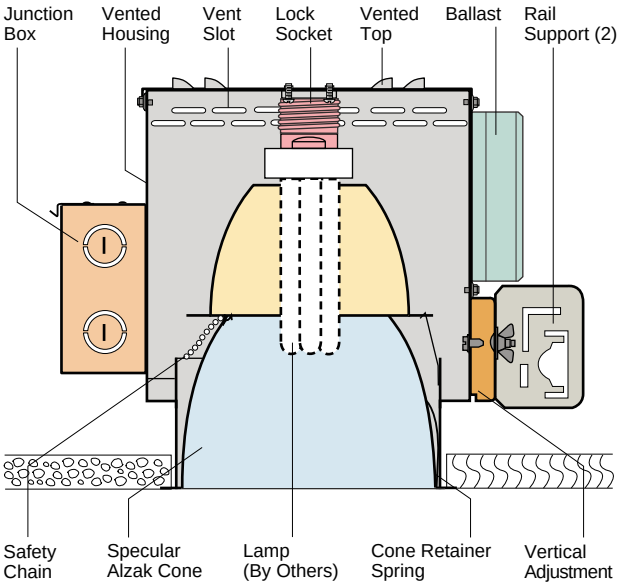


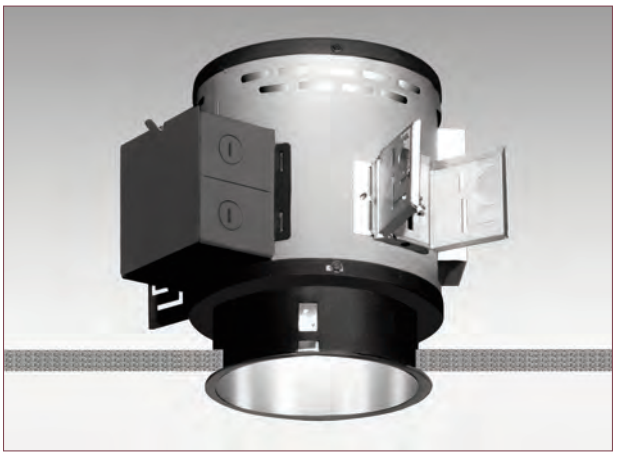
P926
P927

One 26W or 32W Triple Tube Lamp

One 42W Triple Tube Lamp

Medium Beam
5 7/8" Conoid Apertures





Optics and Applications

Distribution from a single vertically mounted triple tube lamp is for general lighting. Spacing to mounting height ratios range from .93 to 1.11 depending upon which lamp is mounted. Use in corridors, entries, work stations or open area lighting in low to medium height ceilings.

Design Features

The two reflector optical system is protected by a rigid steel housing which keeps the reflectors in proper relationship to each other. The twist and lock socket prevents the lamp from falling if it is not properly engaged. It is a dependable fail-safe mechanism to prevent injury and litigation. Maximum ceiling thickness is 2". Ballast and lamp service from below.

Finish

Specular clear Alzak cones are standard. Optional colors and Softglow® finishes are available. Housings and structural parts are painted optical matte black to suppress stray light leaks. Steel parts are phosphate conditioned for corrosion resistance before painting.

Ballasts

Fully electronic, microprocessor controlled with variable starting current for inrush protection to assure rated lamp life. Input voltage ranges from 120V through 277V. Power factor .98, starting temperature 0° F (-18° C), THD < 10%. Pre-heat start < 1.0 second. End of lamp life protection. Rated for > 50,000 starts.

General

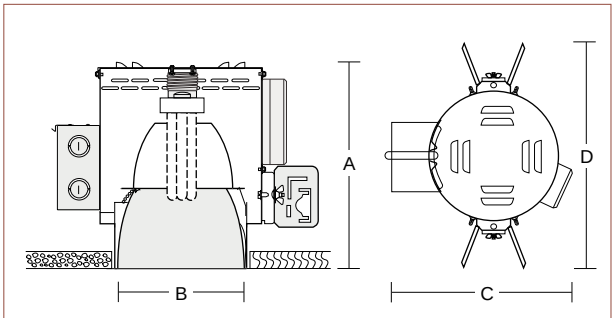
Fixtures are pre-wired, UL and C-UL listed for eight wire 75°C branch circuit wiring. Union made IBEW. Luminaire Efficiency Rating (LER) data is in the photometric directory located in Section Z.

Accessories

G	Gold cone.	R2	26" support rails.
H	Mocha cone.	R5	52" support rails.
P	Graphite cone.	WT	White trim flange.
T	Titanium cone.	WHT	White complete trim.
W	Wheat cone.	V347	347 volt ballast.
Y	Pewter cone.	F	Fuse.
Z	Bronze cone.		

S Softglow® finishes: add S before color letters. e.g. SW for Softglow® wheat cone, SC for Softglow® clear cone.
DM Dimming ballast. Specify watts and volts.
EM Emergency power includes integral charger light and test switch visible through aperture. Single lamp operation for 90 minutes. Specify volts.
WRL Wattage restriction label, specify wattage.

Dimensions and Lamps



Number	A Depth*	B Aperture	C Width	D Length	Lamps
P926	9 3/4" 248mm	5 7/8" 149mm	10 1/2" 267mm	13 1/4" 337mm	26W or 32W Triple Tube
P927	10 1/4" 260mm	5 7/8" 149mm	10 1/2" 267mm	13 1/4" 337mm	42W Triple Tube

*Recess depth increases to 12 1/2" with EM and DM accessories.

P51 P926 P927

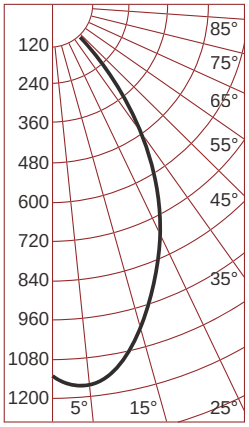
ROUND CFL DOWNLIGHT

Performance Datachart

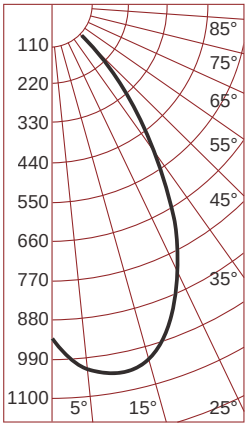
Single Unit Initial Footcandles, 30" Work Plane							Ceiling to Floor	Multiple Units Initial Footcandles, 30" Work Plane			
P926 One 32W Osram Triple Tube Read Top Data P927 One 42W Osram Triple Tube Read Bottom Data								Ceiling 80% Walls 50% Floor 20%			
Nadir	10°		20°		30°			Spacing is Maximum Over Work Plane			
FC	FC	Diam	FC	Diam	FC	Diam		Spacing	RCR 1	RCR 3	RCR 8
37 47	35 42	2' 2'	25 30	4' 4'	13 17	6' 6'	8'	5' 5'	49 66	42 56	30 39
27 33	25 30	2' 2'	18 21	5' 5'	10 12	8' 8'	9'	6' 6'	35 47	30 40	21 28
20 25	19 23	3' 3'	14 16	5' 5'	7 9	9' 9'	10'	7' 7'	26 36	23 30	16 21
13 16	12 14	3' 3'	8 10	7' 7'	4 6	11' 11'	12'	9' 9'	17 22	14 19	10 13
9 11	8 10	4' 4'	6 7	8' 8'	3 4	13' 13'	14'	11' 11'	11 15	10 13	7 9

See notes 4, 5 and 6.

Candlepower Distribution



P926 32W Triple Tube Osram
Eff. 50% S/M .95



P926 32W Triple Tube Philips
Eff. 50% S/M 1.11

Candelas

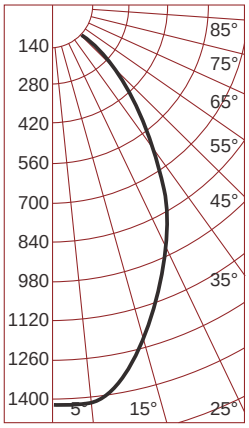
	O 32W	P 32W
°	2400*	2400*
0	1134	938
5	1152	1021
10	1109	1055
15	1023	1020
20	916	956
25	789	837
30	625	667
35	460	467
40	353	321
45	212	173
50	19	16
55	7	6
60	0	0
65	0	0
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

° Vertical Angles
* Initial Lamp Lumens

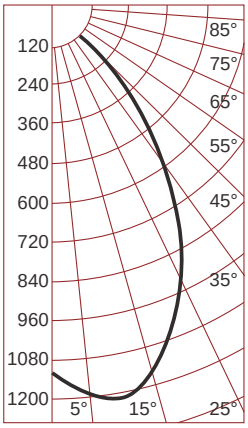
Coefficients of Utilization

Ceiling	80%				70%		50%		30%		0
Wall %	70	50	30	10	50	10	50	10	50	10	0
RCR	Zonal Cavity Method - Floor Reflectance 20%										
1	.57	.56	.55	.53	.55	.52	.53	.51	.51	.49	.47
2	.54	.52	.50	.48	.51	.47	.49	.46	.48	.45	.43
3	.51	.48	.45	.43	.47	.43	.46	.42	.45	.41	.40
4	.48	.44	.41	.39	.44	.39	.43	.38	.42	.38	.37
5	.46	.41	.38	.36	.41	.36	.40	.35	.39	.35	.34
6	.43	.38	.35	.33	.38	.33	.37	.33	.36	.32	.31
7	.41	.36	.33	.30	.35	.30	.35	.30	.34	.30	.29
8	.39	.34	.30	.28	.33	.28	.33	.28	.32	.28	.27
9	.37	.31	.28	.26	.31	.26	.31	.26	.30	.26	.25
10	.35	.30	.26	.24	.29	.24	.29	.24	.28	.24	.23

P926 One 32W Triple Tube Osram Sylvania
P926 One 32W Triple Tube Philips x .98



P927 42W Triple Tube Osram
Eff. 48% S/M .93



P927 42W Triple Tube Philips
Eff. 44% S/M 1.07

	O 42W	P 42W
°	3200*	3200*
0	1412	1104
5	1403	1188
10	1328	1211
15	1176	1154
20	1092	1063
25	958	919
30	789	747
35	611	583
40	487	441
45	355	253
50	75	23
55	10	8
60	0	0
65	0	0
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

° Vertical Angles
* Initial Lamp Lumens

Ceiling	80%				70%		50%		30%		0
Wall %	70	50	30	10	50	10	50	10	50	10	0
RCR	Zonal Cavity Method - Floor Reflectance 20%										
1	.56	.55	.54	.53	.54	.52	.52	.50	.50	.49	.46
2	.53	.51	.49	.47	.50	.47	.48	.46	.47	.45	.43
3	.51	.47	.45	.43	.47	.42	.45	.42	.44	.41	.39
4	.48	.44	.41	.39	.43	.38	.42	.38	.41	.38	.36
5	.45	.41	.38	.35	.40	.35	.39	.35	.39	.35	.34
6	.43	.38	.35	.33	.38	.32	.37	.32	.36	.32	.31
7	.40	.35	.32	.30	.35	.30	.34	.30	.34	.30	.29
8	.38	.33	.30	.28	.33	.28	.32	.28	.32	.27	.27
9	.36	.31	.28	.26	.31	.26	.30	.26	.30	.26	.25
10	.34	.29	.26	.24	.29	.24	.29	.24	.28	.24	.23

P927 One 42W Triple Tube Osram Sylvania
P927 One 42W Triple Tube Philips x .89

Brightness

Number	Lamps	85°	75°	65°	55°	45°
P926	32W Osram Sylvania Triple Tube	10	33	66	150	12837
	32W Philips Triple Tube	12	34	62	151	10756
P927	42W Osram Sylvania Triple Tube	14	45	91	208	17796
	42W Philips Triple Tube	15	45	82	203	14468

Data in footlamberts. Photometer readings, Maximum Brightness Method. See note 7.

Notes

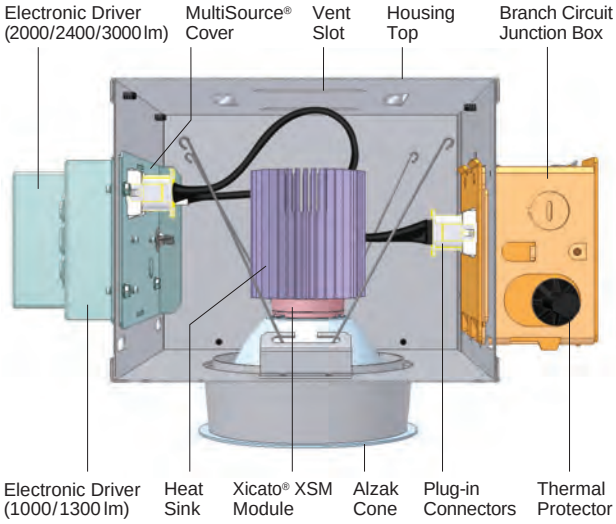
1 Data on all charts calculated with a clear specular cone finish.
2 Specular cone multipliers: Wheat x .84, Pewter x .79, Mocha x .78, Graphite x .75, Titanium x .75, Bronze x .72.
3 Softglow® cone multipliers: Wheat x .71, Mocha x .68, Pewter x .65, Graphite x .64, Titanium x .64, Bronze x .61.
4 Single unit Datachart pattern diameters are determined by the number of degrees from each side of nadir. Therefore a 20° diameter represents a total 40° pattern width at the work plane 30" above the floor. Footcandle values are at the edge of that diameter.
5 Datachart spacing is rounded off to the nearest foot.
6 Data by IES methods. Compact fluorescent data vary due to lamp differences, power input, burning position, ambient temperature and ballast characteristics. Apply a modification factor.
7 Brightness data from the Average Luminance Method are inaccurate for small aperture downlights. They are theoretical calculations derived for large surfaces such as troffers. For a complete discussion refer to section Z brochure Z1.

A1135

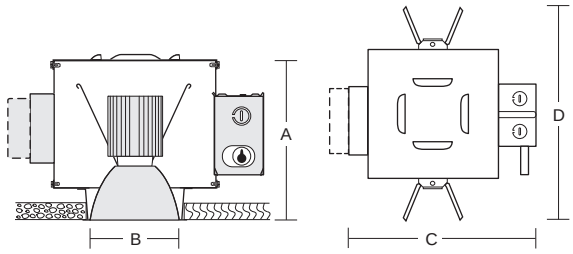
1000, 1300, 2000, 2400, 3000 lm

Medium Beam, 4 3/8" Conoid Downlight
Xicato® XSM Remote Phosphor
MultiSource® Technology

E.3.e
ROUND LED DOWNLIGHT



Dimensions and Sources



Number	A Depth	B Aperture	C Width*	D Length	LED Module
A1135	8 3/4" 222mm	4 3/8" 111mm	12 1/8" 308mm	13 3/4" 349mm	1000 lm or 1300 lm Xicato® XSM
	8 3/4" 222mm	4 3/8" 111mm	13 1/8" 333mm	13 3/4" 349mm	2000 lm, 2400 lm or 3000 lm Xicato® XSM

*For 1000 lm and 1300 lm with Lutron dimming use 13 1/8".

Energy and Ordering Information

Fixture	Module Lumens	System Lumens	System Watts	lm/W	Order Code Model	L	K	V
A1135	1000★	867	15	57.8	A1135	10	30	27
	1300★	1152	22	52.3	A1135	13	30	27
	2000★	1746	36	47.4	A1135	20	30	27
	2400	2372	32	74.1	A1135	24	30	27
	3000	2773	38	73.0	A1135	30	30	27

★ENERGY STAR® Certified.

Optics and Applications

Downlight optical systems have been engineered to produce high efficiencies and soft patterns while maintaining excellent brightness control. Beam pattern is 45˚.

Design Features - MultiSource® Capable

Fixture housings are designed with MultiSource® plug and play connectors allowing conversion to other sources. New lighting technologies will be incorporated as they become available assuring continuity. Proprietary passive heat sinks ensure proper temperatures are maintained. Service from below only. Maximum ceiling thickness is 1½".

Modules

Xicato® XSM remote phosphor modules use high efficiency blue LEDs that convert to white light when directed through a phosphor lens. Fixture lumen packages are 1000 lm, 1300 lm, 2000 lm, 2400 lm and 3000 lm. Standard 80 CRI. 2700K, 3000K, 3500K, 4000K available. Rated Life is 50,000 hours at 70% lumen output.

Dimming Driver

Dimming is standard 0-10V/10%. See accessories for additional dimming options. Specify Voltage: 120 or 277.

Finish

Specular Alzak cones are standard. SoftSheen™ is a new finish designed to mitigate the color over angle "yellow streak" associated with remote phosphor sources. Softglow® and colors available, see accessories. Steel parts are phosphate conditioned then painted matte black.

Warranty

5 year limited. See KV website for manufacturers details.

General

Fixture is pre-wired and thermally protected, UL and C-UL listed, for damp location and eight wire, 75°C, branch circuit wiring. All products are union made. Designed and manufactured in the USA.

Accessories

B	Black cone.	WT	White trim flange.
G	Gold cone.	WHT	White complete cone.
W	Wheat cone.	27	2700 Kelvin temp.
Y	Pewter cone.	30	3000 Kelvin temp.
R2	26" support rails.	35	3500 Kelvin temp.
R5	52" support rails.	40	4000 Kelvin temp.
FMR4	Flush mount, drywall.	F	Fuse.
	For wood and other materials contact factory.		
D1	Lutron to 1%, 3 wire control.		
DE	Lutron EcoSystem to 1%, digital 4 wire.		
REM	Remote Bodine EM. Includes battery pack, charger light, test switch and single lamp operation for 90 minutes. Ceiling access required.		
S	Softglow® add S to color, e.g. SC Softglow® clear.		
SS	SoftSheen™ add SS, e.g. SSW, SoftSheen™ Wheat.		
AS	Xicato® XSM Artist Series 95 CRI modules 1000 lm or 1300 lm. Contact factory for energy information.		

A1135

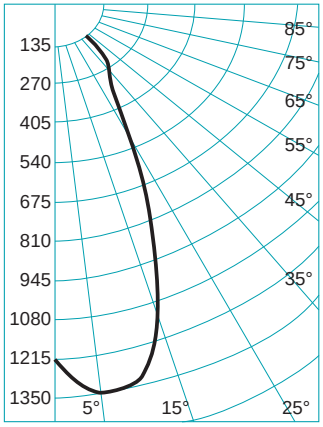
ROUND LED DOWNLIGHT

Performance Datachart

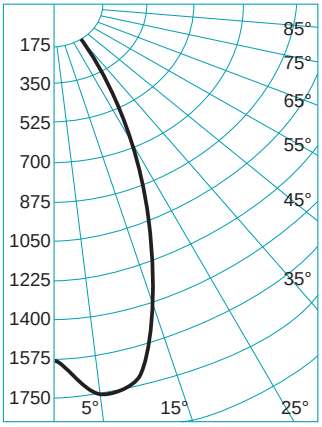
Single Unit Initial Footcandles, 30" Work Plane							Ceiling to Floor	Multiple Units Initial Footcandles, 30" Work Plane			
A1135 Xicato® XSM 1000 lm 3000K Read Top A1135 Xicato® XSM 1300 lm 3000K Read Middle A1135 Xicato® XSM 2000 lm 3000K Read Bottom								Ceiling 80% Walls 50% Floor 20%			
Nadir	20°		30°		40°			Spacing is Maximum Over Work Plane			
FC	FC	Diam	FC	Diam	FC	Diam		Spacing	RCR 1	RCR 3	RCR 8
39 52 72	24 30 50	4' 4' 4'	7 9 13	6' 6' 6'	3 3 5	9' 9' 9'	8'	4' 4' 4'	50 67 102	46 60 92	36 48 74
28 37 52	17 22 36	5' 5' 5'	5 7 9	8' 8' 8'	2 2 3	11' 11' 11'	9'	5' 5' 5'	36 48 73	33 43 66	26 35 53
21 28 39	13 16 27	5' 5' 5'	4 5 7	9' 9' 9'	1 2 2	13' 13' 13'	10'	6' 6' 6'	27 36 55	25 32 49	20 26 40
16 22 30	10 13 21	6' 6' 6'	3 4 5	10' 10' 10'	1 1 2	14' 14' 14'	11'	7' 7' 7'	21 28 43	19 25 39	15 20 31
13 18 24	8 10 17	7' 7' 7'	2 3 4	11' 11' 11'	1 1 2	16' 16' 16'	12'	8' 8' 8'	17 22 34	15 20 31	12 16 25

Single Unit Initial Footcandles, 30" Work Plane							Ceiling to Floor	Multiple Units Initial Footcandles, 30" Work Plane			
A1135 Xicato® XSM 2400 lm 3000K Read Top A1135 Xicato® XSM 3000 lm 3000K Read Bottom								Ceiling 80% Walls 50% Floor 20%			
Nadir	20°		30°		40°			Spacing is Maximum Over Work Plane			
FC	FC	Diam	FC	Diam	FC	Diam		Spacing	RCR 1	RCR 3	RCR 8
85 102	47 55	5' 5'	13 15	8' 8'	5 5	11' 11'	9'	5' 5'	102 126	90 111	68 84
64 77	35 41	5' 5'	10 11	9' 9'	4 4	13' 13'	10'	6' 6'	77 95	68 84	51 63
50 60	27 32	6' 6'	8 9	10' 10'	3 3	14' 14'	11'	7' 6'	60 74	53 65	40 49
40 48	22 26	7' 7'	6 7	11' 11'	2 3	16' 16'	12'	7' 7'	48 59	42 52	32 39
27 33	15 17	8' 8'	4 5	13' 13'	2 2	19' 19'	14'	9' 9'	33 40	29 36	22 27

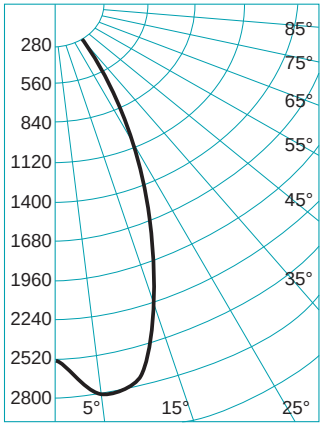
Candlepower Distribution



A1135 Xicato® XSM 1000 lm 3000K
Luminous efficacy 57.8 S/M .8



A1135 Xicato® XSM 1300 lm 3000K
Luminous efficacy 52.3 S/M .8

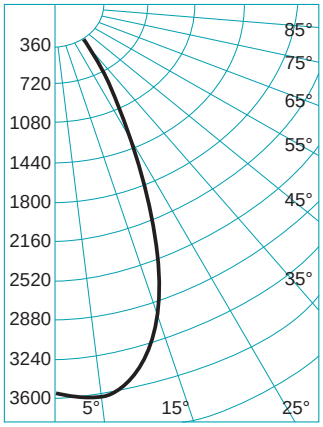


A1135 Xicato® XSM 2400 lm 3000K
Luminous efficacy 47.4 S/M .8

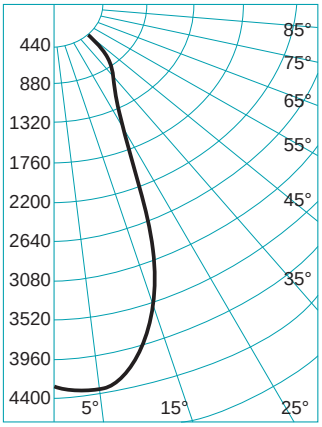
Candelas

	15W	22W	36W
o	867*	1152*	1746*
0	1175	1584	2183
5	1359	1753	2660
10	1338	1721	2768
15	1128	1423	2422
20	868	1098	1830
25	452	662	900
30	309	442	593
35	278	384	546
40	171	232	303
45	19	28	22
50	2	4	2
55	2	2	1
60	1	1	1
65	0	0	0
70	0	0	0
75	0	0	0
80	0	0	0
85	0	0	0
90	0	0	0

o Vertical Angles
* Luminaire Lumens



A1135 Xicato® XSM 2400 lm 3000K
Luminous efficacy 74.1 S/M .78



A1135 Xicato® XSM 3000 lm 3000K
Luminous efficacy 72.3 S/M .75

	32W	38W
o	2372*	2750*
0	3585	4318
5	3620	4367
10	3410	4100
15	3015	3586
20	2375	2780
25	1289	1487
30	835	990
35	716	848
40	475	504
45	66	47
50	11	12
55	9	10
60	7	8
65	6	7
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

o Vertical Angles
* Luminaire Lumens

Notes

1 Photometric Reports:
A1135 (1000 lm) LTL Report No. 266320,
(1300 lm) LTL Report No. 260321,
(2000 lm) LTL Report No. 64145,
(2400 lm) KV Report No. 41714-B,
(3000 lm) KV Report No. 30414-A.

2 Datachart degree headings show one side of nadir. Diameter data includes both sides. Therefore the 10° column shows a 20° pattern diameter at the work plane. Footcandle values are at the diameter edge.

3 Specular colored cone multipliers, contact factory.

4 SoftSheen™ cone multiplier: Clear x .93.
Softglow® cone multiplier: Clear x .87.
For colored cone multipliers, contact factory.

5 The luminous efficacy (lm/W) refers to the total measured luminous flux (lumens) of the fixture divided by the total measured electrical input power (watts) of the complete fixture.

NFS2-3030

Intelligent Addressable Fire Alarm System

NOTIFIER® by Honeywell

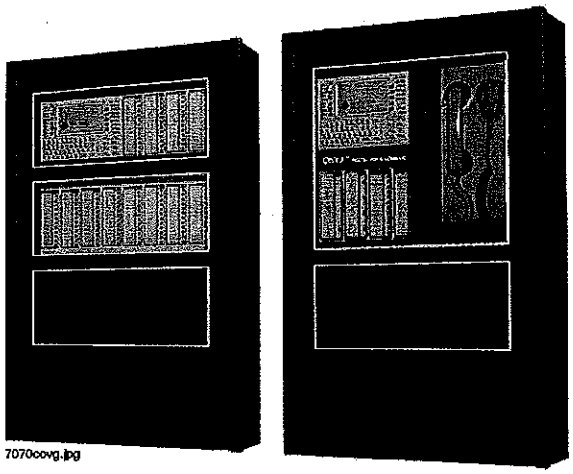
Intelligent Fire Alarm Control Panels

General

The NFS2-3030 is an intelligent Fire Alarm Control Panel (FACP) designed for medium- to large-scale facilities. Fire emergency detection and evacuation are extremely critical to life safety, and the NFS2-3030 is ideally suited for these applications. The NFS2-3030 is part of the ONYX® Series of products from NOTIFIER. The NFS2-3030 is ideal for virtually any application because it features a modular design that is configured per project requirements. With one to ten Signaling Line Circuits (SLCs), the NFS2-3030 supports up to 3,180 intelligent addressable devices.

Information is critical to fire evacuation personnel, and the NFS2-3030's large 640-character Liquid Crystal Display (LCD) presents vital information to operators concerning a fire situation, fire progression, and evacuation details.

A host of other options are available, including single- or multi-channel voice; firefighter's telephone; LED, LCD, or PC-based graphic annunciators; networking; advanced detection products for challenging environments, and many additional options.



**NFS2-3030 (left)
and NFS2-3030 with DVC audio option (right)**

Features

- Certified for seismic applications when used with the appropriate seismic mounting kit.
- Approved for Marine applications when a marine-listed version is used with marine-listed compatible equipment *(see DN-60688)*.
- One to ten isolated intelligent Signaling Line Circuits (SLC) Style 4, 6 or 7.
- Up to 159 detectors and 159 modules per SLC, 318 devices per loop/3,180 per FACP or network node. Detectors can be any mix of ion, photo, laser photo, thermal, or multi-sensor detectors; modules can be addressable pull stations, normally open contact devices, two-wire smoke detectors, notification, or relay modules.
- Large 640-character LCD backlit display (16 lines x 40 characters) or display-less (a node on a network).
- Network options:
  - High-speed network for up to 200 nodes (NFS2-3030, NFS2-640, NFS-320(C), NFS-320SYS, NCA-2, DVC-EM, ONYXWorks, NFS-3030, NFS-640, and NCA).
  - Standard network for up to 103 nodes (NFS2-3030, NFS2-640, NFS-320(C), NFS-320SYS, NCA-2, DVC-EM, ONYXWorks, NCS, NFS-3030, NFS-640, NCA, AFP-200, AFP-300/400, AFP-1010, and AM2020). Up to 54 nodes when DVC-EM is used in network paging.
- Built-in Alarm, Trouble, Security, and Supervisory relays.
- VeriFire® Tools online/offline program option.
- With built-in Degraded Mode operation, the system is capable of general alarm if a fire alarm condition is present even if the central processing unit (CPU) fails.
- Weekly Occupancy Schedules allow changing sensitivity by time of day and day of week.
- EIA-485 annunciators, including custom graphics.
- History file with 4000-event capacity in nonvolatile memory, plus separate 1000-event alarm-only file.
- Advanced history filters allow sorting by event, time, date, or address.
- Alarm Verification selection per point, with automatic counter.
- Autoprogramming and Walk Test reports.
- Multiple central station communication options:
  - Standard UDACT
  - Internet
  - Internet/GSM
- Positive Alarm Sequence (PAS) Presignal.
- Silence Inhibit and Auto Silence timer options.
- Field-programmable on panel or on PC, with VeriFire Tools program, also check, compare.
- Non-alarm points for lower priority functions.
- Remote ACK/Signal Silence/System Reset/Drill via monitor modules.
- Up to 1000 powerful Boolean logic equations.
- Supports SCS Series smoke control system in both HVAC and FSCS modes.
- FM6320 approved Gas Detection System with FMM-4-20 module and any FM listed gas detector.
- EIA-232 printer port.
- EIA-485 annunciator port.

640-Character Display Features

- Backlit, 640-character display.
- Program keypad: full QWERTY keypad.
- Up to nine users, each with a password and selectable access levels.
- **11 LED indicators:** Power; Fire Alarm; Pre-Alarm; Security; Supervisory; System Trouble; Other Event; Signals Silenced; Point Disabled; CPU Failure; Controls Active.

FAPT-851(A)

Acclimate® Plus™ Multi-Sensor Low-Profile Intelligent Detector

NOTIFIER® by Honeywell

Intelligent/Addressable Devices

General

The Notifier FAPT-851(A) Acclimate® Plus™ detector is an intelligent, addressable, multi-sensing, low-profile detector designed for use with Notifier Notifier Onyx and CLIP series Fire Alarm Control Panels (FACPs).

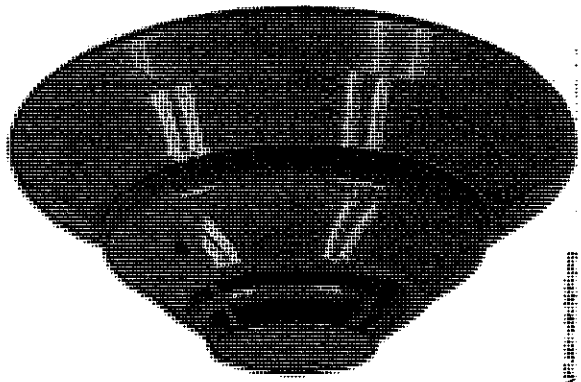
The Acclimate Plus detector uses a combination of photoelectric and thermal sensing technologies to increase immunity to false alarms. Unlike traditional intelligent detectors, the Acclimate Plus detector has a microprocessor in the detector head that processes alarm data. As a result, the Acclimate Plus detector adjusts its sensitivity automatically, without operator intervention or control panel programming.

Areas where the Acclimate Plus detector is especially useful include office complexes, schools, college campuses, manufacturing and industrial facilities, and anywhere else the use of a particular area may change. The Acclimate Plus detector automatically adjusts its sensitivity to the environment.

FlashScan® (U.S. Patent 5,539,389) is a communication protocol developed to greatly enhance the speed of communication between analog intelligent devices and compatible systems. Intelligent devices communicate in a grouped fashion. If one of the devices within the group has new information, the panel's CPU stops the group poll and concentrates on single points. The net effect is response speed greater than five times that of earlier designs.

Features

- Automatically adjusts sensitivity levels without operator intervention or programming. Sensitivity increases with heat.
- Microprocessor-based, combination photo and thermal technology.
- Compatible with all Notifier Onyx and CLIP series Fire Alarm Control Panels (FACPs).
- Addressable-analog communication.
- Sleek, low-profile design.
- Two-wire SLC connection.
- Rotary, decimal addressing (1-99 on CLIP systems, 1-159 on FlashScan systems).
- Addresses can be viewed and changed without electronic programmers.
- Dual bi-color LED design provides 360° viewing angle.
- LEDs lock red when in alarm. In FlashScan, LEDs flash green in standby for normal condition.
- Built-in tamper-resistant feature.
- Constructed of off-white fire-resistant plastic, designed to commercial standards, and offers an attractive appearance.
- SEMS screws for wiring of the separate base.
- Several base options, including relay, isolator, and sounder.
- Built-in functional test switch activated by external magnet.
- Listed to UL 268.
- Capable of heat-only alarm mode, enabled by a special command from the panel. Smoke alarms are ignored.
- Low-temperature signal at 45°F +/– 10°F (7.22°C +/– 5.54°C).



FAPT-851(A) in B210LP(A) Base

Specifications

Sensitivity: *auto-adjusting levels*: 1 to 2%/ft. and 2 to 4%/ft. with classic CLIP systems; 1 to 2, 2 to 3, and 3 to 4%/ft. with systems; *fixed-sensitivity levels:* 1, 2, and 4%/ft. with classic CLIP systems; 0.5, 1, 2, 3, and 4%/ft. with FlashScan systems.

Size: 2.0" (5.3 cm) high; base determines diameter.

- **B210LP(A):** 6.1" (15.5 cm) diameter.
- **B501(A):** 4.1" (10.4 cm) diameter.
- **B200S(A):** 6.875" (17.46 cm) diameter.
- **B200SR(A):** 6.875" (17.46 cm) diameter.
- **B224RB(A):** 6.2" (15.748 cm) diameter.

Shipping weight: 5.2 oz. (147 g).

Operating temperature: 0°C to 38°C (32°F to 100°F).

UL-Listed velocity range: 0 – 4000 ft./min. (1219.2 m/min.), suitable for installation in ducts.

Relative humidity: 10% – 93% noncondensing.

Thermal sensing rating: fixed-temperature setpoint 135°F (57°C).

ELECTRICAL SPECIFICATIONS

Voltage range: 15 – 32 volts DC peak.

Standby current (max. avg.): 300 µA.

Loop resistance: 50 ohms maximum; varies according to control panel used. Refer to panel installation manuals.

LED current (max.): 6.5 mA @ 24 VDC ("ON").

Installation

The FAPT-851(A) plug-in detector uses a separate base to simplify installation, service, and maintenance. A special tool allows maintenance personnel to plug-in and remove detectors without using a ladder. Suitable mounting base boxes include:

DNR(A)/DNRW InnovairFlex

Intelligent Non-Relay Photoelectric Duct Smoke Detector

NOTIFIER® by Honeywell

Intelligent Devices

General

The Notifier InnovairFlex® DNR(A) intelligent non-relay photoelectric duct smoke detector and DNRW watertight non-relay photoelectric duct smoke detector feature a pivoting housing that fits both square and rectangular footprints capable of mounting to a round or rectangular duct.

DNRW duct smoke detector, with its NEMA-4 rating, is listed as a watertight, UV resistant enclosure providing protection against falling dirt, rain, and windblown dust, splashing and hose directed water, allowing operators to use the detector in the most extreme environments.

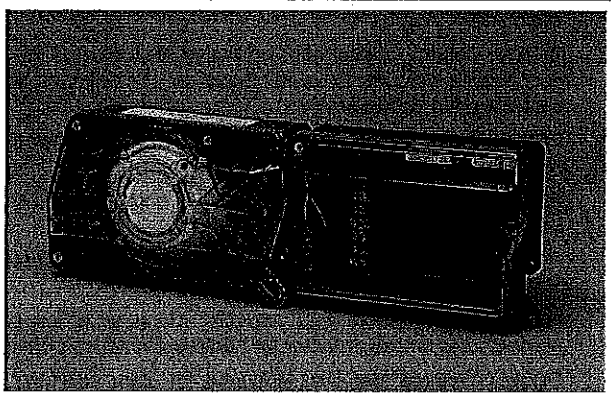
These units sense smoke in the most challenging conditions, oparating in airflow speeds of 100 to 4,000 feet per minute (0.5 to 20.32 m/s), temperatures of -4°F to 158°F (-20°C to 70°C), and a humidity range of 0 to 95 percent (non-condensing.)

An improved cover design isolates the sensor head, which allows for ease of maintenance. A cover tamper feature indicates a trouble signal for a removed or improperly installed sensor cover. The Notifier InnovairFlex housing provides a 3/4-inch conduit knockout and ample space to facilitate easy wiring and mounting of a relay module.

The Notifier InnovairFlex duct smoke detector can be customized to meet local codes and specifications without additional wiring. The new InnovairFlex product line is compatible with all previous Innovair models, including remote test accessories.

Features

- Photoelectric, integrated low-flow technology.
- Air velocity rating from 100 ft/min to 4,000 ft/min (0.5 m/s to 20.32 m/s).
- Versatile mounting options: square or rectangular configuration.
- Broad ranges for operating temperature (-4°F to 158°F, -20°C to 70°C) and humidity (0% to 95% non-condensing).
- Patented sampling tube installs from front or back of the detector with no tools required.
- Cover tamper signal.
- Increased wiring space with a newly added 3/4" conduit knockout.
- Available space within housing to accommodate mounting of a relay module.
- Easily accessible code wheels on sensor head (sold separately).
- Clear cover for convenient visual inspection.
- Remote testing capability.
- Requires com line power only.
- Accommodates the installation of an addressable relay module, sold separately, (FRM-1 or NC-100R) for applications requiring a Form-C relay.



Specifications

Size: (Rectangle) 14.38 in (37 cm) Length; 5 in (12.7 cm) Width, 2.5 in (6.6 cm) Depth.

Size: (Square) 7.75 in (19.7 cm) Length; 9 in (22.9 cm) Width; 2.5 in (6.35 cm) Depth.

Weight: 1.6 lb (0.73 kg).

Operating Temperature Range: -4°F to 158°F (-20°C to 70°C).

Storage Temperature Range: -22°F to 158°F (-30°C to 70°C).

Operating Humidity Range: 0% to 95% relative humidity (non-condensing).

Air Duct Velocity: 100 to 4,000 ft/min (0.5 to 20.32 m/s).

Accessories

Notifier provides system flexibility with a variety of accessories, including two remote test stations and different means of visible and audible system annunciation. As with our duct smoke detectors, all duct smoke detectors accessories are UL listed.

DNR(W)s with a date code of 0013 or higher do not require external 24VDC for remote test applications when used with a remote-test-capable detector.

ACCESSORY CURRENT LOADS AT 24 VDC

Device	Standby	Alarm
RA100Z	0mA	12 mA Max
RTS151/ RTS151KEY	0mA	12mA Max

Agency Listings and Approvals

Consult product manual for lists of compatible UL-Listed devices. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL:** S911, S3705.
- **ULC:** S635.

NOTIFIER® FIRE SYSTEMS

September 28, 2000 DN-1271 • I-307

302 Series
Rate-Anticipation Heat Detectors

Section: Conventional Initiating Devices

GENERAL

The **Thermotech 302 Series** rate-anticipation heat detectors operate within a controlled range of two to three degrees of their set points, regardless of the speed or rate of temperature rise. These detectors are available in either 135°F (57.2°C) or 194°F (90°C) ratings.

The 302 Series are normally-open devices designed especially for fire detection and alarm systems.

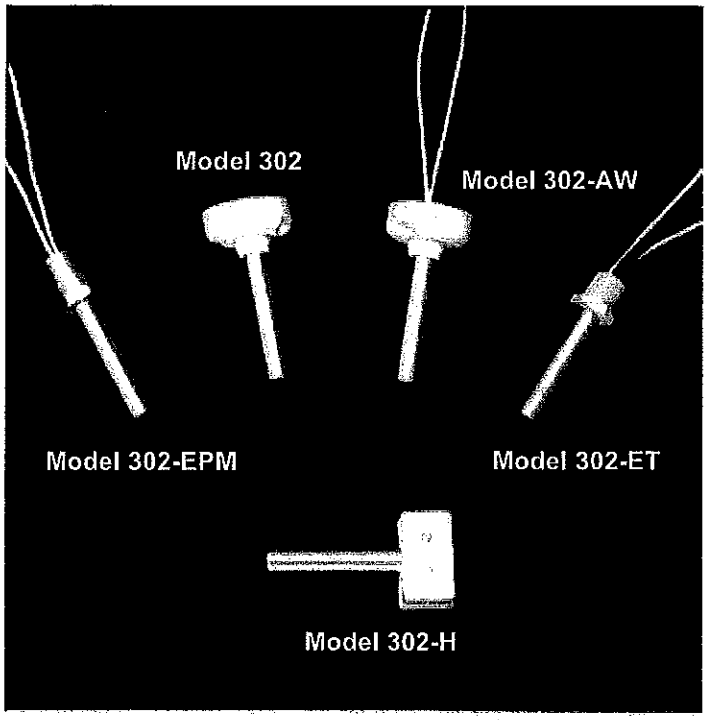
UL LISTED
S539
E35018A
(EPM model only)

California State Fire Marshal
7270-0021:001

FM Approved
(Except EPM)

FEATURES

- ***Immediate response.*** The 302 Series activate whenever ambient air temperature reaches a detector's setting, eliminating the thermal time lag inherent in conventional heat detectors.
- ***Eliminates false alarms.*** The 302 Series do not respond to momentary temperature fluctuations below the selected temperature.
- ***Universal application.*** The 302 Series can be used in all areas for any type of occupancy.
- ***Self-restoring.***
- ***Hermetically sealed,*** shock resistant, corrosion resistant, and tamper-proof.



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PRINCIPLES OF OPERATION

The 302 Series rate-anticipation heat detectors respond and activate the fire alarm immediately whenever the ambient temperature reaches the preset temperature setting. Under rapid heat rise conditions, the rate-anticipation feature enables the detector to respond one to three degrees ahead of the setting. At the same time, however, it does not respond to momentary temperature fluctuations below the selected protection level, thus eliminating false alarms. When temperature drops back down below the protection level, the detector automatically resets itself.

DIMENSIONS (Model 302)

Total overall length: 4-1/8" (10.48 cm).

Base diameter: 2" (5.08 cm).

ELECTRICAL RATINGS

Voltage	*Current*
6 – 125 VAC	5 amps
6 – 25 VDC	1 amp
125 VDC	0.5 amp

APPLICATION INFORMATION

302 Series detector have a smooth ceiling UL rating of 50' x 50' (15.24 x 15.24 meters) and are the only type of heat detectors having such a rating on both fixed temperature and rate anticipation. The 302-H is designed for horizontal mounting and is UL rated for 40' x 40' (12.19 x 12.19 meters).

NOTIFIER® 12 Clintonville Road, Northford, Connecticut 06472

ISO 9001 CERTIFIED ENGINEERING & MANUFACTURING

SpectrAlert® Advance

Selectable Output Notification Appliances

NOTIFIER® by Honeywell

Audio/Visual Devices

General

System Sensor® SpectrAlert® Advance selectable-output horns, strobes and horn/strobes are rich with features guaranteed to cut installation times and maximize profits. The SpectrAlert Advance series of notification appliances is designed to simplify your installations, with features such as: plug-in designs, instant feedback messages to ensure correct installation of individual devices, and eleven field-selectable candela settings for wall and ceiling strobes and horn/strobes.

More specifically, when installing Advance products, first attach a universal mounting plate to a four-inch square, four-inch octagon, or double-gang junction box. The two-wire mounting plate attaches to a single-gang junction box.

Then, connect the notification appliance circuit wiring to the SEMS terminals on the mounting plate.

Finally, attach the horn, strobe, or horn/strobe to the mounting plate by inserting the product's tabs in the mounting plate's grooves. The device will rotate into position, locking the product's pins into the mounting plate's terminals. The device will temporarily hold in place with a catch until it is secured with a captured mounting screw.

SpectrAlert Advance products allow you to choose:

- 12 or 24 volts.
- 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, or 185 candela by way of a rear-mounted slide switch and front viewing window.
- Horn tones and volume by way of a rotary switch.
- The SpectrAlert Advance series includes outdoor notification appliances. Outdoor strobes and horn/strobes (two-wire and four-wire) are available for wall or ceiling. Outdoor horns are available for wall only. All System Sensor outdoor products are rated between –40°F and 151°F (–40°C and 66°C) in wet or dry applications.

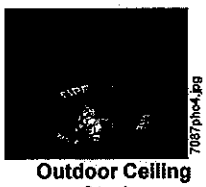
Models available:

- Indoor wall-mount: horn, strobe, 2-wire horn/strobe, 4-wire horn/strobe.
- Indoor ceiling-mount: strobe, 2-wire horn/strobe, 4-wire horn/strobe.
- Outdoor wall-mount: horn, strobe, 2-wire horn/strobe, 4-wire horn/strobe.
- Outdoor ceiling-mount: strobe, 2-wire horn/strobe, 4-wire horn/strobe.

Features

- Plug-in design.
- Same mounting plate for wall- and ceiling-mount units.
- Shorting spring on mounting plate for continuity check before installation.
- Captive mounting screw.
- Tamper-resistance capability.
- Field-selectable candela settings on wall and ceiling units: 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, 185.
- Automatic selection of 12 or 24 volt operation at 15 and 15/75 candela.
- Outdoor wall and ceiling products.


Indoor Ceiling Horn/Strobe


Outdoor Ceiling Strobe


Indoor Wall Horn/Strobe


Indoor Ceiling Strobe


Indoor Wall Horn


Outdoor Wall Strobe

- Outdoor products rated from –40°F and 151°F (–40°C and 66°C).
- Outdoor products rainproof per UL50 (NEMA 3R) and weatherproof per NEMA 4X, IP56
- Minimal intrusion into the backbox.
- Horn rated at 88+ dbA at 16 volts.
- Rotary switch for tone selection.
- Three horn volume settings.
- Electrically compatible with existing SpectrAlert products.

Engineering Specifications

SpectrAlert Advance horns, strobes, and horn/strobes shall mount to a standard 4.0" x 4.0" x 1.5" (10.16 x 10.16 x 3.81 cm) backbox, 4.0" (10.16 cm) octagonal backbox, or a double-gang backbox. Two-wire products shall also mount to a single-gang 2.0" x 4.0" x 1.875" (5.08 x 10.16 x 4.763 cm) backbox. A universal mounting plate shall be used for mounting ceiling and wall products. The notification appliance circuit wiring shall terminate at the universal mounting plate. Also, SpectrAlert Advance products, when used with the Sync•Circuit™ Module accessory, shall be powered from a non-coded notification appliance circuit output and shall operate on a nominal 12 or 24 volts. When used with the Sync•Circuit Module, 12-volt rated notification appliance circuit outputs shall operate between 9 and 17.5 volts; 24-volt rated notification appliance circuit outputs shall operate between 17 and 33 volts. Indoor SpectrAlert Advance products shall operate between 32°F and 120°F (0°C and 49°C) from a regulated DC, or full-wave-rectified, unfiltered power supply. Strobes and horn/strobes shall have field-selectable candela settings including 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, 185.

Ordering Information

Model	Description	Model	Description
WALL HORN/STROBES		*CEILING HORN/STROBES*	
P2R	2-wire horn/strobe, standard cd, red.	PC2R	2-wire horn/strobe, standard cd, red.
P2RH	2-wire horn/strobe, high cd, red.	PC2RH	2-wire horn/strobe, high cd, red.
P2RK	2-wire horn/strobe, standard cd, red, outdoor.	PC2RK	2-wire horn/strobe, standard cd, red, outdoor.
P2RHK	2-wire horn/strobe, high cd, red, outdoor.	PC2RHK	2-wire horn/strobe, high cd, red, outdoor.
P2W	2-wire horn/strobe, standard cd, white.	PC2W	2-wire horn/strobe, standard cd, white.
P2WH	2-wire horn/strobe, high cd, white.	PC2WH	2-wire horn/strobe, high cd, white.
P4R	4-wire horn/strobe, standard cd, red.	PC4R	4-wire horn/strobe, standard cd, red.
P4RH	4-wire horn/strobe, high cd, red.	PC4RH	4-wire horn/strobe, high cd, red.
P4RK	4-wire horn/strobe, standard cd, red, outdoor.	PC4RK	4-wire horn/strobe, standard cd, red, outdoor.
P4RHK	4-wire horn/strobe, high cd, red, outdoor.	PC4RHK	4-wire horn/strobe, high cd, red, outdoor.
P4W	4-wire horn/strobe, standard cd, white.	PC4W	4-wire horn/strobe, standard cd, white.
P4WH	4-wire horn/strobe, high cd, white.	PC4WH	4-wire horn/strobe, high cd, white.
WALL STROBES		*CEILING STROBES*	
SR	Strobe, standard cd, red.	SCR	Strobe, standard cd, red.
SRH	Strobe, high cd, red.	SCRH	Strobe, high cd, red.
SRK	Strobe, standard cd, red, outdoor.	SCRK	Strobe, standard cd, red, outdoor.
SRHK	Strobe, high cd, red, outdoor.	SCRHK	Strobe, high cd, red, outdoor.
SW	Strobe, standard cd, white.	SCW	Strobe, standard cd, white.
SWH	Strobe, high cd, white.	SCWH	Strobe, high cd, white.
ACCESSORIES		*HORNS*	
BBS-2A	Backbox skirt, wall, red.	HR	Horn, red.
BBSW-2A	Backbox skirt, wall, white.	HRK	Horn, red, outdoor.
BBSC-2A	Backbox skirt, ceiling, red.	HW	Horn, white.
BBSCW-2A	Backbox skirt, ceiling, white.	*ACCESSORIES, continued*	
SA-WBB	Weatherproof backbox, wall.	TR-HS	Trim Ring, wall, red, package of 5
SA-WBBC	Weatherproof backbox, ceiling.	TRW-HS	Trim Ring, wall, white, package of 5
WTP	Weatherproof, flush mount plate, red	TRC-HS	Trim Ring, ceiling, red, package of 5
WTPW	Weatherproof, flush mount plate, white	TRCW-HS	Trim Ring, ceiling, white, package of 5

NOTE: *"High cd" refers to strobes that include 135, 150, 177, and 185 candela settings. "Standard cd" refers to strobes that include 15, 15/75, 30, 75, 95, 110, and 115 candela settings.*

NOTE: *For strobes and horn/strobes, add suffix "F" for French or "B" for Bilingual.*

NOTE: *All outdoor models ("K(A)" suffix) include a plastic weatherproof backbox.*

NOTE: *Add "-R" to models for weatherproof replacement device (no back box included). Only for use with weatherproof outdoor flush mounting plate, WTP and WTPW.*

NOTE: *Add "P" to model for plain housing. (No "FIRE" marking on cover.)*

SpectrAlert® Advance

Indoor Selectable Output Speaker Strobes and Dual Voltage Evacuation Speakers

NOTIFIER® by Honeywell

Audio/Visual Devices

General

The SpectrAlert Advance Series of speakers and speaker strobes is designed to reduce ground faults. The plug-in design allows the installer to pre-wire mounting plates and dress the wires before plugging in the speakers. The plastic cover prevents nicked wires by covering exposed speaker components.

This design also allows faster installations with instant feedback to ensure that wiring is properly connected; rotary switches to select voltage and power settings; and 11 field selectable candela settings for wall and ceiling speaker strobes.

The low total harmonic distortion of the SP speaker offers high fidelity sound output while the SPV speaker offers high volume sound output for use in high ambient noise applications.

SpectrAlert Advance makes installation easy

- Attach a universal mounting plate to a 4" x 4" x 2-1/8" back box. Flush mount applications are achievable without the need for an extension ring.
- Connect the notification appliance circuit or speaker wiring to the PEMS terminals on the mounting plate.
- Attach the speaker or speaker strobe to the mounting plate by inserting the product tabs into the mounting plate grooves. Rotate the device into position to lock the product pins into the mounting plate terminals. The device will temporarily hold in place with a catch until it is secured with a captured mounting screw.

Features

- Plug-in design
- Protective cover isolates speaker components, reduces ground faults
- Electrical compatibility with existing SpectrAlert products
- Field selectable candela settings on wall and ceiling units:
  - Standard: 15, 15/75, 30, 75, 95, 110, 115
  - High: 135, 150, 177, 185
- Shorting spring on mounting plate tests continuity before installation
- Rotary switch simplifies field selection of speaker voltage and power settings
- Universal mounting plate for wall- and ceiling-mount units
- Compatible with System Sensor synchronization protocol
- SP speakers offer high fidelity sound output
- SPV speakers offer high volume sound output
- Automatic selection of 12 or 24 volt operation at 15 and 15/75 candela
- No extension ring required
- Ceiling and wall mount application
- Optional tamper resistant Torx head screw included

Specifications

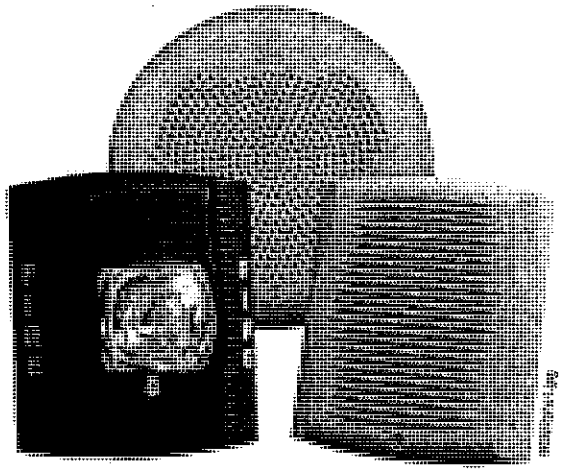
PHYSICAL SPECIFICATIONS

Operating Temperature: 32°F to 120°F (0°C to 49°C)

Humidity Range: 10 to 93% non-condensing

Dimensions, Wall-Mount: –

- SPS Speaker Strobe: 6.0"L x 5.0"W x 4.7"D (includes lens and speaker)



- SPSV Speaker Strobe: 6.0"L x 5.0"W x 4.9"D (includes lens and speaker)
- SP Speaker: 6.0"L x 5.0"W x 2.8"D
- SPSV Speaker: 6.0"L x 5.0"W x 2.9"D

Dimensions, Ceiling-Mount:

- SPS Speaker Strobe: 6.8"Dia x 4.7"D (includes lens and speaker)
- SPSV Speaker Strobe: 6.8"Dia x 4.8"D (includes lens and speaker)
- SP Speaker: 6.8"Dia x 2.8"D
- SPSV Speaker: 6.8"Dia x 2.9"D

ELECTRICAL/OPERATING SPECIFICATIONS

Nominal Voltage (speakers): 25 Volts or 70.7 Volts (nominal)

Maximum Supervisory Voltage (speakers): 50VDC

Strobe Flash Rate: 1 flash per second

Nominal Voltage (strobes): Regulated 12VDC/FWR or regulated 24DC/FWR

Operating Voltage Range (includes fire alarm panels with built-in sync): 8 to 17.5V (12V nominal) or 16 to 33V (24V nominal)

Operating Voltage with MDL Sync Module: 9 to 17.5V (12V nominal) or 17 to 33V (24V nominal)

Frequency Range: 400 to 4000 Hz

Power: ¼, ½, 1, 2 watts

Agency Listings and Approvals

In some cases, certain modules may not be listed by certain approval agencies, or listing may be in progress. *Consult factory for latest listing status.*

- **UL/ULC Listed:** S4048
- **MEA:** 10-08-E
- **CSFM:** 7320-1653:201
- **FM Approved**

UL Maximum Strobe Current Draw (mA RMS)					
	Candela	8 to 17.5 Volts		16 to 33 Volts	
		DC	FWR	DC	FWR
Standard Candela Range	15	123	128	66	71
	15/75	142	148	77	81
	30	NA	NA	94	96
	75	NA	NA	158	153
	95	NA	NA	181	176
	110	NA	NA	202	195
	115	NA	NA	210	205
High Candela Range	135	NA	NA	228	207
	150	NA	NA	246	220
	177	NA	NA	281	251
	185	NA	NA	286	258

Sound Output				
UL Reverberant (dBA @ 10ft)	2W	1W	½W	¼W
Wall Mount SP Series	86	83	80	77
Wall Mount SPV Series	90	87	84	81
Ceiling Mount SPC Series	86	83	80	77
Ceiling Mount SPCV Series	90	87	84	81
Wall Mount SPS Series	85	82	79	76
Wall Mount SPSV Series	89	86	83	80
Ceiling Mount SPSC Series	85	82	79	76
Ceiling Mount SPSCV Series	89	86	83	80

Architectural/Engineering Specifications

GENERAL

SpectrAlert Advance speaker and speaker strobes shall mount to a 4" x 4" x 2-1/8" backbox. A universal mounting plate shall be used for mounting ceiling and wall products. The notification appliance circuit and amplifier wiring shall terminate at the universal mounting plate. Also, SpectrAlert Advance speaker strobes, when used with the Sync Circuit Module accessory, shall be powered from a non-coded notification appliance circuit output and shall operate on a nominal 12 or 24volts. When used with the Sync.Circuit Module, 12 volt rated notification appliance circuit outputs shall operate between nine and 17.5 volts; 24 volt rated notification appliance circuit outputs shall operate between 17 and 33 volts. Indoor SpectrAlert Advance products shall operate between 32°F and 120°F from a regulated DC, or full-wave rectified, unfiltered power supply. Speaker strobes shall have field-selectable candela settings including 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177, 185.

SPEAKER

The speaker shall be a System Sensor SpectrAlert Advance model _____ dual-voltage transformer speaker capable of operating at 25.0 or 70.7 nominal Vrms. It should be listed to UL/ULC 1480 and shall be approved for fire protective service. The speaker shall have a frequency range of 400 to 4000Hz and shall have an operating temperature between 32°F and 120°F. Speaker shall have power taps and voltage that are selected by rotary switches.

SPEAKER STROBE COMBINATION

The speaker strobe shall be a System Sensor SpectrAlert Advance model _____ listed to UL1480 and UL/ULC 1971 and be approved for fire protective signaling systems. Speaker shall be capable of operating at 25.0 or 70.7 nominal Vrms selected via rotary switch, and shall have a frequency range of 400 to 4000Hz. Speaker shall have power taps which are selected by rotary switch. The strobe shall comply with the NFPA 72 requirements for visible signaling appliances, flashing at 1Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system.

SYNCHRONIZATION MODULE

The module shall be a System Sensor Sync Circuit model MDL listed to UL/ULC 464 and shall be approved for fire protective service. The module shall synchronize SpectrAlert strobes at 1Hz. The module shall mount to a 4-11/16" x 4-11/16" x 2-1/8" backbox. The module shall also control two Style Y (class B) circuits or one Style Z (class A) circuit. The module shall synchronize multiple zones. Daisy chaining two or more synchronization modules together will synchronize all the zones they control. The module shall not operate on a coded power supply.

Ordering Information

NOTE: *(W) indicates white coloring; (R), red.*
NOTE: *"A" suffix indicates ULC-Listed model.*

WALL MOUNT

SP(W)(R)(A): Speaker only.

SP(W)(R)V(A): Speaker only, high dB; white.

SPS(W)(R)(A)*: Speaker strobe, selectable candela (15, 15/75, 30, 75, 95, 110, 115).

SPS(W)(R)H(A)*: Speaker strobe, selectable candela, high cd (135, 150, 177, 185).

SPS(W)(R)V(A)*: Speaker strobe, selectable candela, high dB.

CEILING MOUNT

SPC(W)(R)(A): Speaker only.

SPC(W)(R)V(A): Speaker only, high dB.

SPSC(W*)(R)(A): Speaker strobe, selectable candela (15, 15/75, 30, 50, 75, 95, 110, 115)

SPSC(W*)(R)H(A): Speaker strobe, selectable candela, high cd (135, 150, 177, 185)

SPSC(W*)(R)V(A): Speaker strobe, selectable candela, high dB (15, 15/75, 30, 50, 75, 95, 110, 115).

SPSC(W*)(R)VH(A): Speaker strobe, selectable candela, high dB, high cd (135, 150, 177, 185).

ACCESSORIES

RFP(A): Retrofit plate (5 pack), red.

RFPW(A): Retrofit plate (5 pack), white.

SPBBSC(A): Ceiling mount backbox skirt, red.

SPBBSCW(A): Ceiling mount backbox skirt, white.

SPBBS(A): Wall mount backbox skirt, red.

SPBBSW(A): Wall mount backbox skirt, white.

TR(A): Wall mount trim ring, red, package of 5.

TRW(A): Wall mount trim ring, white, package of 5.

TRC(A): Ceiling mount trim ring, red, package of 5.

TRCW(A): Ceiling mount trim ring, white, package of 5.

MWBB(A): Wall mount, metal weatherproof backbox

MWBBW(A): Wall mount, metal weatherproof backbox, white

MWBBC(A): Ceiling mount, metal weatherproof backbox

MWBBCW(A): Ceiling mount, metal weatherproof backbox, white

***NOTE:** Add -P to model number for plain housing (no 'FIRE' marking on the cover), e.g. SPSW-P*

ISO 9001 CERTIFIED ENGINEERING & MANUFACTURING QUALITY SYSTEMS

This document is not intended to be used for installation purposes.
We try to keep our product information up-to-date and accurate.
We cannot cover all specific applications or anticipate all requirements.
All specifications are subject to change without notice.

Made in the U.S. A.

For more information, contact Notifier. Phone: (203) 484-7161, FAX: (203) 484-7118.
www.notifier.com

1221-2W

Switches

Color: White

UPC Code: 07847723990

Country of Origin: United States - **Eligible for ARRA funded projects*

made in USA

May include one or more globally sourced components.

RECOVERY.GOV

Brand Features

Leviton's Industrial Grade AC toggle switches for extra heavy-duty applications represent top-of-the-line quality and peak performance. Leviton uses the finest materials available and the highest production standards to produce industrial switches of unmatched versatility and reliability.

Item Description

20 Amp, 120/277 Volt, Toggle Single-Pole AC Quiet Switch, Extra Heavy Duty Spec Grade, Self Grounding, Back & Side Wired - WHITE

Technical Information

AC Horsepower Ratings

HP Rating: 1HP-120V 2HP-240V

Max. Amperage: 16 Amp

Electrical Specifications

Amperage: 20 Amp

Voltage: 120/277 VAC

Grounding: Self-Grounding

Dielectric Voltage: Withstands 1500V for 1 minute

Overload UL20 Test: 100 cycles of OL at 4.8 times rated current

Temperature Rise: Maximum 30 degress C rise

Endurance: 50,000 cycles minimum

Environmental Specifications

Flammability: Rated V-2 per UL94

Operating Temperature: -40ºC to 65ºC

Material Specifications

Strap Material: .048" Thick Galvanized Steel

Base Material: Thermoplastic

Toggle: Polycarbonate

Cover Material: Thermoplastic

Contact Material: Silver Alloy

Terminal Screws: Brass 8-32

Grounding Screw: Brass 8-32

Ground Clips: Brass

Color: White

Mechanical Specifications

Terminal ID: Brass-Hot Black-Hot White-Neutral Green-Gnd

Terminal Accom.: 14-#10 AWG back wired; #14-#12 AWG side wired

Product ID: Ratings are permanently marked on device

Torque Range: 12-14 inch pounds

Product Features

Color: White

Grounding: Self Grounding

Voltage: 120/277 Volt

HP Rating: 1HP-120V 2HP-240V-277V

Body Material: Thermoplastic

Strap Material: Steel

Standards and Certifications

NEMA: WD-1 & WD-6

ANSI: C-73

UL Fed Spec WS896E: File #E7458

UL Standard: UL 20

CSA C22.2 No. 111: File #152105

NOM: 057

RoHS: Compliant

Warranty: 10 Year Limited

1223-2W

Switches

Color: White

UPC Code: 07847722348

Country of Origin: United States - **Eligible for ARRA funded projects*

made in USA

May include one or more globally sourced components.

Brand Features

Leviton's Industrial Grade AC toggle switches for extra heavy-duty applications represent top-of-the-line quality and peak performance. Leviton uses the finest materials available and the highest production standards to produce industrial switches of unmatched versatility and reliability.

Item Description

20 Amp, 120/277 Volt, Toggle 3-Way AC Quiet Switch, Extra Heavy Duty Spec Grade, Self Grounding, Back & Side Wired - WHITE

Technical Information

AC Horsepower Ratings

HP Rating: 1HP-120V 2HP-240V

Max. Amperage: 16 Amp

Electrical Specifications

Amperage: 20 Amp

Voltage: 120/277 VAC

Grounding: Self-Grounding

Dielectric Voltage: Withstands 1500V for 1 minute

Overload UL20 Test: 100 cycles of OL at 4.8 times rated current

Temperature Rise: Maximum 30 degress C rise

Endurance: 50,000 cycles minimum

Environmental Specifications

Flammability: Rated V-2 per UL94

Operating Temperature: -40ºC to 65ºC

Material Specifications

Strap Material: .048" Thick Galvanized Steel

Base Material: Thermoplastic

Toggle: Polycarbonate

Cover Material: Thermoplastic

Contact Material: Silver Alloy

Terminal Screws: Brass 8-32

Grounding Screw: Brass 8-32

Ground Clips: Brass

Color: White

Mechanical Specifications

Terminal ID: Brass-Hot Black-Hot White-Neutral Green-Gnd

Terminal Accom.: 14-#10 AWG back wired; #14-#12 AWG side wired

Product ID: Ratings are permanently marked on device

Torque Range: 12-14 inch pounds

Product Features

Color: White

Grounding: Self Grounding

Voltage: 120/277 Volt

HP Rating: 1HP-120V 2HP-240V-277V

Body Material: Thermoplastic

Strap Material: Steel

Standards and Certifications

NEMA: WD-1 & WD-6

ANSI: C-73

UL Fed Spec WS896E: File #E7458

UL Standard: UL 20

CSA C22.2 No. 111: File #152105

NOM: 057

RoHS: Compliant

Warranty: 10 Year Limited

E.9.b.i
PLUG RECEPTACLES

5362-W

Color: White

UPC Code: 07847713952

Country of Origin: Please Contact Customer Service

NEMA: 5-20R

Brand Features

Leviton's line of Extra Heavy-Duty Industrial Grade receptacles are designed and manufactured to withstand the harsh conditions typically associated with industrial environments. Available in a wide variety of configurations, including isolated ground, tamper-resistant, hospital grade, etc., these Industrial Grade devices are the electrical contractor's choice for use in factories, schools, hospitals and commercial office buildings.

Item Description

20 Amp, 125 Volt, NEMA 5-20R, 2P, 3W, Industrial Series Extra Heavy Duty Specification Grade, Duplex Receptacle, Straight Blade, Self Grounding, Back & Side 8 Hole Feed-Thru Wired, Brass Strap, - WHITE

Technical Information

AC Horsepower Ratings

At Rated Voltage: 1 HP

Electrical Specifications

Grounding: Self-Grounding

Amperage: 20 Amp

Voltage: 125 Volt

NEMA: 5-20R

Pole: 2

Wire: 3

Dielectric Voltage: Withstands 2000V per UL498

Current Limiting: Full Rated Current

Temperature Rise: Max 30C after 250 cycles OL at 200 percent rated current

Environmental Specifications

Flammability: Rated V-2 per UL94

Operating Temperature: -40C to 60C

Material Specifications

Face Material: Thermoplastic Nylon

Body Material: Thermoplastic Nylon

Strap Material: Brass

Line Contacts: Brass Triple-Wipe

Terminal Screws: Brass 10-32

Grounding Screw: Brass 8-32

Clamp Nuts: Zinc-Plated Steel

Ground Clips: Brass-Plated

Color: White

Mechanical Specifications

Terminal ID: Brass-Hot, Green-Ground, Silver-Neutral

Terminal Accom.: 14-10 AWG

Product ID: Ratings are permanently marked on device

Product Features

NEMA: 5-20R

Color: White

Standards and Certifications

NEMA: WD-6

ANSI: C-73

UL498: File E13399

UL Fed Spec WC-596: File E13399

CSA C22.2 No. 42: File 152105

NOM: 057

Warranty: 10 Year Limited

N7899-W

Ground Fault Circuit Interrupter (GFCI)

Color: White

UPC Code: 07847753049

Country of Origin: Please Contact Customer Service

NEMA: 5-20R

Brand Features

Slim is in. New SmartlockPro Slim GFCIs Install Easily Industry-leading quality, professional grade lockout action, and the slimmest profile on the market make SmartlockPro Slim GFCIs the smartest choice in ground fault circuit interrupter protection. Faster and easier to install in any wallbox because depth is reduced, the slim GFCIs flush mount to the wall with minimal protrusion for a sleek, finished look. Enhanced features include external back wiring for positive indication the wire is properly seated, exceptional resistance to wire pullout and the ability to withstand high torque.

Item Description

20 Amp, 125 Volt Receptacle, 20 Amp Feed-Through, SmartLock Pro Slim GFCI, monochromatic, back and side wired, wallplate and self grounding clip included - White

Technical Information

AC Horsepower Ratings

At Rated Voltage: 1 HP

Electrical Specifications

Dielectric Voltage: Withstands 1250VAC per UL 943 and CSA-C22.2 No. 144.1-06

Short Circuit Current Rating: 10KA

Temperature Rise: Max 30C after 100 cycles OL at 150 percent rated current

Environmental Specifications

Flammability: Rated V-2 per UL94

Operating Temperature: -35C to +66C

Material Specifications

Face Material: Thermoplastic

Body Material: Polycarbonate

Line Contacts: Brass Triple Wipe .031 Thick

Terminal Screws: Plated Steel

Grounding Screw: Plated Steel

Yoke: Zinc-Plated Steel

Clamps: Brass

Notes: w/ Wallplate

Mechanical Specifications

Terminal ID: Brass-Hot, Green-Ground, Silver-Neutral

Terminal Accom.: 14-10 AWG

Product ID: Ratings are permanently marked on device

Product Features

Feature: SmartlockPro® Slim

Amperage: 20 Amp

Voltage: 125 Volt

NEMA: 5-20R

Pole: 2

Standards and Certifications

NEMA: WD-6

ANSI: C-73

UL498: Yes

CSA C22.2 No. 42: Yes

NOM: 057

MIL-SPEC: A-A-55459-SB

UL 943: File E48380

Fed Spec WC-596: Yes

CSA-C22.2 No. 144.1-06: File LR-57811

Wire: 3

Trip Level: Class A, 5mA plus or minus 1mA

Termination: Back & Side

Face Material: Thermoplastic

Body Material: Polycarbonate

Grounding: Self-Grounding

Color: White

Strap Material: Galvanized Steel

Fed Spec WC-596: Yes

Standards and Certifications: UL/CSA

Warranty: 2-Year Limited

Notes: w/ Wallplate

Features and Benefits

- Reduced depth of SmartlockPro® Slim GFCI makes it easier to install in any electrical box, even shallow ones.
- Terminals allow for easy wiring options – back and side wire capable.
- External back wire clamps provide visual indication of proper wire seating.
- Withstands high torque and resists wire pullout.
- Standard brass self-grounding clip.
- Automatically test the GFCI every time the RESET button is pushed in. The GFCI will not reset if the GFCI circuit is not functioning properly.
- By blocking reset of the GFCI if protection has been compromised, SmartlockPro® Slim GFCI reduces the possibility of end-users incorrectly assuming that a reset GFCI outlet is providing ground fault protection when it actually is not.
- A line-load reversal diagnostic feature is provided which prevents the GFCI from being reset and stops power from being fed to the GFCI receptacle face or through to downstream devices. A green LED indicator on the GFCI's face also illuminates to alert the installer to the line-load wiring reversal.
- Trip threshold meets or exceeds UL requirements for tripping time.
- Improved immunity to high-frequency noise reduces nuisance tripping.
- Advanced electronics design provides superior resistance to electrical surges and over-voltages.
- Compatible with all Decora devices and wallplates; available in select Decora colors.
- UL Fed Spec WC-596 rated.

SPECIFICATION SUBMITTAL

JOB NAME:	CATALOG NUMBERS:	
JOB NUMBER:		

80401-NW

Decora®

Color: White

UPC Code: 07847708880

Country of Origin: United States - **Eligible for ARRA funded projects*

****May include one or more globally sourced components.***

Brand Features

Leviton Decora Designer Wallplates — available in a wide spectrum of colors and styles — can add subtle elegance to any home. Sleek, versatile and convenient, they also come in a midway size that gives even greater coverage, and can hide unsightly wall surface irregularities. All Leviton Decorative Wallplates can stand up to heavy use while coordinating perfectly with paint or wall coverings. Think of them as the finishing touch to giving a home its signature look.

Item Description

1-Gang Decora/GFCI Device Decora Wallplate, Standard Size, Thermoplastic Nylon, Device Mount, - White

Technical Information

Product Features

Standards and Certifications: UL/CSA

Type: Standard Size

Warranty: 10-Year Limited

Gang: 1

Material: Thermoplastic Nylon

Color: White

Mount: Device

80409-NW

Decora®

Color: White

UPC Code: 07847748850

Country of Origin: Please Contact Customer Service

Brand Features

Leviton Decora Designer Wallplates — available in a wide spectrum of colors and styles — can add subtle elegance to any home. Sleek, versatile and convenient, they also come in a midway size that gives even greater coverage, and can hide unsightly wall surface irregularities. All Leviton Decorative Wallplates can stand up to heavy use while coordinating perfectly with paint or wall coverings. Think of them as the finishing touch to giving a home its signature look.

Item Description

2-Gang Decora/GFCI Device Decora Wallplate, Standard Size, Thermoplastic Nylon, Device Mount, - White

Technical Information

Product Features

Standards and Certifications: UL/CSA

Type: Standard Size

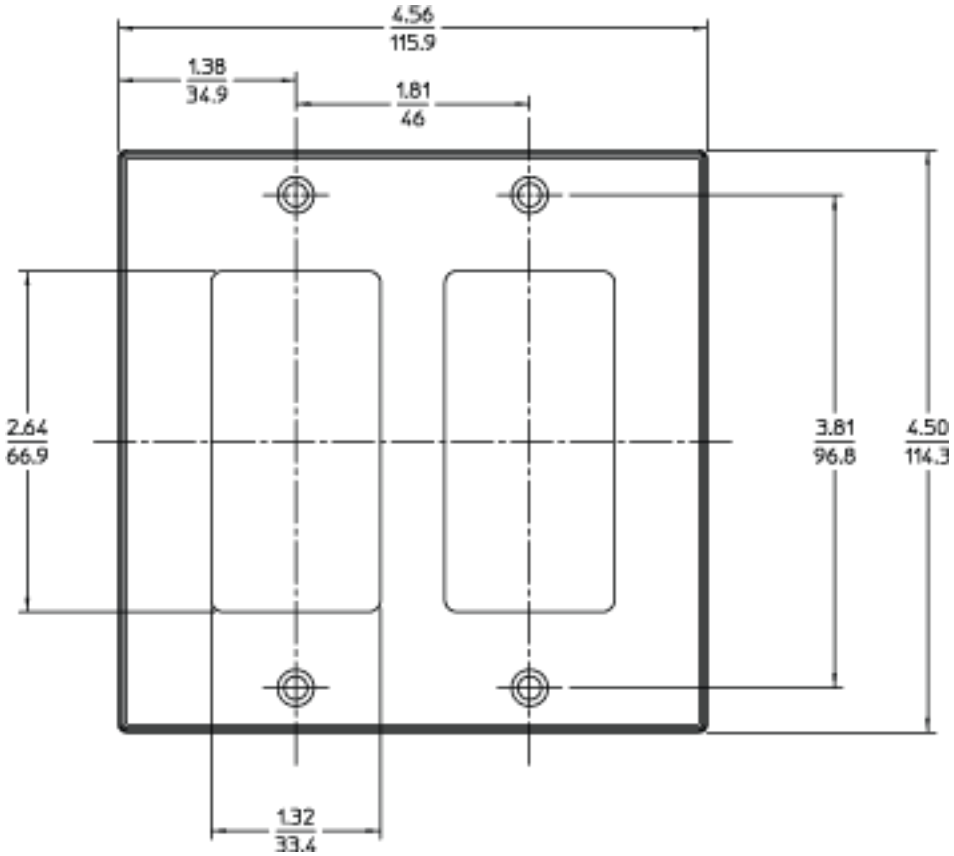
Warranty: 10-Year Limited

Gang: 2

Material: Thermoplastic Nylon

Color: White

Mount: Device



80411-NW

Wallplates

Color: White

UPC Code: 07847748868

Country of Origin: Please Contact Customer Service

Brand Features

Leviton Decora Designer Wallplates — available in a wide spectrum of colors and styles — can add subtle elegance to any home. Sleek, versatile and convenient, they also come in a midway size that gives even greater coverage, and can hide unsightly wall surface irregularities. All Leviton Decorative Wallplates can stand up to heavy use while coordinating perfectly with paint or wall coverings. Think of them as the finishing touch to giving a home its signature look.

Item Description

3-Gang Decora/GFCI Device Decora Wallplate, Standard Size, Thermoplastic Nylon, Device Mount. White

Technical Information

Product Features

Type: Standard Size

Gang: 3

Material: Thermoplastic Nylon

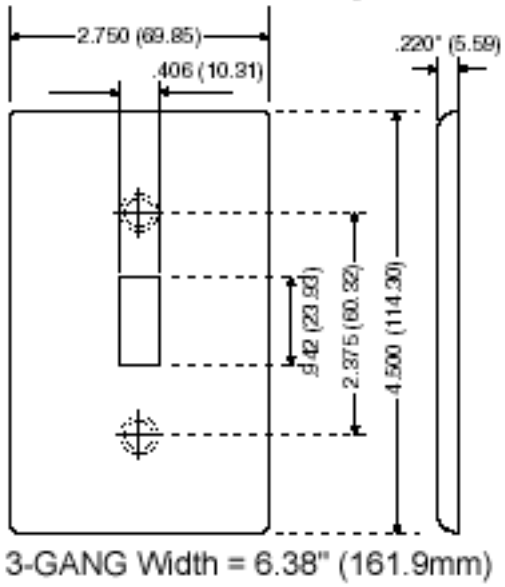
Color: White

Mount: Device

Standards and Certifications: UL/CSA

Warranty: 10-Year Limited

Dimensional Diagram



3-GANG Width = 6.38" (161.9mm)

SPECIFICATION SUBMITTAL

JOB NAME:		CATALOG NUMBERS:	
JOB NUMBER:			

80412-NW

Decora®

Color: White

UPC Code: 07847778805

Country of Origin: Please Contact Customer Service

Brand Features

Leviton Decora Designer Wallplates — available in a wide spectrum of colors and styles — can add subtle elegance to any home. Sleek, versatile and convenient, they also come in a midway size that gives even greater coverage, and can hide unsightly wall surface irregularities. All Leviton Decorative Wallplates can stand up to heavy use while coordinating perfectly with paint or wall coverings. Think of them as the finishing touch to giving a home its signature look.

Item Description

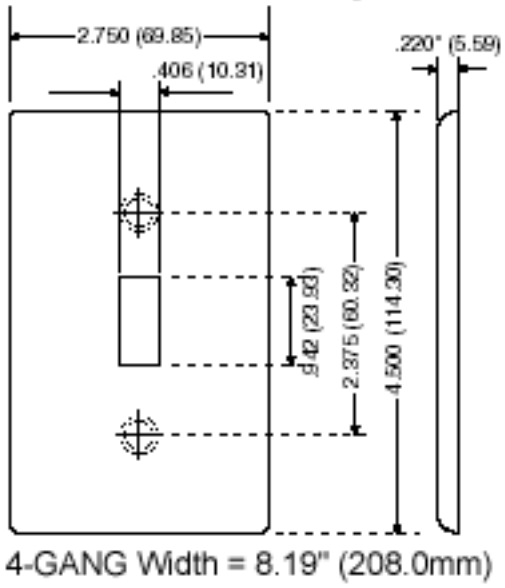
wallplate 4 gang decora standard size cof white nylon with-6-32 screws White

Technical Information

Product Features

Type: Standard Size
Gang: 4
Material: Thermoplastic Nylon
Color: White
Mount: Device
Standards and Certifications: UL/CSA
Warranty: 10-Year Limited

Dimensional Diagram



4-GANG Width = 8.19" (208.0mm)

SPECIFICATION SUBMITTAL

JOB NAME:		CATALOG NUMBERS:	
JOB NUMBER:			

E.9.d
WALLBOX DIMMERS

369616g 1 12.19.14

Nova T☆® Controls

This series of classic thin-profile linear-slide dimmers and switches offers the following standard features:

- Square Law Dimming
- Voltage compensation (not applicable to NTCL-250)
- Power-failure memory
- Superior RFI suppression
- Captive linear slider
- Accessible air-gap switch
- Electrostatic discharge tested
- Precise color matching
- Heavy-duty components for surge protection and long product life
- 100% factory tested

Product Family Features

- Available for 120–277~ line voltage switching (sink only control) 0–10 V⎓ LED drivers and ballasts (power pack not required for loads up to 8 A)
- Excellent for residential or commercial applications
- Intuitive operation–easy to use
- Slide-to-off and preset models available
- Enclosed heat sink for aesthetically pleasing appearance
- Multigang alignment for quick and easy installation
- Full family of products for most lighting sources, plus matching accessories and wallplates
- Rated at 120 V~ 60 Hz, unless noted otherwise
- Custom products (CPN) are available to meet specific customer needs. Please contact Lutron® Customer Service at 888.588.7661 for availability.

Regulatory Approvals

- UL®
- CSA
- NOM

Colors and Finishes

When ordering product for use with metal wallplates, the product and wallplate must be ordered separately. See the Architectural Wallplates and Accessories section of Volume 1: Basic Devices and Single-Space Systems Catalog (P/N 367-1746) for ordering procedure. See right for complete list of metal finishes.

Custom color matching is available for all Nova T☆® products. A swatch or sample is all that is required. Call customer service to arrange for a color-matched control.

Engraving is available for all Nova T☆® products. Engraving schedules are available at www.lutron.com/engraving or through Customer Service at 888.588.7661.

Slide-to-Off Controls
Select light level with slider; slide down to off

Preset Controls
Select light level with slider; press on/off

Available Colors and Finishes

Matte Finishes

Add color/finish suffix to model number to order.
Example: NT-600-**WH**

WH	White	GR	Gray
BE	Beige	TP	Taupe
IV	Ivory	SI	Sienna
AL	Almond	BR	Brown
LA	Light Almond	BL	Black

Special Order

Add color/finish suffix to model number to order.
Example: NT-600-**BB**

Metal Finishes

SB	Satin Brass	BB	Bright Brass
BC	Bright Chrome		

Special Metal Finishes

QB	Antique Brass	QZ	Antique Bronze
SC	Satin Chrome	SN	Satin Nickel
BN	Bright Nickel		

Anodized Aluminum Finishes

CLA	Clear	BLA	Black
BRA	Brass		

LUTRON® SPECIFICATION SUBMITTAL

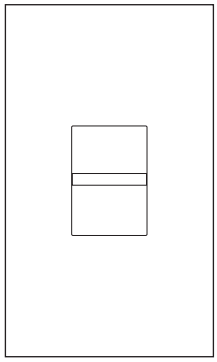
Page

Job Name:	Model Numbers:
Job Number:	

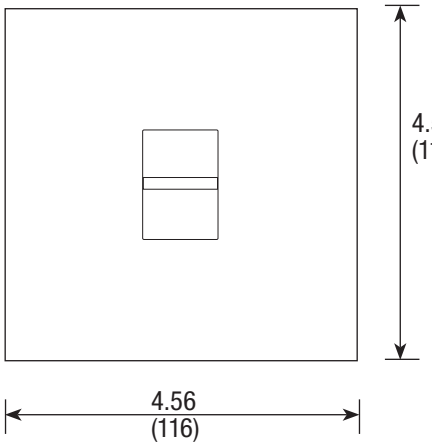
Dimensions

Dimensions are shown as: in (mm).

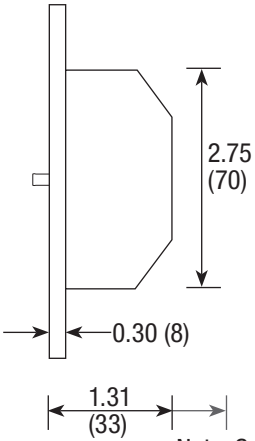
Small Control



Large Control

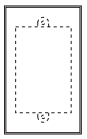


Profile

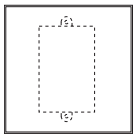


Note: Some models up to 1.9 (48)

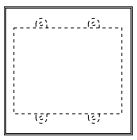
Back Views: NT- models



NT-600
NT-1000



NT-1500

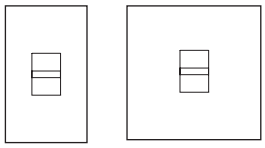


NT-2000

Available Controls and Accessories (Summary)

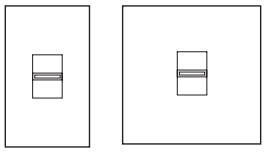
For specific uses, capacities, and model numbers, see the following pages.

Slide-to-Off Dimmers



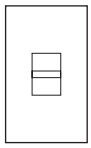
Small Control | Large Control

Preset Dimmers



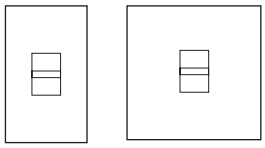
Small Control | Large Control

Linear-Slide Switches



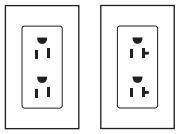
Small Control

Slide-to-Off Fan-Speed Controls

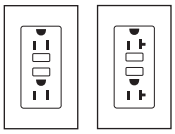


Small Control | Large Control

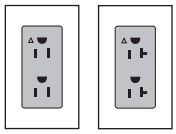
Receptacles and Plugs



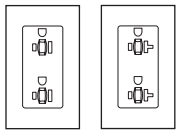
15 A Receptacles | 20 A



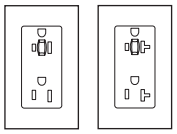
15 A GFCI Receptacles | 20 A



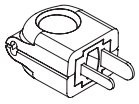
15 A Isolated Ground Receptacles | 20 A



15 A Duplex for Dimming Use | 20 A

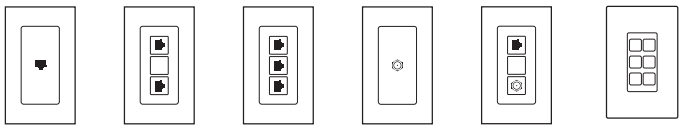


15 A Half for Dimming Use | 20 A



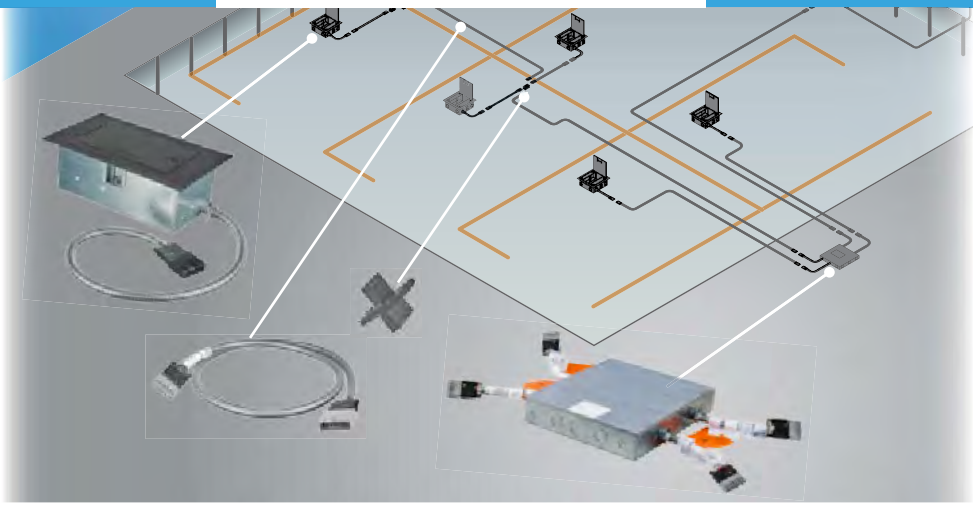
10 A Replacement Plug for Dimming Use

Jacks and Ports

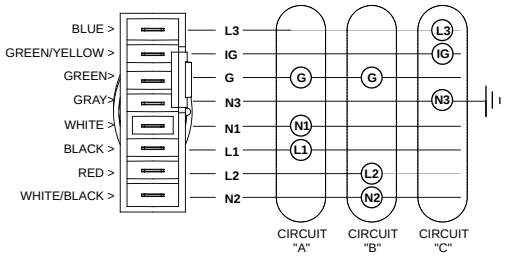


Single Telephone | Double Telephone | Triple Telephone | Cable TV | Telephone/ Cable TV | 6-Port Frame

The Hubbell CONNEXION 2.0 Zone Distribution System is a factory assembled, flexible, modular system that delivers power in raised floor installations. This unique system increases the value of the infrastructure and meets the challenges posed by new construction and renovation in commercial offices, retail outlets and educational facilities. By improving cable management, enhancing flexibility, and reducing administration expense, the CONNEXION 2.0 Zone Distribution System allows for power to be located where it's needed when it's needed.



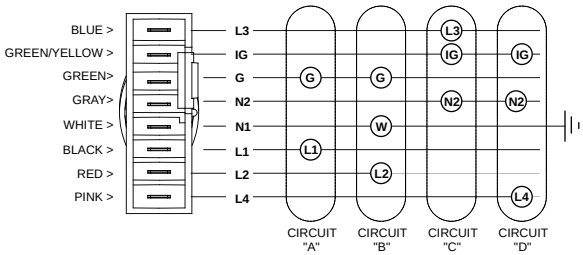
3/3/2 System Configuration (3-Hots, 3-Neutrals, 2-Grounds) 2 + 1 Wiring Configuration



Appropriate for a 120/208 volt 3ØY power distribution and dedicated neutrals are desired.

- Three circuit capacity
- Isolated ground capability for sensitive equipment
- Each circuit has its own #12 AWG neutral to manage harmonics
- Component Rating: 20 amperes at 120/208 volt
- 8-Wires (3 hots, 3 neutrals, 2 grounds)

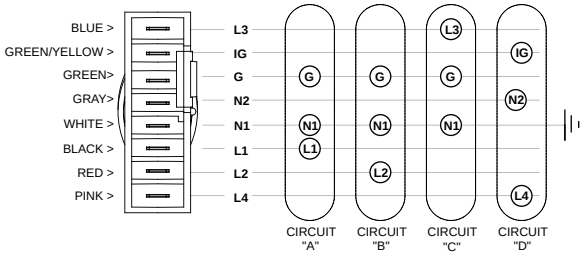
4/2/2 System Configuration (4 Hots, 2 Neutrals, 2 Grounds) 2 + 2 Wiring Configuration



Appropriate in areas where a high concentration of sensitive equipment.

- Two circuits share one #10 AWG neutral to manage harmonics for general purpose
- Two additional circuits share one #10 AWG neutral to manage harmonics for general purpose
- Isolated ground capability for sensitive equipment
- Component Rating: 20 amperes at 120/208 volt
- 8-Wires (4 hots, 2 neutrals, 2 grounds)

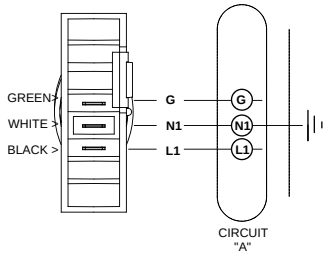
4/2/2 System Configuration (4 Hots, 2 Neutrals, 2 Grounds) 3+ 1 Wiring Configuration



Appropriate in areas where moderate amounts of sensitive equipment are used, and where separation from other circuits and isolated grounding are required.

- Three circuits share #10 AWG neutral to manage harmonics for general purpose
- One circuit on dedicated #10 AWG neutral for sensitive equipment
- Isolated ground capability for sensitive equipment
- Component Rating: 20 amperes at 120/208 volt
- 8-Wires (4 hots, 2 neutrals, 2 grounds)

1/1/1 System Configuration (1 Hot, 1 Neutral, 1 Ground)



- One circuit capacity
- Isolated ground capability
- Component Rating: 20 amperes at 120/208 volt
- 3-Wires (1 hot, 1 neutral, 1 ground)

Note: Contact factory for custom wiring configurations.

2.0 Zone Boxes

Wiring Type	Wiring Configuration	Output Whips	Zone Box
Terminal Block	111	1	**111C1W1PIN**
Wire Caps	111	1	**111C1W1POUT**
Terminal Block	111	2	**111C1W2TC**
Terminal Block	111	4	**111C1W4TC**
Terminal Block	111	6	**111C1W6TC**
Terminal Block	111	8	**111C1W8TC**
Wire Caps	111	2	**111C2W2P**
Terminal Block	111	2	**111C2W2TM**
Wire Caps	111	4	**111C4W4P**
Terminal Block	111	4	**111C4W4TM**
Wire Caps	111	6	**111C6W6P**
Terminal Block	111	6	**111C6W6TM**
Wire Caps	111	8	**111C8W8P**
Terminal Block	111	8	**111C8W8TM**
Wire Caps	332	4	**ZB332C12W4P**
Terminal Block	332	4	**ZB332C12W4TM**
Wire Caps	332	1	**ZB332C3W1PIN**
Wire Caps	332	1	**ZB332C3W1POUT**
Terminal Block	332	2	**ZB332C3W2TC**
Terminal Block	332	4	**ZB332C3W4TC**
Wire Caps	332	2	**ZB332C6W2P**
Terminal Block	332	2	**ZB332C6W2TM**

Wiring Type	Wiring Configuration	Output Whips	Zone Box
Wire Caps	422, 2+2	4	**ZB422S2C16W4P**
Terminal Block	422, 2+2	4	**ZB422S2C16W4TM**
Wire Caps	422, 2+2	1	**ZB422S2C4W1POUT**
Terminal Block	422, 2+2	2	**ZB422S2C4W2TC**
Terminal Block	422, 2+2	4	**ZB422S2C4W4TC**
Wire Caps	422, 2+2	2	**ZB422S2C8W2P**
Terminal Block	422, 2+2	2	**ZB422S2C8W2TM**
Wire Caps	422, 3+1	4	**ZB422S3C16W4P**
Terminal Block	422, 3+1	4	**ZB422S3C16W4TM**
Wire Caps	422, 3+1	1	**ZB422S3C4W1PIN**
Wire Caps	422, 3+1	1	**ZB422S3C4W1POUT**
Terminal Block	422, 3+1	2	**ZB422S3C4W2TC**
Terminal Block	422, 3+1	4	**ZB422S3C4W4TC**
Wire Caps	422, 3+1	2	**ZB422S3C8W2P**
Terminal Block	422, 3+1	2	**ZB422S3C8W2TM**

2.0 Splitters

Hot Circuits	Wires	Catalog Number
1	3	**SP31**
3	8	**SP83**
4	8	**SP84**

2.0 Homerun Cables

Length	Catalog Number
25 ft.	**ZBHR25**
50 ft.	**ZBHR50**
75 ft.	**ZBHR75**
100 ft.	**ZBHR100**

2.0 Extender Cables

Hubbell Connexion 2.0 extender cables have male/female ends allowing them to be connected in the field if needed. Available in three different versions, 422, 332, and 111, in 5 ft. increments up to 30 ft.

Connectors	Length	422 Family	332 Family	111 Family
Male / Female	1 ft.	**CEXT422MFL01**	**CEXT332MFL01**	**CEXT111MFL01**
Male / Female	5 ft.	**CEXT422MFL05**	**CEXT332MFL05**	**CEXT111MFL05**
Male / Female	10 ft.	**CEXT422MFL10**	**CEXT332MFL10**	**CEXT111MFL10**
Male / Female	15 ft.	**CEXT422MFL15**	**CEXT332MFL15**	**CEXT111MFL15**
Male / Female	20 ft.	**CEXT422MFL20**	**CEXT332MFL20**	**CEXT111MFL20**
Male / Female	25 ft.	**CEXT422MFL25**	**CEXT332MFL25**	**CEXT111MFL25**
Male / Female	30 ft.	**CEXT422MFL30**	**CEXT332MFL30**	**CEXT111MFL30**
Female / Open	1 ft.	**CEXT422FWL01**	**CEXT332FWL01**	**CEXT111FWL01**
Female / Open	1 ft.	**CEXT422FWL01XP***	**CEXT332FWL01XP***	**CEXT111FWL01XP***
Male / Open	1 ft.	**CEXT422MWL01**	**CEXT332MWL01**	**CEXT111MWL01**
Male / Open	1 ft.	**CEXT422MWL01XP***	**CEXT332MWL01XP***	**CEXT111MWL01XP***
Male / Open	5 ft.	**CEXT422MWL05**	**CEXT332MWL05**	**CEXT111MWL05**
Male / Open	15 ft.	**CEXT422MWL15**	**CEXT332MWL15**	**CEXT111MWL15**

*Note: *XP Suffix denotes 18 leads.*

Power Distribution Module

Modular power systems for every work environment.

The CII Advantage

CII Distribution Modules are mounted in the ceiling or access floor plenum and are connected by “plug and play” power cables. Whether building, relocating facilities, or just adding workstations, CII’s modular "plug and play" power system is the most efficient and cost effective total solution.

Flexibility - *As mobile as you need to be.*

Modular “plug and play” connectors provide fast installation, with easy reconfiguration or relocation of power services during moves. Low-profile modules to fit all finished floor heights.

Capacity - *Providing more power options.*

High Capacity - 12 to 18 circuits distributed from a single module allows for future growth. Our standard 10 - wire system provides maximum power for large workstation clusters or multiple equipment areas.

Customization - *Your first stop in continued customer service.*

CII Power Distribution can be customized to any circuit requirements, including separate or isolated ground circuits, to protect sensitive equipment.

Life Cycle Costs - *Extending the life of your furniture.*

Factory assembled cables provide significant labor savings over conventional pipe and wire installations. Relocation costs are reduced, due to not having to replace the electrical system, as in conventional installations.

Safety - *Protecting you and your investment.*

All CII power products are UL approved. CII Power Connectors have a positive tab location and variable keying to ensure secure and safe connection.

Warranty

Communications Integrators, Inc. guarantees that all ten-wire products shall be new and free from defects in material and workmanship for a period of five years from the date of shipment.

Communications Integrators Incorporated
Corporate Headquarters
1835 S. MacDonald, Suite 103
Mesa, Arizona 85210

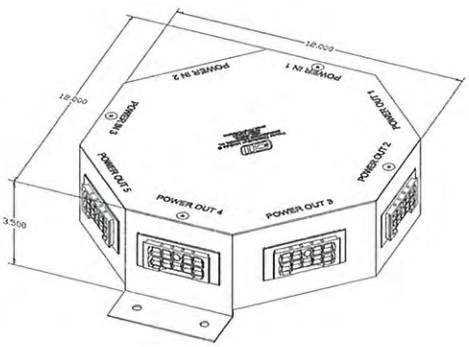
Phone: 480.464.8101
Toll Free: 800.679.9711
Fax: 480.668.8938

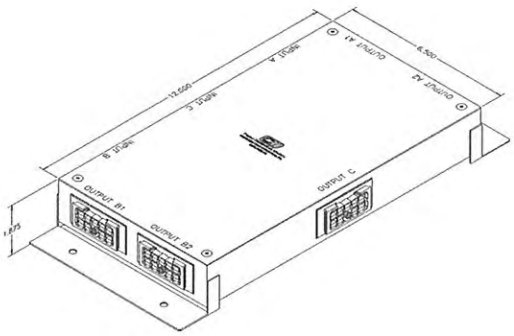
Web Site
www.ciinet.com

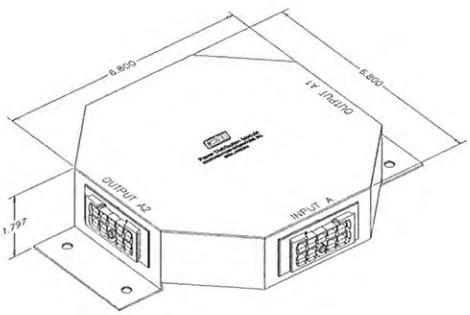
Technical Support
Toll Free: 800.679.9711

Power Distribution Module

Modular power systems for every work environment.







Specifications

Construction: Constructed of 18-gauge cold rolled, quality sheet steel and finished with catalyzed urethane enamel standard.

- Standard in Black.
- Custom silk-screened to designate the customer's preferred labeling.

Options:

Master Power Distribution Module

Up to eight (8) ten-wire connections (3 power in maximum)

Size: L: 12 " H: 3.50 "

Capacity: Maximum 18 circuits, 360 amps (288 Usable)

Low Profile Power Distribution Module

Up to eight (8) ten-wire connections (3 power in maximum)

Size: L: 12 " W: 6.50 " H: 1.875 "

Capacity: Maximum 18 circuits, 360 amps (288 usable)

Low Profile Satellite Power Distribution Module

Up to three (3) ten-wire connections (1 power in maximum)

Size: L: 6.80 " H: 1.875 "

Capacity: Maximum 6 circuits, 120 amps (96 usable).

Ultra Low Profile Power Distribution Module

Up to eight (8) ten-wire connections (3 power in maximum)

Size: L: 16 " W: 16 " H: 1.125 "

Capacity: Maximum 18 circuits, 360 amps (288 usable).

Ultra Low Profile Power Distribution Module

Up to three (3) ten-wire connections (1 power in maximum)

Size: L: 8 " W: 8 " H: 1.125 "

Capacity: Maximum 6 circuits, 120 amps (96 usable).

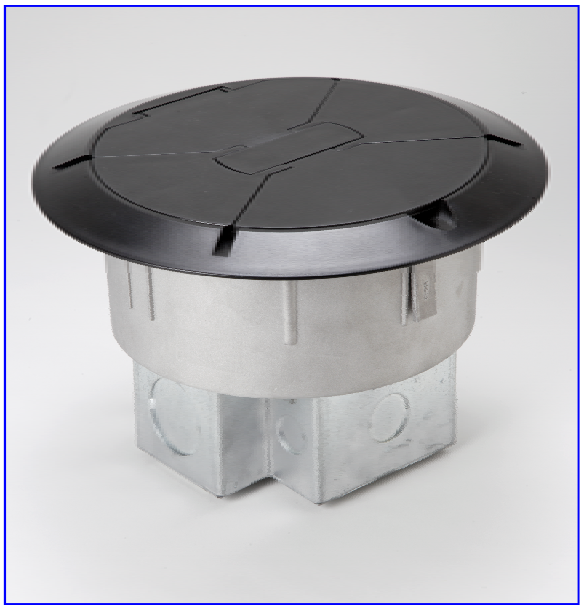
Technically Speaking

Power Distribution Modules are U.L. listed as a " Manufactured Wiring System" conforming to UL-183 Standard for Safety and NEC Article 300-22(c)(1) for use in environmental air handling spaces. Being a "Manufactured Wiring System" allows the customer disconnect and reconnect of pre-manufactured products.

COMMUNICATIONS INTEGRATORS INC.

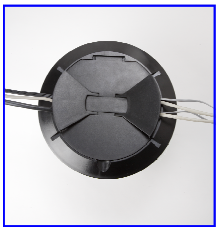
Modular power systems for every work environment.

Round PVD Servicenter ™



Flexible Convenient and Economical Power, Voice and Data Distribution

Today's architectural design frequently demands a more symmetrical option when it come to terminating power, voice and data in the access floor. ***Cii*** has responded with a round PVD Servicenter™ designed to accommodate commercially available air diffusers most commonly used in raised access flooring applications.



PVD Servicenter™

Air diffuser

Flexibility

- Round design allows the box to be installed on the same size hole as standard air diffusers – eliminates the need for multiple raised-floor tiles with custom-sized cutouts.
- Three-compartment stamped-steel box with voltage dividers accommodates both power and data outlets.
- General purpose, isolated and/or dedicated circuits
- Distribution of circuits to modular components, building systems or equipment.
- Multiple PVD Servicenters™ can be powered from single power source.
- Accommodates all voice/data options.

Design Oriented

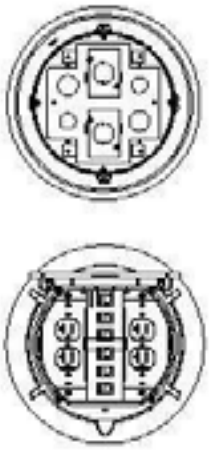
- Durable black polycarbonate cover features two cable-entry lids that lock in open position to prevent cable damage.
- Optional Steel lid available with multi-cable egress to allow 100% closure for maximum reduction in air loss. Available in multiple powder coat colors to match décor.
- Optional power tunnel links outside power compartments to feed both compartments with a singles conduit – while still allowing for communications wiring in the center.
- Two thumbscrews secure PVD Servicenter™ firmly in place, but remove easily for reconfiguration.

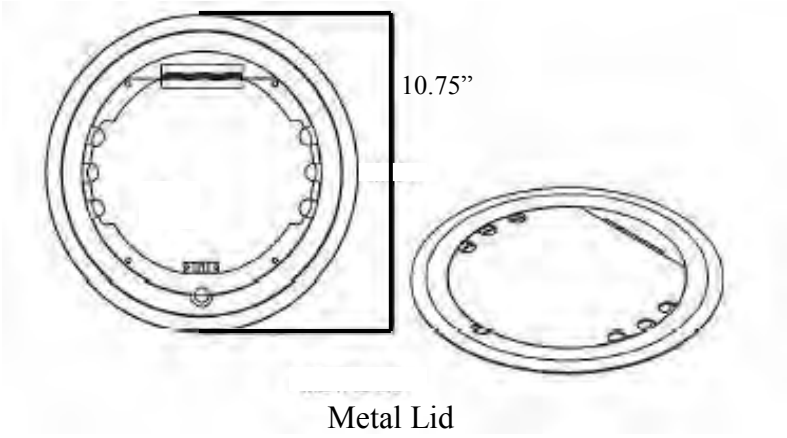
Economical

- High quality design at low cost.
- Churn cost reduced due to drop-in design.
- Quick relocation when used with ***Cii*** plug and play modular wiring system.

Technically Speaking

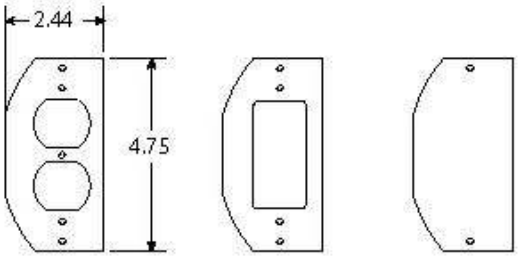
Plastic Lid

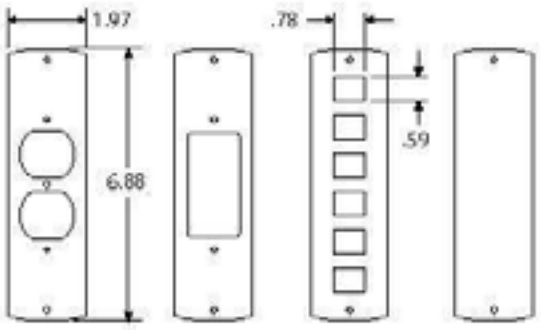




Metal Lid

- Outside compartments: 21cu. in. capacity, ¾” KO on side, ½” KO on each end, ½” KO and ¾” KO on bottom.
- Center compartment: 40 cu. In. capacity 1 ¼” KO on each end, two removable access plates with ¾” KO on bottom.
- Fits into holes ranging from 8 ¼” to 8 ¾” in diameter.





LISTED

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Toll Free: 800.679.9711
Fax: 480.668.8938

Tech support: 800.679.9711

www.ciinet.com

legrand®
Wiremold

CRFB Series™
Round Recessed Floor Boxes

Multi-Service Floor Boxes for Raised & Wood Floors

Wiremold® CRFB Series Floor Box is a round recessed floor box designed to meet the functionality and flexibility requirements of the raised and wood floor markets. CRFB Series Floor Boxes have multiple trade size KOs located on the sides and bottom of the box to feed four separate compartments that can accommodate multiple combinations of power, communication, and audio/video services. The surface style covers are made from cast aluminum and are available in black, brass, nickel, bronze or gray finishes.

CRFB Series Floor Boxes can also be field configured to accommodate power only, communication only, audio visual only, or combinations of all three services. CRFB Series Floor boxes applications include: open office environments, conference rooms, schools, stages, and altars.

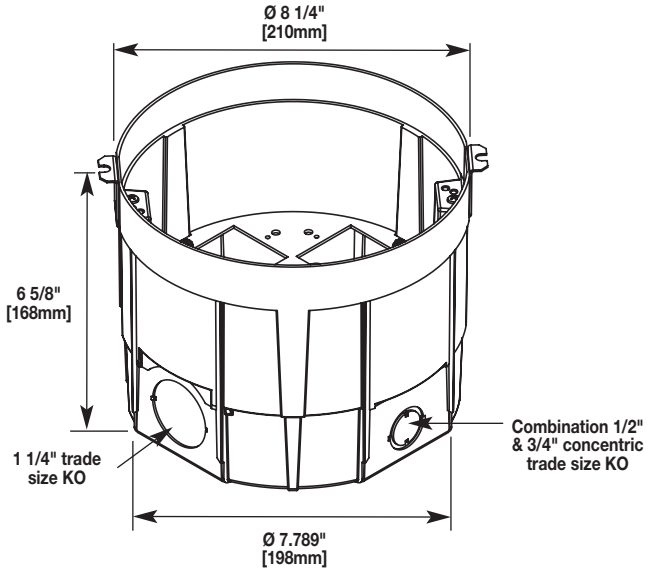
CRFB Series Floor Boxes can now accept either Evolution™ Series Poke-Thru Covers or the new CRFB Series Floor Box Covers.

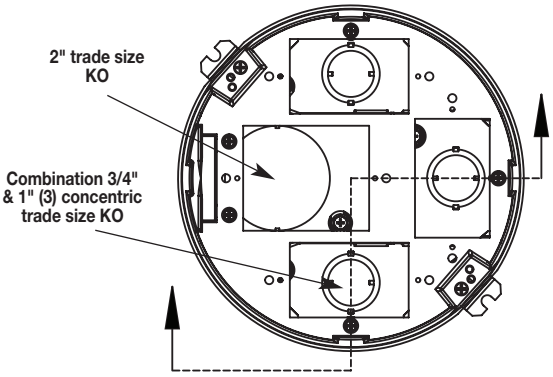
FEATURES & BENEFITS

- **Locking tabs help secure box to floor panel.** This allows for quick and easy installation.
- **Prewired and custom plate options.** Prewired units reduce labor costs for field installation. Consult the factory for more information on custom plates or prewired options.
- **Large multi-compartment boxes.** Provides adequate wiring capacity and easily isolates power and communication services.
- **Ease of installation.** CRFB Series Floor Boxes are designed to be installed before or after floor coverings have been installed.
- **Accepts the Evolution™ Series Poke-Thru Covers.** The CRFB Series Floor Box has been designed to accept the round 8" Evolution Series Poke-Thru Covers, increasing the ability to match aesthetics throughout the building. NEW!
- **Configurable.** CRFB Series Floor Boxes can be field-configured or reconfigured to accommodate power only, communication only, audio/video only, or combinations of all three power, communication and audio/video in a single floor box unit. NEW!
- **Flexible box design.** Flexible box design has been improved with a tunnel feature that allows for the two outer compartments to be used for a single service, while the other two compartments are used for different services.
- **Range of Conduit sizes.** Wide range of knockouts 1/2", 3/4", 1-1/4" and 2" trade size allow for most conduit sizes. NEW!
- **Meets ADA Accessibility Guidelines.** Wide trim flange is designed to meet the ADA Accessibility Guidelines as it pertains to ADA Standard 4.5 which addresses changes in floor and ground surface levels. The poke-thru trim flanges are beveled so the slope is no greater than 1:2 ratio.
- **Fits into diffuser openings.** CRFB Series Floor Boxes are designed to be installed in a standard round diffuser opening. **NOTE:** Most raised floor system manufacturers precut their panels to fit round diffusers.
- **Audio/video ready.** CRFB Series Floor Boxes have been designed to accept a wide range of audio/video devices from most manufacturers. NEW!
- **Compatible with wood floors.** CRFB Series Floor Boxes are designed to be used in wood floor applications such as: stages, altars, and balconies. NEW!
- **Meets Buy American Act.** the CRFB Series floor boxes are manufactured in the United States and comply with all BAA (Buy American Act) and NAFTA (North American Free Trade Act) requirements. NEW!
- **TopGuard™ Protection**. Integral design component that prevents water, dirt, and debris from entering power and communication compartments. Meets and exceeds all UL scrub water exclusion requirements for tile and carpet floors.
- **Datacom connectivity options.** Accepts industry standard proprietary devices from a wide range of manufacturers to provide a seamless and aesthetically pleasing interface for voice, data, audio, and video applications at the point-of-use.
- **Listed by Underwriters Laboratories Inc. to U.S. and Canadian safety standards for raised floors and wood floors.**
- **Meets NEC Section 300-22(C).** The AC, AF, SAF, and CRFB Series Floor Boxes are suitable for use in air handling spaces and raised floor plenums.

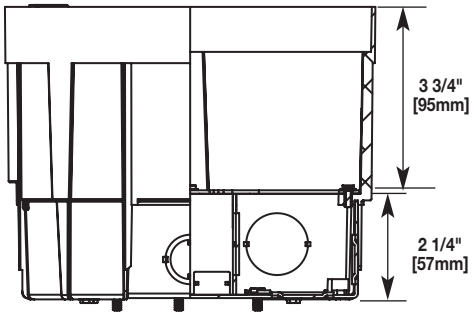
CRFB Series Floor Box Assembly Details

The CRFB Series Floor Box housing is die-cast aluminum construction with stamped steel bottom plate.

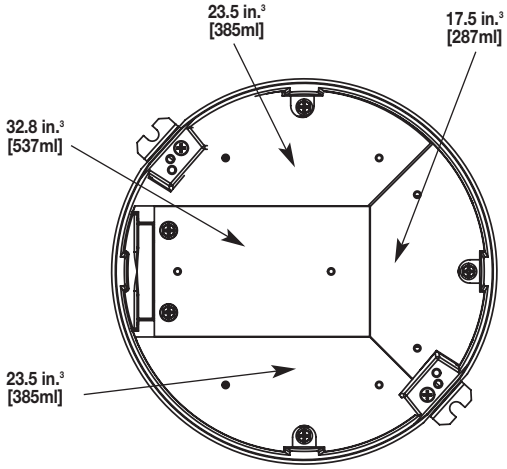


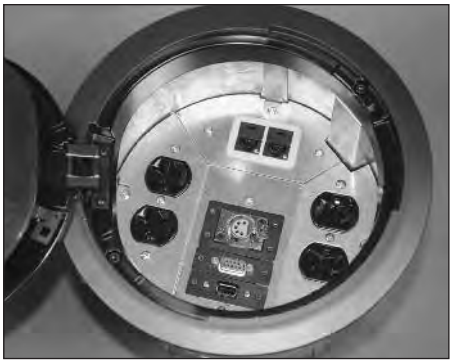


COMPARTMENT DEPTH

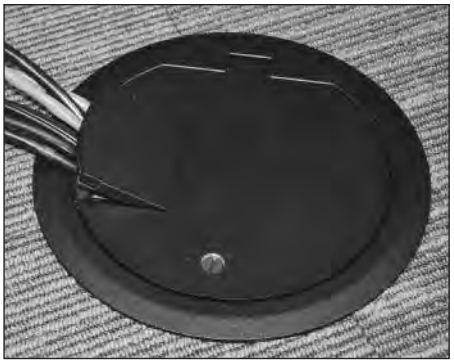


COMPARTMENT VOLUMES

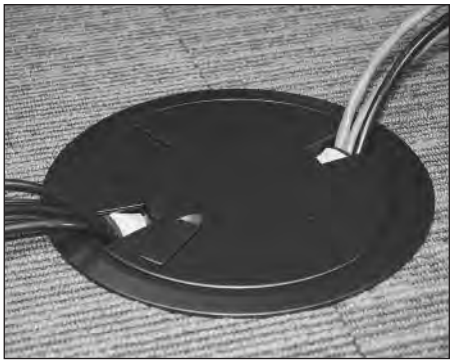




CRFB Series four-compartment configurable box.

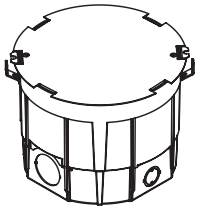
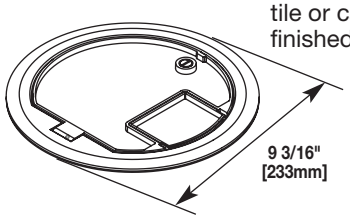
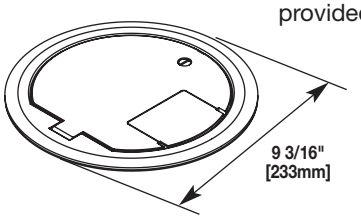
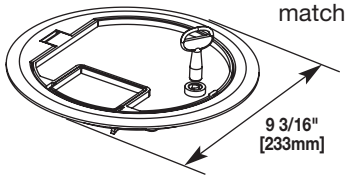
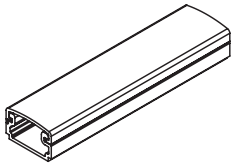


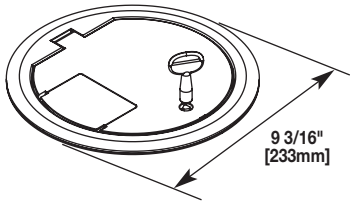
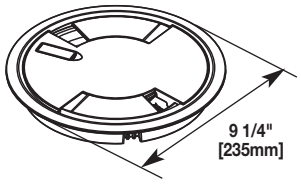
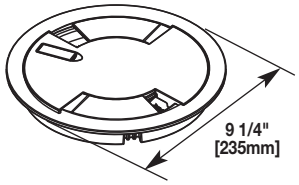
New egress design for CRFB Series Floor Box Covers offers larger wire/cable egress with locking feature.



Cables egress from a CRFB Series Floor Box with Evolution Series Poke-Thru Cover.

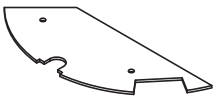
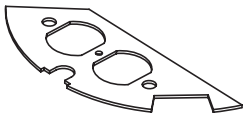
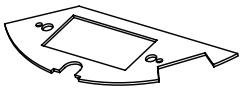
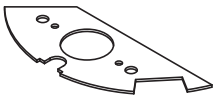
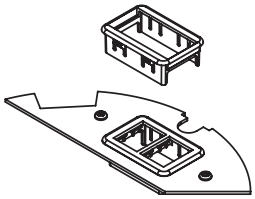
CRFB Series Floor Box Product Information

Catalog No./Item	Description/Specifications
CRFB4 	**CRFB Housing** – Die-cast aluminum construction with stamped steel bottom plate. Includes 3 duplex receptacle plates, 1 center communication plate and 3 cable pass through grommets for 1" trade size tunnel. **NOTE: Floor thickness range (including floor covering) 3/8" - 2" [9.5mm - 51mm].**
CRFBCTCBK **CRFBCTCBS** **CRFBCTCNK** **CRFBCTCBZ** **CRFBCTCGY** 	**Surface Style Cover Assembly** – Available in die cast aluminum with a painted black (BK), brass (BS), nickel (NK), bronze (BZ) or gray (GY) finish. Insert areas allow for tile or carpet cutouts to match finished floor.
CRFBBTCBK **CRFBBTCBS** **CRFBBTCNK** **CRFBBTCBZ** **CRFBBTCGY** 	**Surface Style Cover Assembly** – Available in die cast aluminum with a painted black (BK), brass (BS), nickel (NK), bronze (BZ) or gray (GY) finish. No cutouts are provided for floor coverings.
CRFBCTCBKTR **CRFBCTCBSTR** **CRFBCTCNKTR** **CRFBCTCBZTR** **CRFBCTCGYTR** 	**Tamper Resistant Surface Style Cover Assembly** – Available in die cast aluminum with a painted black (BK), brass (BS), nickel (NK), bronze (BZ) or gray (GY) finish. Lid has built-in key locking feature for tamper resistance. Insert areas allow for tile or carpet cutouts to match finished floor.
CRFB-TUN 	**Tunnel –** Tunnel allows the two outer compartments to be utilized for one service while the center two compartments are utilized for other services.

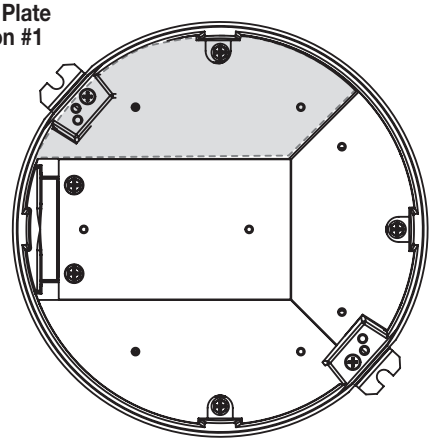
Catalog No./Item	Description/Specifications
CRFBBTCBKTR **CRFBBTCBSTR** **CRFBBTCNKTR** **CRFBBTCBZTR** **CRFBBTCGYTR** 	**Tamper Resistant Surface Style Cover Assembly** – Available in die cast aluminum with a painted black (BK), brass (BS), nickel (NK), bronze (BZ) or gray (GY) finish. No cutouts are provided. Lid has built-in key locking feature for tamper resistance.
8CTCGY* **8CTCBK*** **8CTCBS*** **8CTCBZ*** **8CTCNK*** 	**Surface Style Cover Assembly –** Die-cast aluminum cover assembly. Cover assembly is available in the following painted finishes: (BK) black, (GY) gray, (NK) nickel, (BS) brass, or (BZ) bronze.
8CTGY* **8CTBK*** **8CTBS*** **8CTBZ*** **8CTNK*** 	**Flush Style Cover Assembly –** Die-cast aluminum cover assembly. Cover assembly is available in the following painted finishes: (BK) black, (GY) gray, (NK) nickel, (BS) brass, or (BZ) bronze.

*** Add suffix "TR" to the end of the part number to indicate tamper-resistant cover assembly. Tamper-resistant versions are secured with a single tamper-resistant screw.**

CRFB Series Device Plates for Location 1 Ordering Information

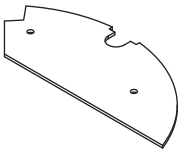
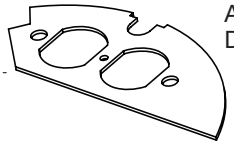
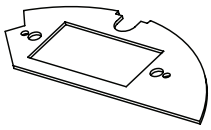
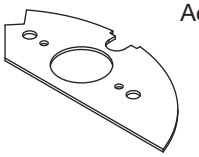
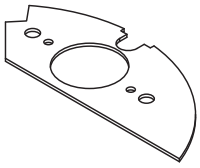
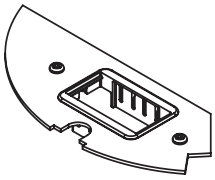
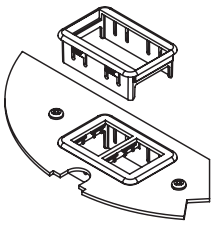
Catalog No./Item	Description/Specifications
CRFB-B-1 	**Blank Device Plate #1** – Used to close off unused gang.
CRFB-D-1 	**Duplex Device Plate** – Accepts standard 15A and 20A Duplex Receptacles.
CRFB-GFI-1 	**GFCI/Decorator Plate** – Accepts standard GFCI or Decorator Style Receptacles.
CRFB-SR1-1 	**1.39" [35mm] Device Plate** – Accepts single device 1.39" [35mm].
CRFB-AB-1 	**Communication Device Plate** – Accepts two (2) ports of communication devices. Includes one (1) Wiremold CM Series Open System adapter and inserts.
CRFB-RT-1 	**Communication Device Plate** – Accepts two (2) ports of communication devices. Includes one (1) Ortronics® Series II and one (1) TracJack adapter.

Device Plate Location #1

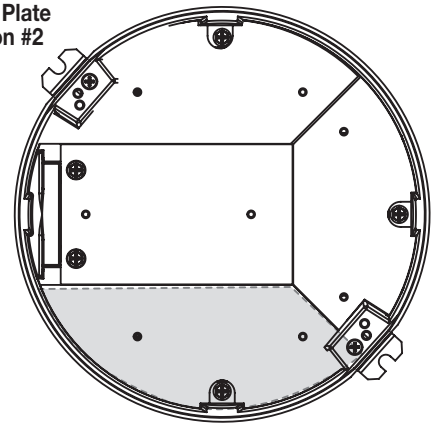


NOTE: Standard sizes for device plates for Plate Location 1 are 6 11/32" [161mm] x 2 3/4" [62mm].

CRFB Series Device Plates for Location 2 Ordering Information

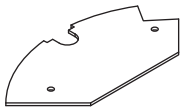
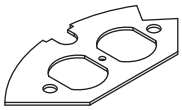
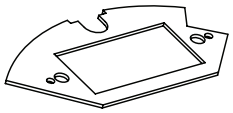
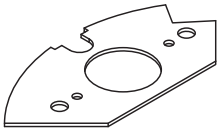
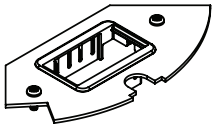
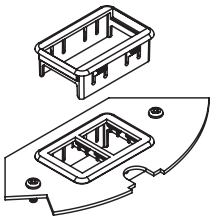
Catalog No./Item	Description/Specifications
CRFB-B-2 	**Blank Device Plate #2** – Used to close off unused gang.
CRFB-D-2 	**Duplex Device Plate** – Accepts standard 15A and 20A Duplex Receptacles.
CRFB-GFI-2 	**GFCI/Decorator Plate** – Accepts standard GFCI or Decorator Style Receptacles.
CRFB-SR1-2 	**1.39" [35mm] Device Plate** – Accepts single device 1.39" [35mm].
CRFB-SR2-2 	**1.6" [41mm] Device Plate** – Accepts single device 1.6" [41mm]. **NOTE: When using a 30A device, egress opening must be located directly over receptacle.**
CRFB-AB-2 	**Communication Device Plate** – Accepts two (2) ports of communication devices. Includes one (1) Wiremold CM Series Open System adapter and inserts.
CRFB-RT-2 	**Communication Device Plate** – Accepts two (2) ports of communication devices. Includes one (1) Ortronics® Series II and one (1) TracJack adapter.

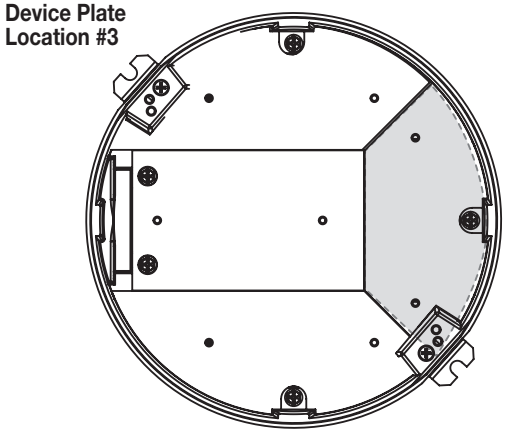
Device Plate Location #2



NOTE: Standard sizes for device plates for Plate Location 2 are 5 7/32" [132mm] x 2 3/4" [62mm].

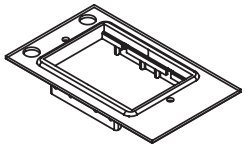
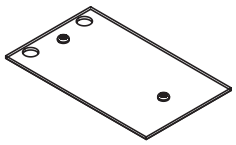
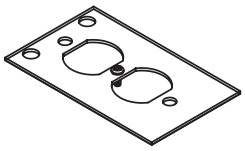
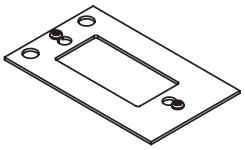
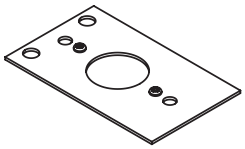
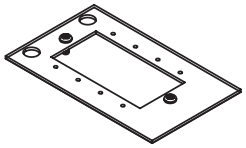
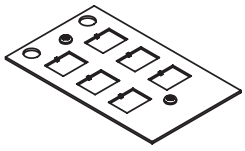
CRFB Series Device Plates for Location 3 Ordering Information

Catalog No./Item	Description/Specifications
CRFB-B-3 	**Blank Device Plate #3** – Used to close off unused gang.
CRFB-D-3 	**Duplex Device Plate** – Accepts standard 15A and 20A Duplex Receptacles.
CRFB-GFI-3 	**GFCI/Decorator Plate** – Accepts standard GFCI or Decorator Style Receptacles.
CRFB-SR1-3 	**1.39" [35mm] Device Plate** – Accepts single device 1.39" [35mm].
CRFB-AB-3 	**Communication Device Plate** – Accepts two (2) ports of communication devices. Includes one (1) Wiremold CM Series Open System adapter and inserts.
CRFB-RT-3 	**Communication Device Plate** – Accepts two (2) ports of communication devices. Includes one (1) Ortronics® Series II and one (1) TracJack adapter.

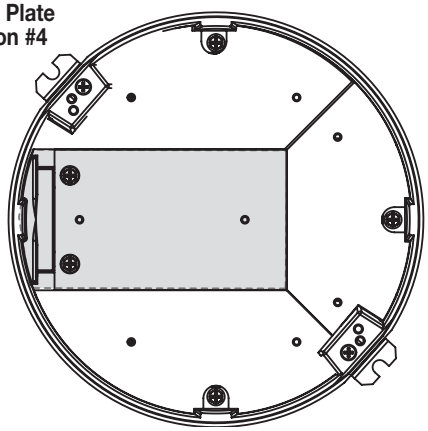


NOTE: Standard sizes for device plates for Plate Location 3 are 5 7/32" [132mm] x 2 3/4" [62mm].

CRFB Series Device Plates for Location 4 Ordering Information

Catalog No./Item	Description/Specifications
CRFB-BEZ6A-4 	**Center 6A Comm Bezel** – 6A communications plate. Includes: one (1) 6A Wiremold Open System Bezel, one (1) Ortronics® Series II Bezel, one (1) Ortronics® TracJack Bezel. Modular jacks sold separately.
CRFB-B-4 	**Center Blank Plate** – Used to close off unused gang.
CRFB-D-4 	**Center Duplex Plate** – Accepts standard 15A and 20A Duplex Receptacles.
CRFB-GFI-4 	**Center Decorator Style Plate** – Accepts standard GFCI or Decorator Style Receptacles.
CRFB-SR1-4 	**Center 1.39" [35mm] Device Plate** – Single Device 1.39" [35mm].
CRFB-MAAP-4 	**Extron® MAAP Plate** – Holds 4 Extron® Electronics MAAP device plates.
CRFB-6COM-4 	**Center Communications Plate** – Communications plate with six (6) RJ knockouts. Modular keystone jacks sold separately.

Device Plate Location #4



NOTE: Standard sizes for device plates for Plate Location 4 are 5 7/32" [132mm] x 2 3/4" [62mm].

NOTES

WIREMOLD
U.S. and International:
60 Woodlawn Street • West Hartford, CT 06110
1-800-621-0049 • FAX 860-232-2062 • Outside U.S. 860-233-6251
Canada:
570 Applewood Crescent • Vaughan, Ontario L4K 4B4
1-800-723-5175 • FAX 905-738-9721

APPENDIX G – SUSTAINABLE TENANT GUIDELINE MANUAL

Hines

609 Main
Houston, Texas
Sustainable Tenant Guideline – First Draft

Prepared by:

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IES INTEGRATED ENVIRONMENTAL SOLUTIONS

December 2014

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INTRODUCTION

Purpose of Sustainable Tenant Guideline

This guide is intended to highlight the green building features in place aimed at enhancing building performance and working environment for potential Tenant occupancy. The guide also assists the Tenant's design team in maximizing those building design provisions and promotes a responsible Tenant interior build out that achieves a healthy, efficient, and environmentally-conscious work space.

By selecting 609 Main, the prospective Tenant has made an environmentally-sensitive choice. The 609 Main project provides significant advantages and a head start toward LEED for Commercial Interiors (CI) certification for the project team.

The LEED-CI Rating System has been developed with the Commercial Tenant in mind, and this guide contributes to the design process by highlighting the strategies, technologies, and materials that assist with LEED-CI credit compliance. Property ownership strongly encourages the Tenant to consider seeking its own LEED-CI certification for its new space.

Making the Business Case for LEED for Commercial Interiors (CI)

Over 2,000 diverse projects have registered in the LEED-CI program since it began its pilot program including Harvard School of Public Health, GE Oil and Gas, Starbucks Mariposa & Bryant, HOK Offices, Humanscale Atlanta Office, Morgan Stanley- CWM Call Center- Ohio and several other market sector tenant types. The benefits of pursuing LEED-CI certification are based on the following critical factors: minimizing hard and soft costs, reduced liability, increased value, and community benefits.

Hard Costs

Reduce Operating Cost

The U.S. Environmental Protection Agency shows by using energy efficient strategies, tenants reduce operating costs by $0.50 per square foot annually, equivalent to reducing energy usage by 30%. This benefit yields a significant savings for an average size lease space.

Reduce Churn Cost

On average, corporations typically relocate approximately 25% of their employees within a building annually. The estimated cost for relocation or "churn" is

approximately $2,500 per employee. When tenant interior spaces are created with more flexible integrated design principles promoted by LEED-Commercial Interiors (CI), corporations can reduce these costs by 90%. For example, a building materials manufacturing firm, Owens Corning in Toledo, Ohio, has invested in a raised access floor with under-floor air distribution systems that significantly reduce churn costs and give greater control to the individuals within their work space. Fort Stewart, Georgia also included raised access flooring with similar results [1].

Soft Cost

Daylighting Increases Productivity

Increased access to daylighting in the work space demonstrates a measurable increase in labor productivity. Carnegie Mellon University recently completed a study confirming the relationship of occupant lighting controls and increases in productivity by 7.1% [2].

Escalations in employee productivity, in tandem with lower operating costs, equals increased real estate value. Costco, The California State Auto Association, and Marin County Day School have all benefited from daylighting strategies [3].

Reducing Absenteeism and Turnover

Environmental strategies, such as daylighting, minimize soft costs by reducing absenteeism. The ING Bank Headquarters in Amsterdam utilizes only 10% of the energy of its predecessor while reducing worker absenteeism by 15% and the annual savings have been an astounding $3.4 million [4].

1. U.S. Army Corps of Engineers (2003), Analysis of Raised Access Floor vs. Conventional Distribution (http://www.tateaccessfloors.com/pdf/cost_study_accessfloorrtkl.pdf)
2. Yun Gu of Carnegie Mellon University Green Design Institute (2011) , The Impacts of Real-Time Knowledge Based Personal Lighting Control on Energy Consumption, User Satisfaction, and Task Performance in Offices (http://www.cmu.edu/architecture/research/grad_work/2011_phdbpd_gu_yun.pdf)
3. Rensselaer Polytechnic Institute Lighting Research Center (2011), Daylight Dividends (www.lrc.rpi.edu/programs/daylighting)
4. Susan Ho (2007), Green Office Buildings: Design Strategies Used in the ING Bank (http://www.greendesignetc.net/buildings_07(pdf)/Ho_Susan_ING_Bank(paper).pdf)

Reduce Liability

The LEED for Commercial Interiors Rating System promotes sustainable building practices that mitigate harmful pollutants from entering and developing within the Tenant space thus improving indoor air quality and reducing the likelihood of mold. The following are two examples of recent litigation involving buildings that did not follow these principles.

J.J. Acquisition Corp. v. Pacific Gulf Properties

Employees of a California newspaper filed suit in September 2000 against the owner of their building, seeking $10 million for illnesses resulting from exposure to several types of toxic mold.

Bloomquist v. Wapello

The plaintiffs successfully sued the employer and building for creating an unsafe environment via inadequate ventilation and pesticides.

The McGraw Hill Construction Mold Update Center provides additional resources on mold avoidance and abatement [5].

Increased Value

CoStar Group reports, on a national level, tenants are springing for sustainable and energy-efficient buildings and that higher-than-normal occupancy levels and rental rates are seen at such properties [6]. Another study examines two office buildings in the Pacific Northwest and one in Canada, which confirms the impact of sustainability and energy efficiency on increased property value [7]. In conclusion, buildings with LEED certification or the government's Energy Star label, on average, achieve higher occupancy levels, lease rates, and sale prices than non-certified buildings [6].

Community Benefit

Projects pursuing LEED for Commercial Interiors benefit local communities by strengthening the tenant's local economy, improving and protecting the quality of the local environment, and enhancing the quality of life and the well-being of all people in the tenant's community.

5. McGraw Hill Construction Mold Update Center (2013)
6. CoStar Group (2008), CoStar Study Finds Energy Star, LEED Buildings Outperform Peers (http://www.costar.com/News/Article.aspx?id=D968F1E0DCF73712B03A099E0E99C679)
7. Cascadia Green Building Council (2009), High Performance Green Building: What is it Worth? (http://legacy.cascadiagbc.org/news/GBValueStudy.pdf)

CORE & SHELL ACCOMPLISHMENTS

LEED-CS (Core and Shell) – Design phase planning

609 Main in Houston, TX has achieved a LEED Core and Shell Certification at the level of Platinum with 45 credits. The project was continually monitored throughout the construction process to not only confirm the implementation of the LEED-CS design features that were originally intended, but to track progress of construction efforts and to identify any additional LEED-CS design features that may be incorporated.

This document was updated periodically throughout the design and construction process as the credits and implementation strategies were refined. The following is a general discussion of the accomplishments and features of the building as recognized by the Core and Shell product.

Sustainable Sites

Beginning with the selection of the site, the credits for this project range from the remediation of contamination on the site and building on a site with desirable environmental factors to incorporation of extensive vegetated and pedestrian oriented open space and smart stormwater management and rainwater harvest. Other site attributes include exceptional access to public transportation, tremendous existing density and access to amenities in the surrounding area as well as design of vegetated roofing with accessible terraces.

Water Efficiency

Utilization of low flow water fixtures in the building helped to reduce potable water use by over 40% compared to code requirements. This includes low flow lavatory faucets, high efficiency low flow toilets, and the use of reduced flow urinals in men's restrooms.

Also important is the conscientious design of the landscape to include plantings requiring less watering and an efficient irrigation system to reduce the potable water use for this function by at least 50%. And as noted above, rainwater harvest has been incorporated and is being used as part of the greater water balance and management. The rainwater will be harvested for landscape irrigation uses.

Energy & Atmosphere

609 Main is a 48 story tower with retail spaces at level 1, a conference and fitness center at Level 2, and 35 levels of office floors with one level of mechanical penthouse. Additionally, 13 levels of parking are sandwiched between the

conference center and office levels. The office levels are served by dual-path air handlers that include both overhead and underfloor air distribution for optimal efficiency, flexibility and superior air quality.

Lighting for most of the office tenant spaces is to be chosen by the tenant. In the parking areas the lighting consists of surface mounted fluorescent light fixtures.

Building Energy Efficiency Measures

This information may be modified pending GBCI review of credits.
Building envelope – This high performance office building has double pane low-e glass and high insulation exterior walls. These features help to lower building HVAC loads.

Heating and Cooling – An advanced hybrid (dual-path) HVAC system has been designed that decouples the building envelope loads from internal loads resulting in a highly optimized system operation. Overlap of different load profiles often results in zonal reheat which is minimized with this system. It also allows for the system to operate at minimum supply during low load conditions. Under floor air supply system creates opportunity for free reheat using return air recirculation with elevated zone supply temperature of 65F. The building HVAC system has also been designed with two AHUs per floor (separate AHU for North and South halves of the building), which also results in optimized operation of the building.

Lighting – The project utilized high efficiency lighting on both the interior and exterior of the building. Efficient lighting in the parking garage results in more savings as the parking garage lights operate 24/7. Lighting design results in approximately XX% interior lighting savings, and a XX% exterior lighting savings when compared to the ASHRAE 90.1-2004 baseline.

These features combine to create an environment for the tenant that is not only energy efficient, but maintains a high level of environmental air quality.

Finally, the building has an extensive network of sensors and building management controls for measurement and verification of the performance of the building.

Tenant Sub-metering Guidelines
The central Building Management Control System (BMCS) installed at *609 Main* will have control and monitoring capabilities. As such, the capability will be included for tenants to monitor their utility usage in accordance with LEED for Commercial Interiors, Energy and Atmosphere Credit 3. See Appendix E for Tenant Sub-metering Guidelines.

Green Power
The ownership of the building is investigating various methods for reducing the environmental footprint of the power being utilized by the core and shell elements of the electrical consumption. To accomplish this, ownership intends to engage in a

renewable energy contract to provide a significant portion of the core and shell building's electricity from renewable sources.

Materials & Resources

The item in this category that affects tenants most directly is the installation of intermediate collection points to enable the tenants to institute recycling practices for their spaces.

During the demolition and the construction of the core and shell of the building, the contractor has committed to achieving at least 75% diversion rate of materials from landfill utilizing recycling and reuse.

Additionally, this building is documenting performance in the use of recycled materials in building products and the use of local/regional materials. It is the project team's goal to use materials of which at least 10% (based on cost) is recycled content, and at least 20% was manufactured and harvested/extracted locally or regionally. This illustrates that similar levels of performance are likely achievable in any tenant fit out (LEED-CI).

Indoor Environmental Quality

One of the core values for the Hines Ownership group is providing buildings with superior indoor air quality performance. This enabled this project to pursue ten (10) credits in this category and is highly amenable to tenants achieving similar levels of success in their build out performance. This non-smoking building is provided with a high quality ventilation system which will be protected from debris during the construction period. The construction process will utilize low emitting adhesives and sealants, paints and coatings and the carpet will be a low VOC emitting type. Additionally, the building systems are designed to meet thermal comfort standards and provide thermal comfort controls for over 50% of building occupants.

Finally, with the high performance floor to ceiling glass curtain wall system, a high degree of daylighting and views are possible if the tenant pays particular attention to the layout of their spaces.

Innovation & Design Process

Innovation and design credits are accomplished by either significantly exceeding the requirements for an existing credit or for providing documented performance in an area not covered by any of the existing credits.

This project is pursuing these credits in the areas of exemplary performance in water use reduction, exemplary performance in reduced heat islands by having all parking under cover, exemplary performance in development density, and exemplary performance in transit access given the building's proximity to extensive public transportation.

TENANT OPPORTUNITIES WITH LEED-CI

As previously mentioned, by selecting 609 Main, the opportunities afforded prospective tenants to achieve a LEED-CI rating are significantly increased. Free Credits and Head-Start Credits are the two major categories in which the base building design will significantly assist the Tenant in achieving a LEED for Commercial Interiors rating while minimizing costs and design efforts. Credits not counted as Free Credits or Head-Start Credits are still achievable based on Tenant's design and build-out of the Tenant's space. Only a few credits are not applicable to this site.

Free Credits

First, there are several credits and prerequisites that the tenant will automatically qualify for just for having chosen 609 Main. These credits are known as Free Credits. The documentation of these points will have already been done by the building LEED AP consultant and accepted by the U.S. Green Building Council, further reducing the tenant's documentation costs. These Free Credits are noted on Table A: LEED for Commercial Interiors v2009 Registered Project Checklist.

Head-Start Credits

Second, in the base building, infrastructure has been provided to assist with credit compliance for certain prerequisites and credits. These Head-Start Credits benefit potential tenants easing the certification process with minimal cost impact. These Head-Start Credits are noted on Table A: LEED for Commercial Interiors v2009 Registered Project Checklist.

THE BOTTOM LINE

To achieve a LEED for Commercial Interiors Certification 40 points must be achieved through credit compliance. As demonstrated in this LEED for Commercial Interiors v2009 Registered Project Checklist that follows, the base building will contribute to six (6) Prerequisites and twenty-two (22) Credits. This guide provides guidance on how to achieve these prerequisites and credits. Ownership would be happy to assist the tenant in identifying a LEED Accredited Professional (LEED AP) or consultant to assist its design team in this most important undertaking.

Table A: LEED-CI v2009 Registered Project Checklist

Project Name: **LEED-CI (Commercial Interiors) Tenant**

Project Address: **609 Main**
609 Main Street
Houston, TX 77002

Yes	?	No			
17			**Sustainable Sites**	Possible Points	**21**
				Free Prerequisites	**N/A**
				Free Points	**17**
				Head Start Prerequisites	**N/A**
				Head Start Points	
5			Credit 1	**Site Selection - Select a LEED Certified Building - OR -**	5
				Locate the tenant space in a building with following characteristics (up to 5 points):	
			Path 1	**Brownfield Redevelopment**	1
			Path 2	**Stormwater Design: Quantity Control**	1
			Path 3	**Stormwater Design: Quality Control**	1
			Path 4	**Heat Island Reduction, Non-Roof**	1
			Path 5	**Heat-Island Reduction, Roof**	1
			Path 6	**Light Pollution Reduction**	1
			Path 7	**Water Efficient Irrigation: Reduce by 50%**	2
			Path 8	**Water Efficient Irrigation: No Potable Use or No Irrigation**	2
			Path 9	**Innovative Wastewater Technologies**	2
			Path 10	**Water Use Reduction: 30% Reduction**	1
			Path 11	**Onsite Renewable Energy**	2
			Path 12	**Other Quantifiable Environmental Performance**	1
6			Credit 2	**Development Density and Community Connectivity**	6
6			Credit 3.1	**Alternative Transportation, Public Transportation Access**	6
			Credit 3.2	**Alternative Transportation, Bicycle Storage & Changing Rooms**	2
			Credit 3.3	**Alternative Transportation, Parking Availability**	2

Yes	?	No			
	6		**Water Efficiency**	Possible Points	**11**
				Free Prerequisites	**N/A**
				Free Points	**0**
				Head Start Prerequisites	**N/A**
				Head Start Points	**6-11**
Y			Prereq 1	**Water Use Reduction:** 20% Reduction	Required
	6		Credit 1.1	**Water Use Reduction:** 30% (6 points), 35% (8 points), 40% (11points)	6-11

Yes	?	No			
2	**8**		**Energy & Atmosphere**	Possible Points	**37**
				Free Prerequisites	**1**
				Free Points	**N/A**
				Head Start Prerequisites	**2**
				Head Start Points	**7-10**

Y			Prereq 1	**Fundamental Commissioning**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**CFC Reduction in HVAC&R Equipment**	Required
			Credit 1.1	**Optimize Energy Performance -** Lighting Power	1-5
			Credit 1.2	**Optimize Energy Performance** - Lighting Controls	1-3
	5		Credit 1.3	**Optimize Energy Performance** – HVAC	5-10
			Credit 1.4	**Optimize Energy Performance** - Equipment and Appliances	1-4
			Credit 2	**Enhanced Commissioning**	5
2	3		Credit 3	**Energy Use, Measurement & Payment Accountability**	2-5
			Credit 4	**Green Power**	5

Yes	?	No			
1	**1**		**Materials & Resources**	Possible Points	**14**
				Free Prerequisites	**N/A**
				Free Points	**N/A**
				Head Start Prerequisites	**1**
				Head Start Points	**1**

Y			Prereq 1	**Storage and Collection of Recyclables**	Required
	1		Credit 1.1	**Tenant Space, Long Term Commitment**	1
			Credit 1.2	**Building Reuse, Maintain 40% of Interior Non-Structural Components**	1-2
			Credit 1.3	**Building Reuse, Maintain 60% of Interior Non-Structural Components**	
			Credit 2	**Construction Waste Management, Divert 50% From Landfill**	1-2
				Construction Waste Management, Divert 75% From Landfill	
			Credit 3.1	**Resource Reuse, 5%**	1-2
				Resource Reuse, 10%	
			Credit 3.2	**Resource Reuse, 30% Furniture and Furnishings**	1
			Credit 4	**Recycled Content, 10% (post-consumer + ½ pre-consumer)**	1-2
				Recycled Content, 20% (post-consumer + ½ pre-consumer)	
			Credit 5	**Regional Materials, 20% Manufactured Regionally**	1-2
				Regional Materials, 10% Extracted and Manufactured Regionally	
			Credit 6	**Rapidly Renewable Materials**	1
			Credit 7	**Certified Wood**	1

Yes	?	No			
1	**4**		**Indoor Environmental Quality**	Possible Points	**17**
				Free Prerequisites	**1**
				Free Points	
				Head Start Prerequisites	**1**
				Head Start Points	**6**

Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
	1		Credit 1	**Outside Air Delivery Monitoring**	1
	1		Credit 2	**Increased Ventilation**	1
			Credit 3.1	**Construction IAQ Management Plan, During Construction**	1
			Credit 3.2	**Construction IAQ Management Plan, Before Occupancy**	1
			Credit 4.1	**Low-Emitting Materials, Adhesives and Sealants**	1
			Credit 4.2	**Low-Emitting Materials, Paints and Coatings**	1
			Credit 4.3	**Low-Emitting Materials, Flooring Systems**	1
			Credit 4.4	**Low-Emitting Materials, Composite Wood and Laminate Adhesives**	1
			Credit 4.5	**Low-Emitting Materials, Systems Furniture and Seating**	1
			Credit 5	**Indoor Chemical and Pollutant Source Control**	1
			Credit 6.1	**Controllability of Systems, Lighting**	1
	1		Credit 6.2	**Controllability of Systems, Thermal Comfort**	1
1			Credit 7.1	**Thermal Comfort** – Design	1
			Credit 7.2	**Thermal Comfort** - Verification	1
	1		Credit 8.1	**Daylight & Views** - Daylight 75% of Spaces	1-2
				Daylight & Views - Daylight 90% of Spaces	
	1		Credit 8.2	**Daylight & Views** - Views for 90% of Seated Spaces	1

Yes	?	No			
2			**Innovation & Design Process**	Possible Points	**6**
				Free Prerequisites	**N/A**
				Free Points	**2**
				Head Start Prerequisites	**N/A**
				Head Start Points	**0**

1			Credit 1.1	**Innovation in Design: SSc2 Exemplary Development Density**	1
			Credit 1.2	**Innovation in Design: Green Cleaning**	1
			Credit 1.3	**Innovation in Design: Green Power**	1
			Credit 1.4	**Innovation in Design: Integrated Pest Management**	1
1			Credit 1.5	**Innovation in Design: SSc3.1 Exemplary Public Transit**	1
			Credit 2	**LEED™ Accredited Professional**	1

Yes	?	No			
22	**19**		**Totals (estimates)**	Possible Points	**110**

Certified 40 to 49 points **Silver** 50 to 59 points **Gold** 60 to 79 points **Platinum** 80 to 110 points

LEED-CI Resources

While this document serves as an educational tool and design guideline, the best resource and the most current information on LEED-CI, benefits, current projects, and "how to," is available at www.usgbc.org. There the tenant will find the resources necessary to facilitate LEED-CI Certification of its space including:

LEED-CI v2009 Rating System
LEED-CI v2009 Reference Guide
LEED Training Workshops
LEED Accredited Professional's Directory
USGBC Technical Support Website
LEED Case Studies

To facilitate the tenant in its review of the rating system, we have included in Appendix B links to the most current LEED-CI Rating System as of the date of this writing (currently v2009). There the tenant will find an abbreviated explanation of each LEED-CI Credit with the environmental impact, requirements, submittals, and potential strategies for achievement. For Certification purposes, please refer to the expanded details in the LEED-CI Reference Guide.

Some of 609 Main's tenants will be specialty tenants with non-corporate program needs. LEED for Retail: Commercial Interiors v2009 addresses the specific differences and opportunities for retail projects. According to the USGBC, the development of LEED for Retail-CI was based on the recommendations of the LEED for Retail Committee and over 100 pilot projects. In addition to containing links to the latest LEED-CI rating system documents, Appendix C also provides a link the latest resources for the LEED Retail-CI rating system.

LEED-COMMERCIAL INTERIORS CATEGORIES

Sustainable Sites

SSc1: Site Selection- Select a LEED Building – (5 points)

- By selecting a LEED Certified building, Tenants in 609 Main automatically earn SSc1: Site Selection, Select a LEED Building when LEED-CI Certification is pursued. Since this is considered a "free" credit, the base building LEED Core and Shell Certificate has been provided in Appendix A to document the accomplishments of the base building. TO BE INCLUDED IN MANUAL UPON CS CERTIFICATION.

SSc2: Development Density and Community Connectivity – (6 points)

- 609 Main is located in a vibrant walkable community with a minimum density of 60,000 square feet per acre net (two-story downtown development). Density Studies documents provided in Appendix C, which show the project has documented compliance with the exemplary performance threshold for this credit and as such this document lists the exemplary SSc2 as a "free" ID credit for an ID+C certification. TO BE INCLUDED IN MANUAL UPON CS CERTIFICATION.

SSc3.1: Alternative Transportation, Public Transportation Access – (6 points)

- 609 Main is located within a ¼ mile walking distance to stops for multiple bus routes and within a ½ mile walking distance to three metro light rail stations. As a result, Tenants will automatically earn this credit (plus an ID credit for exemplary performance) when pursuing LEED-CI Certification. Note the base building has been able to obtain an additional point for Exemplary Performance in this credit area. Bus stop locations, metro station locations, route information, and schedules have been provided in Appendix C. TO BE INCLUDED IN MANUAL UPON CS CERTIFICATION.

Water Efficiency

WEp1: Water Use Reduction 20% – (Required)

- *609 Main has* installed *1.28 gpf* low-flow water closets, *0.125 gpf* urinals, and *0.5 gpm* lavatory faucets; however, this prerequisite is related to only those fixtures to be included in the tenant scope of work. If the tenant is not installing fixtures as part of its scope of work then it is exempt from meeting the requirements of the prerequisite but cannot pursue any points related to WEc1. If the Tenant claims exemption to this credit, the project may not pursue any points related to WEc1: Water Use Reduction, 30%, 35%, and 40%. This is classified as a Head Start Prerequisite. Note all prerequisites must be achieved in order to pursue certification.

WEc1: Water Use Reduction 30% / 35% / 40% – (6-11 points)

- *609 Main* includes the water efficient fixtures noted above. These efficient fixtures can provide the Tenant Head Start credit to earn point(s) for water use reduction. The tenant must include the base building fixtures that will be used by its occupants and its own fixtures in the calculation of this credit.

WATER REDUCTION PAYBACK CASE STUDIES

Example 1
One Boston facility took advantage of renovations to the building to replace 126 existing 3.5 gpf toilets with 1.6 gpf toilets. When completed, the change will reduce total water use by 15%. With an implementation cost of $32,000 and estimated annual savings of $22,800, payback occurs in 1.4 years.[8]

Example 2
By installing 30 faucet aerators, a commercial building in Brookline could reduce water consumption by 190,000 gallons per year. The cost of the devices and labor is approximately $300 and the savings for the retrofit are estimated at $1,250 per year -- a payback of 2 months.[8]

8. Massachusetts Water Resources Authority's Water Efficiency and Management in Commercial Buildings (2009), Water Efficiency and Management of Commercial Buildings. (http://www.mwra.state.ma.us/04water/html/bullet4.htm)

Energy & Atmosphere

Prerequisites (These items must be completed)

EAp1: Fundamental Commissioning – (Required)

- *609 Main* has commissioned all major base building systems. The base building efforts provide a Head Start for this prerequisite. The commissioning plan has been provided in Appendix D. TO BE INCLUDED AFTER Cx IS COMPLETE.

EAp2: Minimum Energy Performance – (Required)

- *609 Main* meets ASHRAE 90.1-2004 standards. The building includes a complete HVAC system; therefore, additional requirements to meet the prerequisite intent may be minimal. However, particular attention should be paid to the design of lighting systems as reduction of the lighting power density (LPD) by 10% below the ASHRAE 90.1-2007 allowance is required under LEED ID&C v2009. The base building efforts provide a Head Start for this prerequisite.

EAp3: CFC Reduction in HVAC&R Equipment – (Required)

- 609 Main has installed HVAC&R equipment that does not use chlorofluorocarbon (CFC) based refrigerants. As the base building does not have HVAC&R equipment containing CFC-based refrigerants and CFC production in the United States ended in 1995, the project will automatically earn this credit when purchasing new HVAC&R equipment. The EQp3: Fundamental Refrigerant Management is a Free Credit prerequisite.

EAc3: Measurement and Verification – (2-5 points)

- The central Building Management Control System (BMCS) installed at 609 Main will have extensive control and monitoring capabilities. As such, the capability will be included for tenants to monitor their utility usage in accordance with LEED-CI: EAc3. See Appendix E for Tenant Sub-metering Guidelines.

Materials & Resources

Prerequisites (These items must be completed)

MRp1: Storage and Collection of Recyclables – (Required)

- *609 Main* maintains a base building recycling plan (see Appendix F), which provides a space to store recyclables and the opportunity for collection in each tenant space. This credit is a Head Start prerequisite due to the base building's existing recycling plan

MRc1.1: Tenant Space Long Term Commitment – (1 point)

- *609 Main* leasing agents are amenable to lease lengths that meet or exceed the term of 10 years. This credit is a Head Start credit and the project is able to achieve compliance if willing to remain in the lease space for the 10 year duration.

Indoor Environmental Quality

Prerequisites (These items must be completed)

IEQp1: Minimum IAQ Performance – (Required)

- *609 Main* has installed outdoor air equipment that is designed to supply the required amount of outdoor air per ASHRAE 62.1-2004 using the feasible tenant layout provided in Appendix G. This provides a "head start" for earning this prerequisite, which for v2009 ID&C is compliance with ASHRAE 62.1-2007. Compliance is dependent on the layout of the tenant space(s).

IEQp2: Environmental Tobacco Smoke (ETS) Control – (Required)

- *609 Main* has a smoking policy (See Appendix H), which prohibits smoking on the building site by all occupants and users. This policy automatically earns the tenant space this prerequisite.

IEQc1: Outside Air Delivery Monitoring – (1 point)

- The building HVAC system installed in 609 Main includes four dedicated outdoor air handing units (OAHUs) delivering the required outdoor air to each of the two dual-path UFAD units serving the office level floors. Additionally, the system has been designed with the capability to be expanded to accommodate CO2 sensors in tenant spaces providing the tenant a great "head start" to earning this credit.

IEQc5: Indoor Chemical and Pollutant Source Control – (1 point)

- *609 Main* currently has MERV 13 filters at all outdoor air intakes, deck to deck walls and dedicated exhaust systems in all spaces where hazardous gases or chemicals may be present or used, and walk off mats or carpet at all common exterior entrances. Any introduction in tenant spaces of new HVAC equipment which brings in outside air to the space must be equipped with a MERV 13 filter, and any introduction of spaces where hazardous gases or chemicals may be present must have deck to deck partitions or hard ceilings, self-closing doors, and must have a dedicated exhaust. Compliance with these provisions in the base building systems provides a Head Start for earning this credit.

IEQc6: Controllability of Systems – Thermal Comfort – (1 point)

- For Office Levels 12 through 47, the C&S project has been designed to allow for flexible tenant design and accommodation of thermal comfort system control through modular floor diffusers for individual occupants and groups in multi-occupant spaces promoting productivity, comfort, and well-being. This design was made in following ASHRAE Standard 55-2004 considering the environmental conditions for thermal comfort of air speed, air temperature, radiant temperature, and relative humidity.

IEQc7.1: Thermal Comfort: Design – (1 point)

- The C&S project established the thermal comfort conditions as typical in compliance with ASHRAE Standard 55-2004. These design conditions were proposed by the design team and coordinated with the ownership to provide the building occupants with comfortable indoor conditions that support their productivity and well-being. Note; however, that achievement of this credit also depends on tenant space terminal equipment, controls design, and diffuser layout. These elements must be designed in compliance with ASHRAE Standard 55-2004.

IEQc8.2: Daylight & Views: Views for 90% of Seated Spaces – (1 point)

- Assuming tenant use of a layout similar to the assumed feasible tenant layout in Appendix G, *609 Main* has provided adequate glazing to allow 90% of seated regularly occupied spaces to have views to the outdoors. However, credit achievement relies heavily on the layout of the tenant space. Tenant spaces with different layouts which allow greater access to views may be able to achieve this credit.

INDOOR AIR QUALITY CASE STUDY

For state of California employees, “a 1% increase in productivity (equal to about 5 minutes per working day) is equal to $600 to $700 per employee per year, or $3 per square foot per year.”[9] Additionally, “the present value of the productivity of benefits is about $35 per square foot for Certified and Silver level buildings, and $55 per square foot for Gold and Platinum level.” [9]

Regional Priority

Regional Priority credits allow project teams to target geographically-specific environmental priorities. Projects earning the following credits will receive an additional point for each achieved Regional Priority credit. These three credits have been marked as Head Start above and qualify for Regional Priority credit, as well: SSc1: Option 2, Path 2, EAc1.1 (15%), MRc2 (75%), MRc5: Option 1, MRc7 and IEQc8.1 (75%).

Please Note

This guideline does not guarantee LEED for Commercial Interiors certification as that is only deemed by the U.S. Green Building Council and Green Building Certification Institute.

9. Gregory H. Kats (2003). The Green Building Costs and Financial Benefits. (http://www.dnr.sc.gov/marine/NERR/present/highperf/Green%20Building%20Costs_Kats.pdf)

APPENDIX A
LEED-CS Certification Scorecard

The LEED for Core and Shell Certification Scorecard for the 609 Main project will be input here upon certification of the project by GBCI.

APPENDIX B
LEED-CI Rating System Resources

Rating System: LEED 2009 for Commercial Interiors (CI)
http://www.usgbc.org/resources/leed-commercial-interiors-v2009-current-version

Addenda for the LEED 2009 CI Rating System
http://www.usgbc.org/resources/leed-commercial-interiors-redline-v2009-current-version

Rating System: LEED 2009 for Retail Commercial Interiors (Retail-CI)
http://www.usgbc.org/resources/leed-retail-new-construction-v2009-current-version

APPENDIX C
C&S Sites Documentation and Building Standards information

Sites Documentation

Sites documentation for the 609 Main project will be inserted into this section after the final LEED review results are received by GBCI.

Building standards

Tenants in 609 Main will be required to comply with Hines facility building standards. Upon tenant move-in, tenants will be required to complete tenant fit-out with owner selected designers and equipment. All options for tenant HVAC equipment, lighting equipment, and plumbing equipment will be pre-selected by the owner and provided as options to the tenant.

APPENDIX D
C&S Commissioning Plan

Tenants will be provided with the base building commissioning plan as part of the Hines tenant manual package. In addition, field reports and commissioning reporting will also be provided for effective connectivity as well installation and functional testing of tenant equipment.

APPENDIX E
Tenant Sub-metering Guidelines

Tenants will be billed directly for their total electricity usage, and any usage for the core & shell non metered areas are billed back to the tenant based on the percentage of the building the tenant leases. Therefore, it is required that tenants ensure that individual meters are in place for their suite.

An E-Mon Metering System is in place to allow tenants to submeter their suites. The Emon Metering Unit Cabinets (MMU) contain sufficient submeters for all tenants to be individually submetered in a fully occupied building.

To connect to the metering cabinet, the 609 Main staff electrician will pull wires from each of the electrical panels (lighting panel, 120 V panel, or 480 V panel), join the wires together appropriately (Join all 120V A Phase together, then 120V B Phase, 120V C Phase, 480V A Phase, 480V B Phase, and 480V C Phase) and distribute them to the tenant to install the Class 2000 Submeter. There will typically be two Emon Meters per tenant, measuring 120V, and 480V loads. Instructions to complete the submeter installation are provided on the next several pages.

All data from the E-Mon Tenant Submeters will be exported to the BMS computer. The 609 Main property manager will be able to remotely access the BMS computer and E-Mon software. This functionality will allow the property manager, or the building management staff to compile data for any given tenant, and/or trend data.

MMU (Multiple Meter Unit) Cabinets

Features

- Available in configurations containing up to 8, 16, or 24 meters.
- MMU cabinets may contain E-Mon D-Mon® Class 1000*, Class 2000 (kWh or kWh/demand), and standard Green Class Meters.
- Compact installation of multiple meters allows for easy and centralized reading.
- IDRs (Interval Data Recorders) can be factory-installed inside the MMU enclosures along with the meters allowing for easy interface to the E-Mon Energy software system. (IDRs are mounted on the back wall of the enclosure.)
- Three-phase MMU cabinets come with prewired voltage feeds. If IDR(s) are installed inside MMU cabinets, the connections from the meters to the IDR are also prewired at the factory.
- MMU cabinets may contain meters of different voltage configurations. (i.e. 208V & 480V meters inside a single MMU enclosure.)

* NOTE: Single-Phase 277V meters not compatible with MMU cabinets.

Model Numbers

When ordering, specify configuration, meters to be contained inside cabinet, and blank spaces (if any).

Example:
1 MMU16
9 208200M KIT
2 480400M KIT
5 Blank Spaces

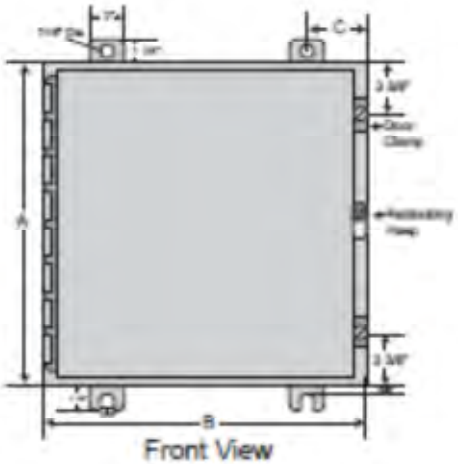
Available Configurations:

MMU8

MMU16

MMU24

MMU Dimensions



Front View

Side View

MMU	Dimensions (in inches)		
	A	B	C
MMU8	24	12	1 1/4
MMU16	24	20	3
MMU24	30	24	3

MMU	Meter Configuration		Total Meter Spaces
	Across	Down	
MMU8	2	4	8
MMU16	4	4	16
MMU24	6	6	24

CLASS 3000 METER
kWh/DEMAND METER WITH COMMUNICATION

E-Mon D-Mon
Energy Monitoring Products & Systems

Features

- Easy-to-read cycling 4-line by 20-character backlit LCD display:
  - kWh
  - kW demand (with peak date and time)
  - Power factor per phase
  - Real-time load in kW
  - Amps per Phase
  - Volts per phase
- 0-2 volt output split-core current sensors allow for enhanced safety and accurate remote mounting of sensors up to 500 feet from meter without power interruption. (Optional solid-core sensors available for 100 & 200 amp meters only.)
- Installation diagnostics and verification system.
- RS-485 communications capability supports the following connection configurations (or combinations not to exceed 52 devices per channel):
  - Up to 52 Class 3000 meters and/or IDR-8 interval data recorders
  - Up to 26 IDR-16 interval data recorders (IDR-16 counts as two devices)

  Cabling can be either daisy-chain or star configuration, 4-conductor, 24-26 AWG, up to 4,000 cable feet total per channel.
- Communication Options (Specify when ordering)
  - Requires E-Mon Energy Software for reading:
    - RS-232/RS-485 (Standard)
    - Telephone Modem
    - Ethernet
  - Requires third-party EMS/BMS system supplied by others. E-Mon Energy software not used:
    - Modbus RTU or TCP/IP
    - BACnet IP or MS/TP
    - LONworks TP (Twisted Pair)
- Records kWh and kVARh data for two channels. Data stored in 15-minute intervals for up to 36 days or 5-minute intervals for up to 12 days. Maintains the last 36 days of data in a first-in, first-out format.
- External meter pulse input (water, gas, BTU, etc.) on 3rd channel.
- Meter is designed for use on both 3-phase, 3-wire (delta) and 3-phase, 4-wire (wye) circuits. (Specify when ordering.)
- Industrial grade JIC steel enclosure with padlocking hasp and mounting flanges for indoor installation with three 1 1/16" KO (3/4" conduit) on bottom of enclosure.
- Revenue Grade Accuracy. UL/CUL Listed. Meets or exceeds ANSI C12 national accuracy standard.
- Optional load control/alarm relay (3A, 240V max.) with high and low threshold adjustment.
- MV-90 Compatible.

Dimensions: 9 1/2" H x 6 3/4" W x 4 1/4" D

Model Numbers

120/208-240V, 3-Phase*

208100C* KIT (100 amp)
208200C* KIT (200 amp)
208400C* KIT (400 amp)
208800C* KIT (800 amp)
2081600C* KIT (1600 amp)
2083200C* KIT (3200 amp)

277/480V, 3-Phase*

480100C* KIT (100 amp)
480200C* KIT (200 amp)
480400C* KIT (400 amp)
480800C* KIT (800 amp)
4801600C* KIT (1600 amp)
4803200C* KIT (3200 amp)

Options (Specify when ordering)

Requires E-Mon Energy software for reading:
- Telephone Modem (Suffix M)
- Ethernet Communication (Suffix E)

Requires third-party EMS/BMS system supplied by others. E-Mon Energy not used:
- Pulse Output (Suffix O)
- Modbus RTU Communications (Suffix RTU)
- **Modbus TCP/IP Communications (Suffix ERTU)
- **BACnet IP Communication (Suffix EB)
- BACnet MS/TP (Suffix B)
- LONworks TP (Twisted Pair) (Suffix LTP)

Load Control Option (Suffix LC)

** Modbus TCP/IP and BACnet IP communicate over Ethernet. No RS-485 daisy-chain capabilities with Modbus TCP/IP & BACnet IP. Each meter must connect directly to the BACnet/Modbus backbone and have a unique IP address.

To order options, add the specified suffix to the end of the model number (e.g., 480100CMY KIT).

NOTE: All meter kits include one set of three (3) split-core current sensors.

* NOTE: Specify Delta or Wye when ordering. Add suffix "Y" for Wye configuration or "T" for Delta configuration. (e.g., 480100CEY or 480100CET)

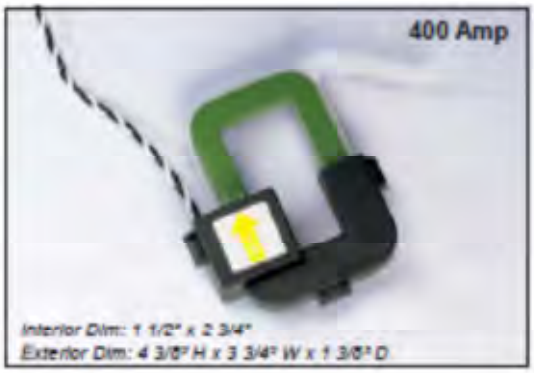
(800) 334-3666 - www.emon.com

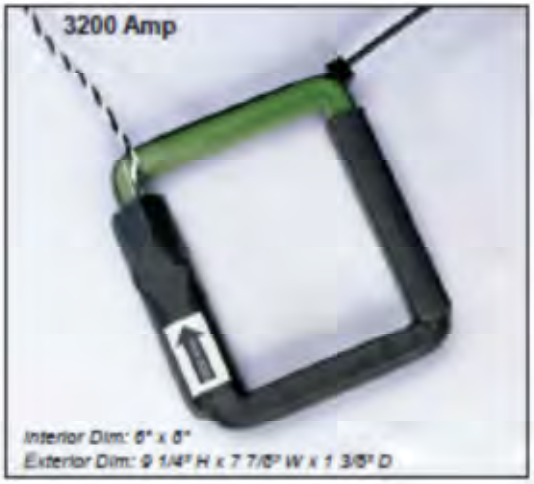
Effective Date: 6/17/2010

E-Mon
Energy Monitoring Products

Split-Core Current Sensors

Note: All current sensors are split-core type. (Solid-core option available; specify when ordering.)
All current sensors shipped in complete sets of three (3).





Notes:

The above split-core current sensors are supplied with E-Mon D-Mon® Class 1000, 2000, 2100, 3000, 4000 and 4100 meters.

Current sensors can be installed up to 2000 feet away from meter (500 feet for Class 3000 meters). Leads supplied are 3' in length and can be extended up to 2000 feet using low voltage #14-22 AWG wire. (stranded/twisted not required) See local electrical codes for proper sizing.

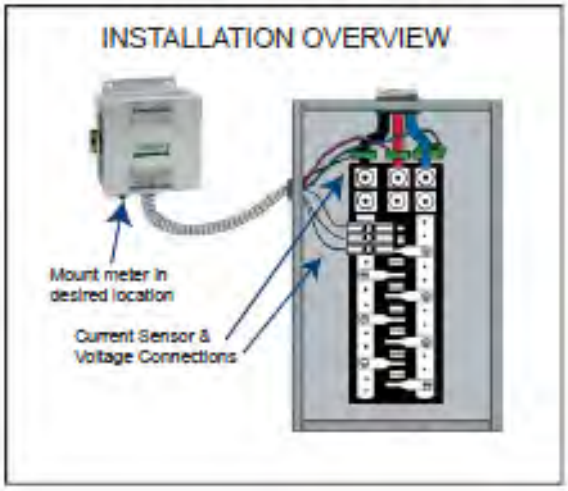
When paralleling current sensors, the meter reading must be multiplied by the number of sets of current sensors in parallel.

* Solid-core current sensors available in 100 & 200 amp configuration. Specify when ordering.

Model Numbers

Model #	Amperage	Interior Dim.
CS25	25 amp	7/8" x 1 1/2"
CS50	50 amp	7/8" x 1 1/2"
CS100	100 amp	7/8" x 1 1/2"
CS200	200 amp	7/8" x 1 1/2"
CS400	400 amp	1 1/2" x 2 3/4"
CS800	800 amp	3 1/4" x 4 1/2"
CS1600	1600 amp	3 1/4" x 4 1/2"
CS3200	3200 amp	6" x 8"

Meter Installation Overview



Compact meters can be mounted virtually anyway in either stand-alone or MMU configuration (shown above). Meters can be mounted up to 2,000 feet by extending the current sensor leads to the load(s) being monitored.

Split-core current sensors install without power interruption in new or retrofit applications.

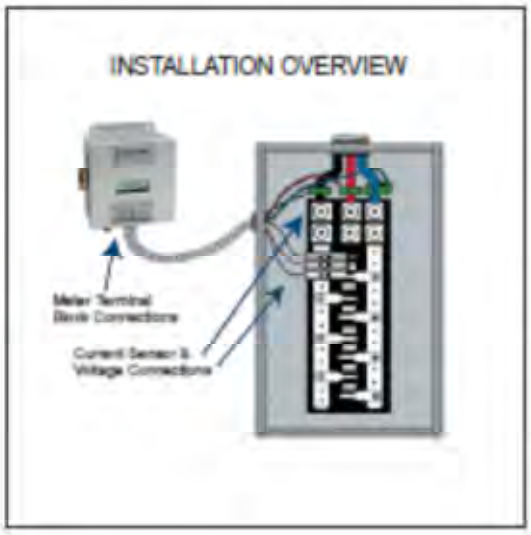
Many E-Mon D-Mon products have been tested and approved by independent agencies including:

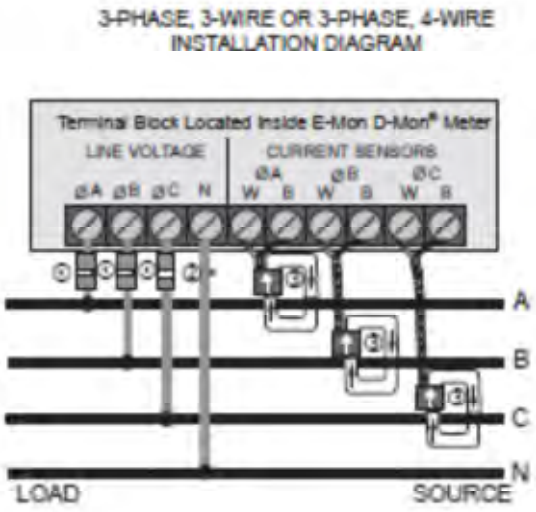
National Approvals
- UL Listed
- CSA Approved (Canadian Standards Assoc.)
- ANSI C12.1 and C12.16 Certified (National Accuracy Standards) by MET Testing Labs

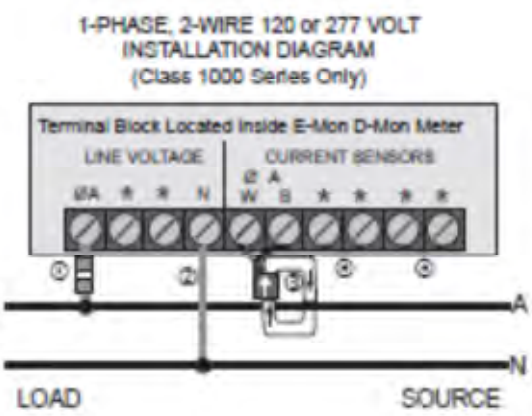
State and Local Approvals

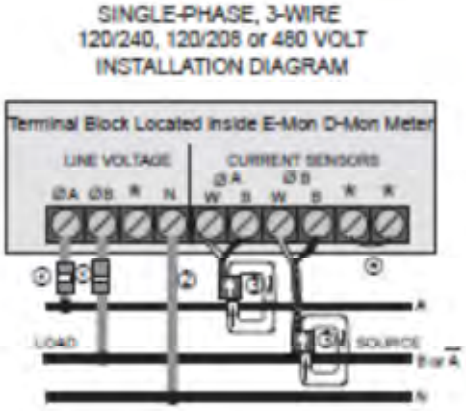
- CA - California Bureau of Weights & Measures, DWP-Los Angeles, CSE-Westminster, SDG&E-San Diego
- CO - Public Service of Colorado-Denver
- FL - Tampa Electric-Tampa
- MI - Detroit Edison-Detroit
- NJ - NJ Dept. of Energy-Newark, PSE&G Approved for DSM program
- NH - New Hampshire Electric Co.-Plymouth
- NY - NYC Approved for RSP program, City of NY-Bureau of Electrical Control, ConEd Approved for RSP
- PA - PECO Energy-Berwyn
- SC - State of SC-Columbia
- VA - Appalachian Power Company-Roanoke
- PR - PREPA Approved-Puerto Rico

E-Mon D-Mon Meter Wiring Diagrams









* These terminals are not used in Class 1000 installations.

① Recommended fuses or circuit breaker per the National Electrical Code (Meter load 6VA.)
② Neutral not required in delta system.
③ Split-core current sensors. Install according to instructions.
④ Install jumper.

Typical Fuses: Littlefuse KLDR .100 (100 ma) (Consult local electrical codes for requirements.)


E-Mon D-Mon
The Industry's Choice For Submetering For Over 25 Years.
Installs Easily In Minutes!
Step 1: Mount the E-Mon D-Mon Meter.
Step 2: Install E-Mon's split-core current sensors around wire(s) to be monitored.
Step 3: Connect voltage wires.
7/09
E-Mon
Energy Monitoring Products
(800) 334-3666
info@emon.com
www.emon.com
Electric
E-Mon D-Mon
Submeters

Cost Allocation & Tenant Metering

Building owners and facility managers are faced with ever increasing utility costs that eat away at the bottom line. In order to begin managing these costs; users need to know where the energy is being used and be able to allocate them appropriately. Submetering products and systems allow users to see specifically where and when energy is consumed within the building envelope. Meters are used to monitor actual usage by department, tenant or common area and report back to a computerized system for billing, allocation and analysis.

Cost Allocation

Metering individual departments, areas or buildings for cost center analysis, budgetary accountability and allocation allows visibility into energy consumption and usage trends. Armed with this critical information, managers are able to take advantage of energy saving opportunities that may be as simple as turning off lights or computers when rooms are not in use. When department budgets include energy consumption, users will be inclined to take the necessary steps to ease the pressure on their budgets by reducing overall energy use.

Tenant Billing

In facilities where there are multiple tenants, monitoring actual consumption is a win-win situation for both the building manager and the tenants.

Managers are able to allocate energy usage costs directly to the tenants. Energy costs can include not only electric but gas, water and BTU costs as well. In addition, all common area usage can be monitored and distributed equitably between tenants. Both tenant billing and common area allocation allows building managers to recoup energy expenses.

Tenants benefit from submetering of actual energy usage in two ways. First tenants only pay for what they use. They are not burdened with the overflow cost of large users as they would be if billed a flat rate per square foot of space rented. The second benefit is that they gain control over their usage allowing them to conserve energy and benefit financially for their efforts.

Whether metering a commercial or residential tenant or a department, cost allocation and billing practices help reduce costs, recoup energy expenses and promote energy conservation.

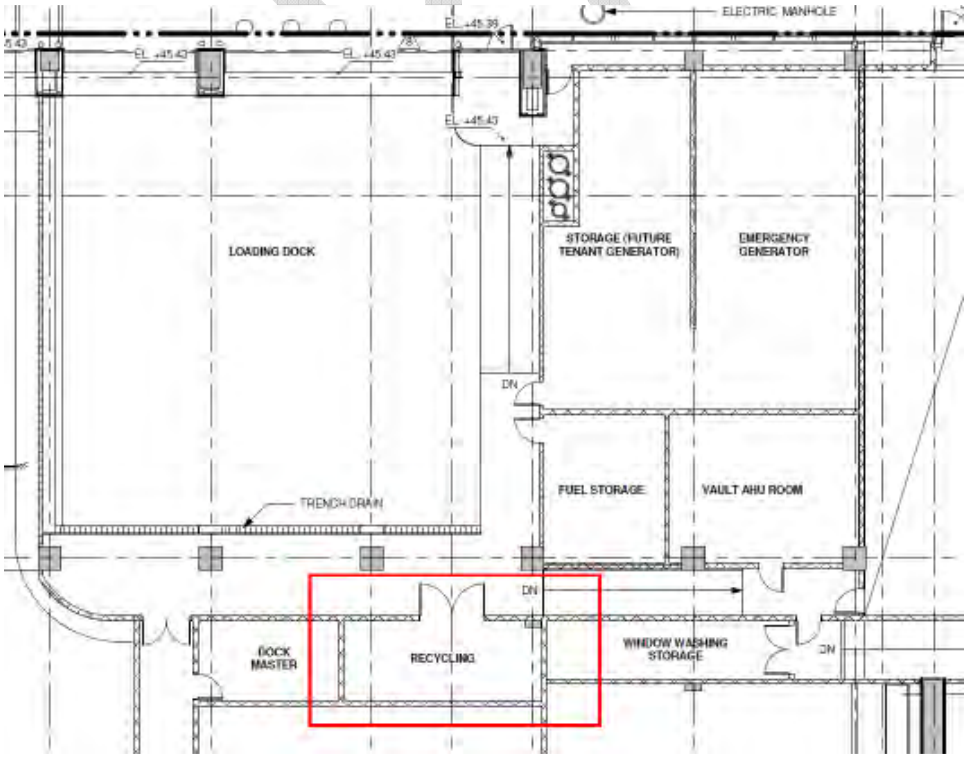
APPENDIX F
C&S Recycling Program

609 Main has a process in place to collect and store recyclables including paper, cardboard, aluminum plastic, and glass.

A dedicated recycling room has been provided near the loading dock at Level 1. Commingled recycling from office tenants will be picked up daily by custodial staff and stored in 96 gallon toters in the recycling room. Common areas (Level 2 Fitness and Conference Center) area also equipped with recycling bins which are to be emptied by custodial staff as needed. Retail tenants will transport their recyclables directly to the recycling room.

Recyclables are typically picked up twice a week (by vendor selected and contracted by Hines) and sorted back at the vendors recycling center. The frequency of collection will be evaluated periodically by management to ensure that the volume of recyclables generated is being properly accommodated. In other words, the frequency of collection from the waste hauler will be increased if demand for recycling exceeds the space allocation and current frequency of collection.

To maximize program participation, educational material on what can be recycled will be provided to tenants as part of the move-in packet and also periodically distributed electronically.



APPENDIX G
Feasible Tenant Layout

Final internal review and coordination in process. To be inserted prior to submission for design review.

APPENDIX H
C&S Environmental Tobacco Smoke Policy

Smoking is prohibited anywhere in the building, and within 25 feet of the exterior of the 609 Main site.

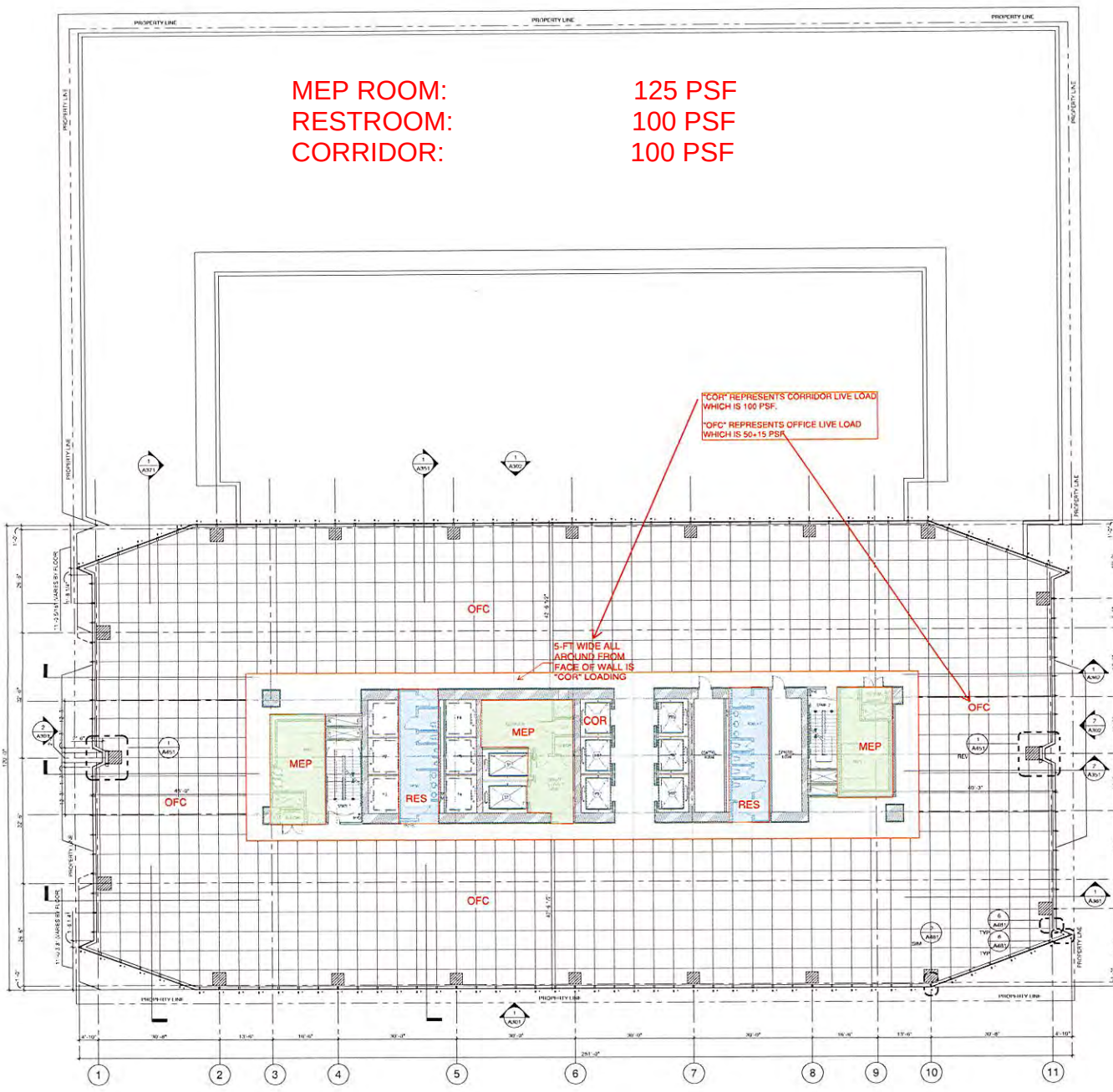
Locations of smoking indicating that smoking is not allowed on site are indicated below.

Final internal review and coordination in process. To be inserted prior to submission for design review.

APPENDIX I
MEP Design Criteria

Tenants in 609 Main will be required to comply with facility building standards. Tenants will be provided with the building standards as part of the Hines tenant manual package. All criteria for tenant HVAC equipment, lighting equipment, and plumbing equipment will be outlined.

APPENDIX H – TYPICAL FLOOR LOADING DIAGRAMS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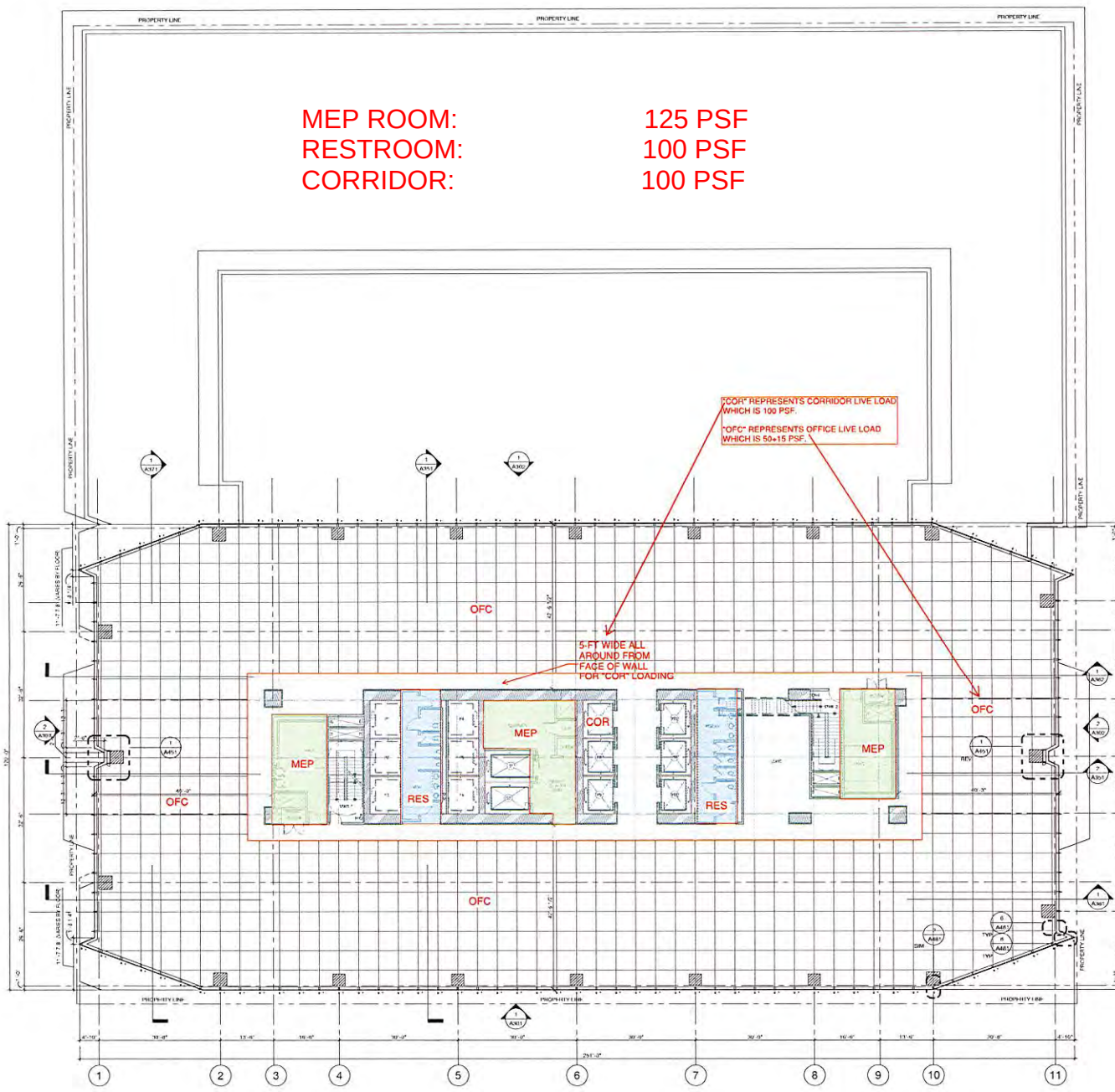
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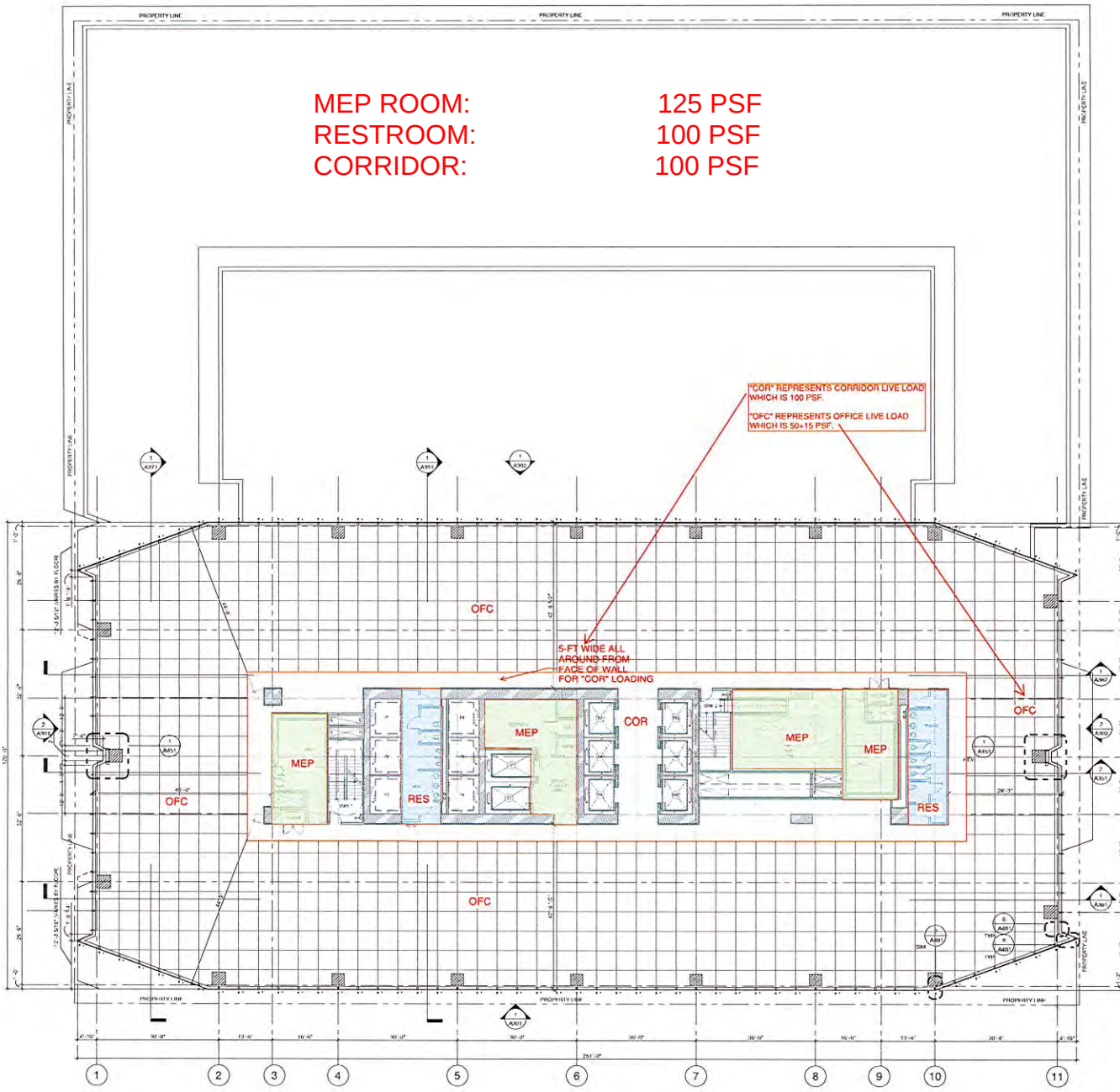
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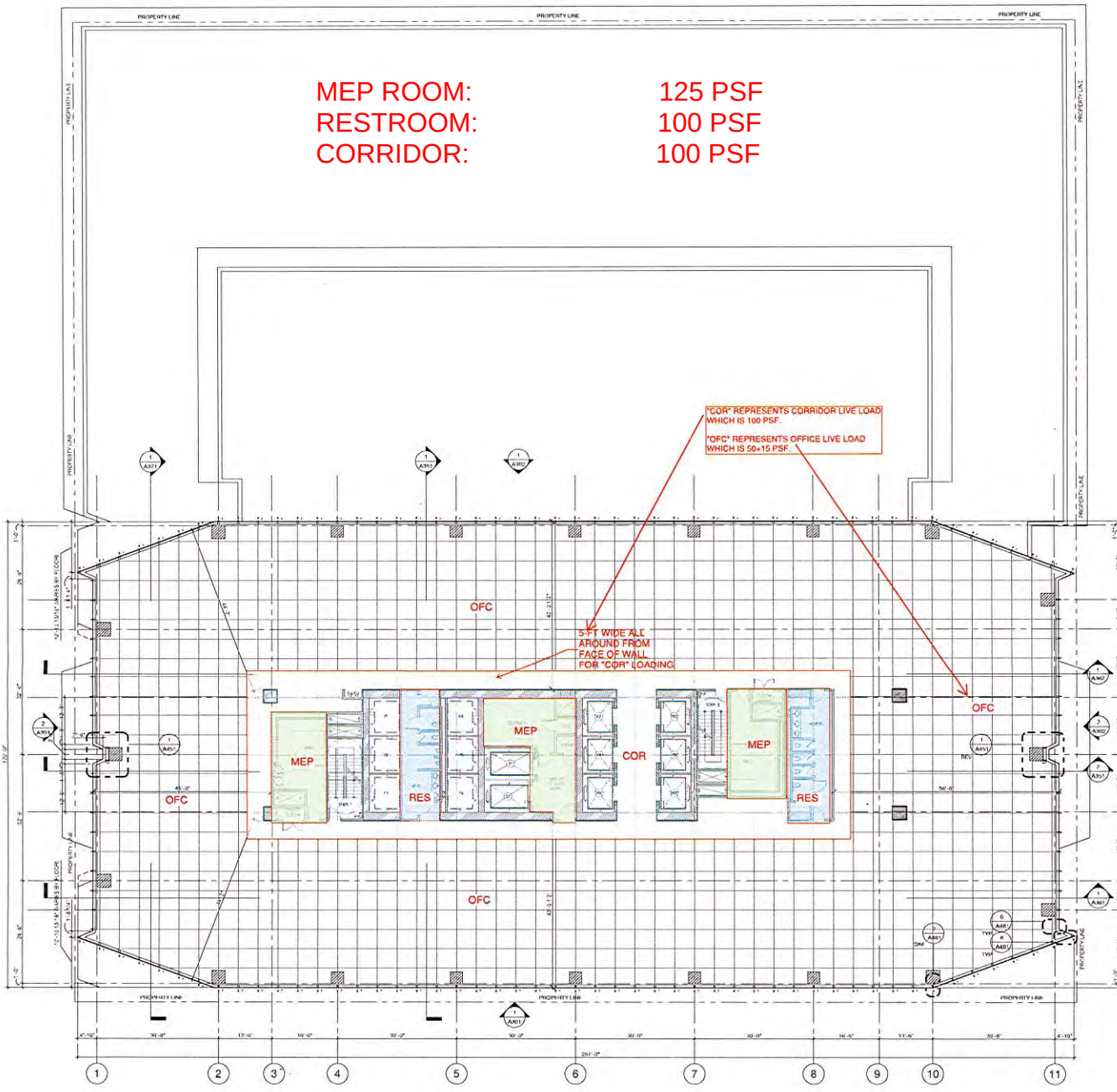
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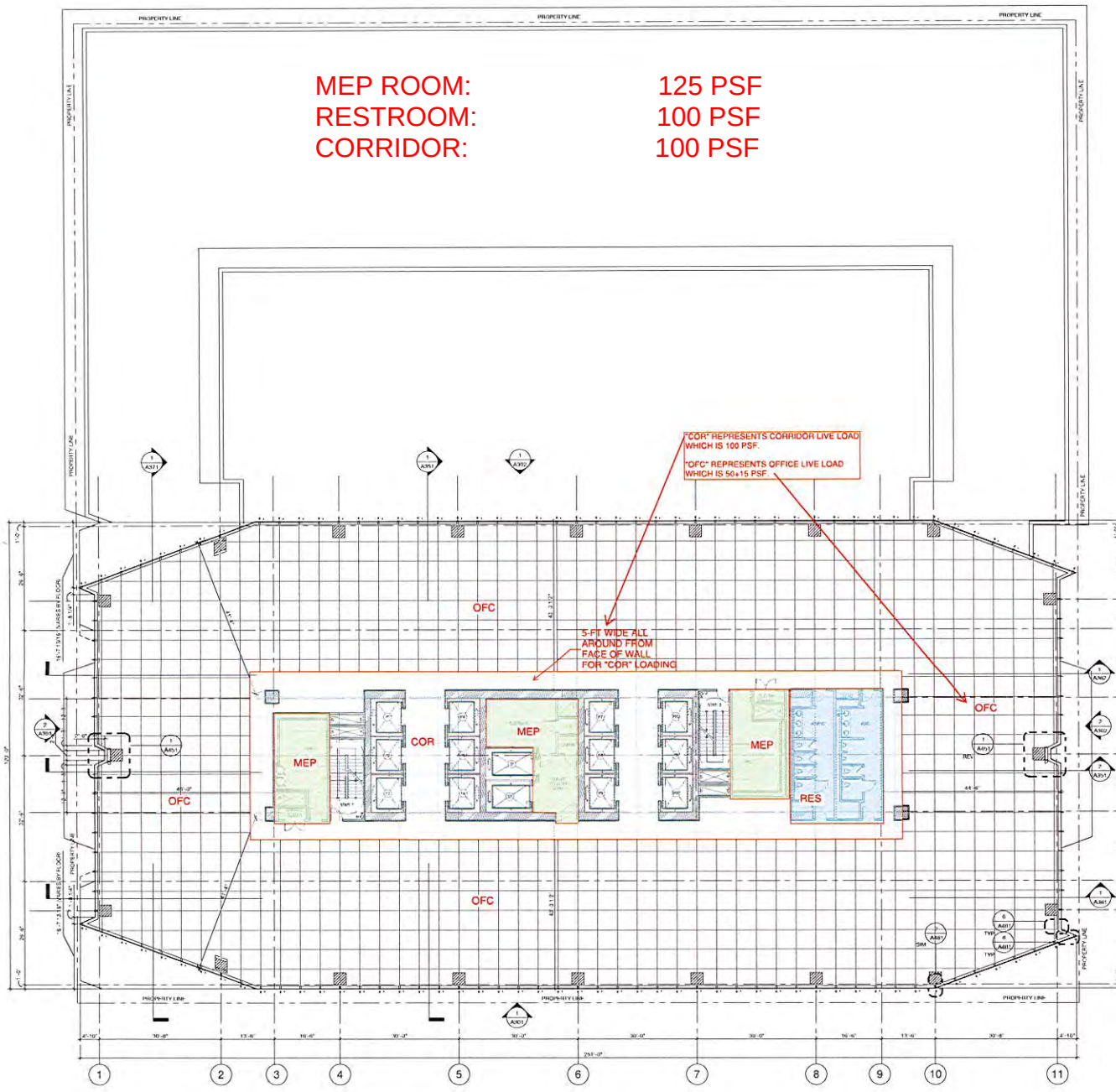
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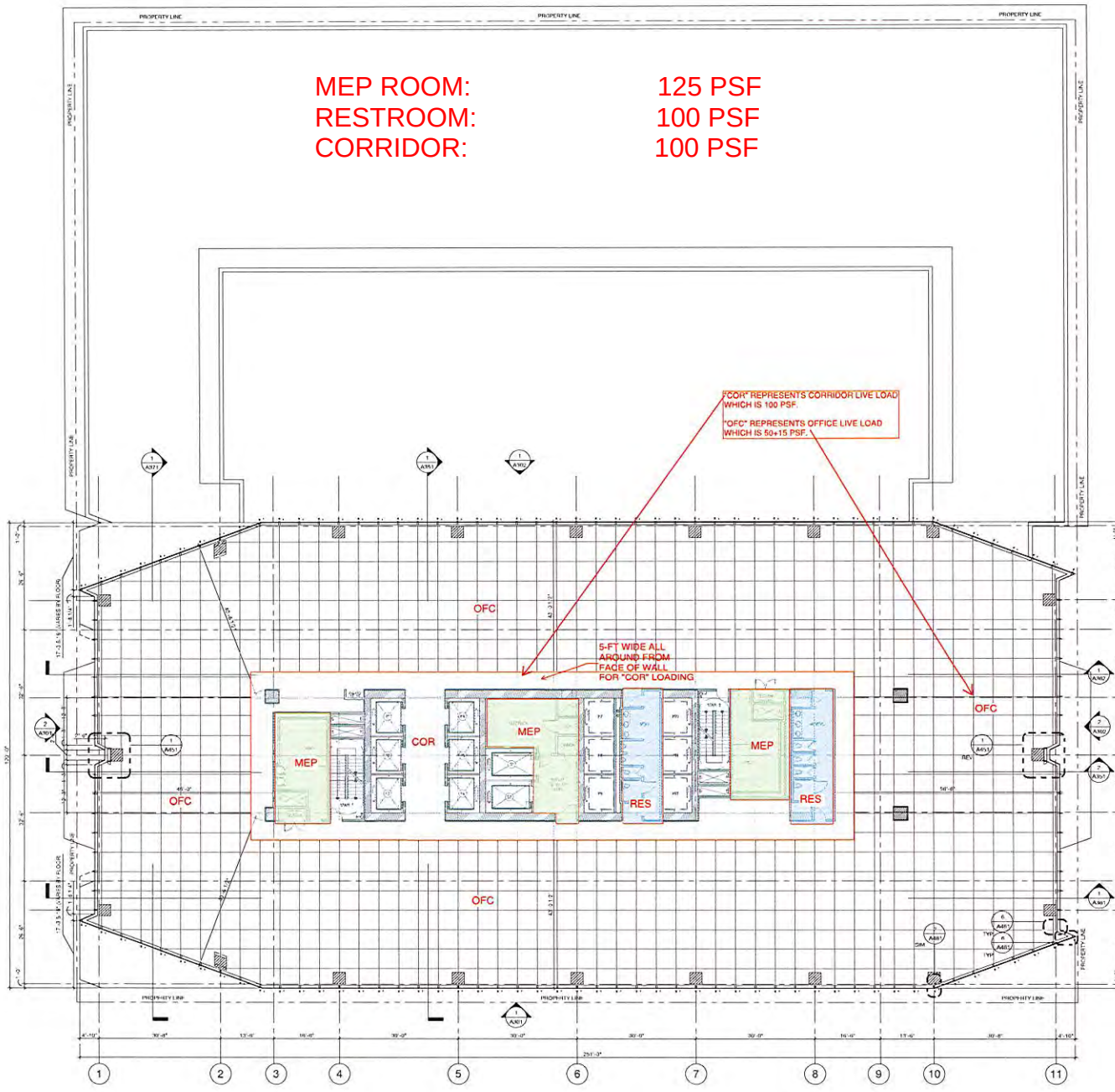
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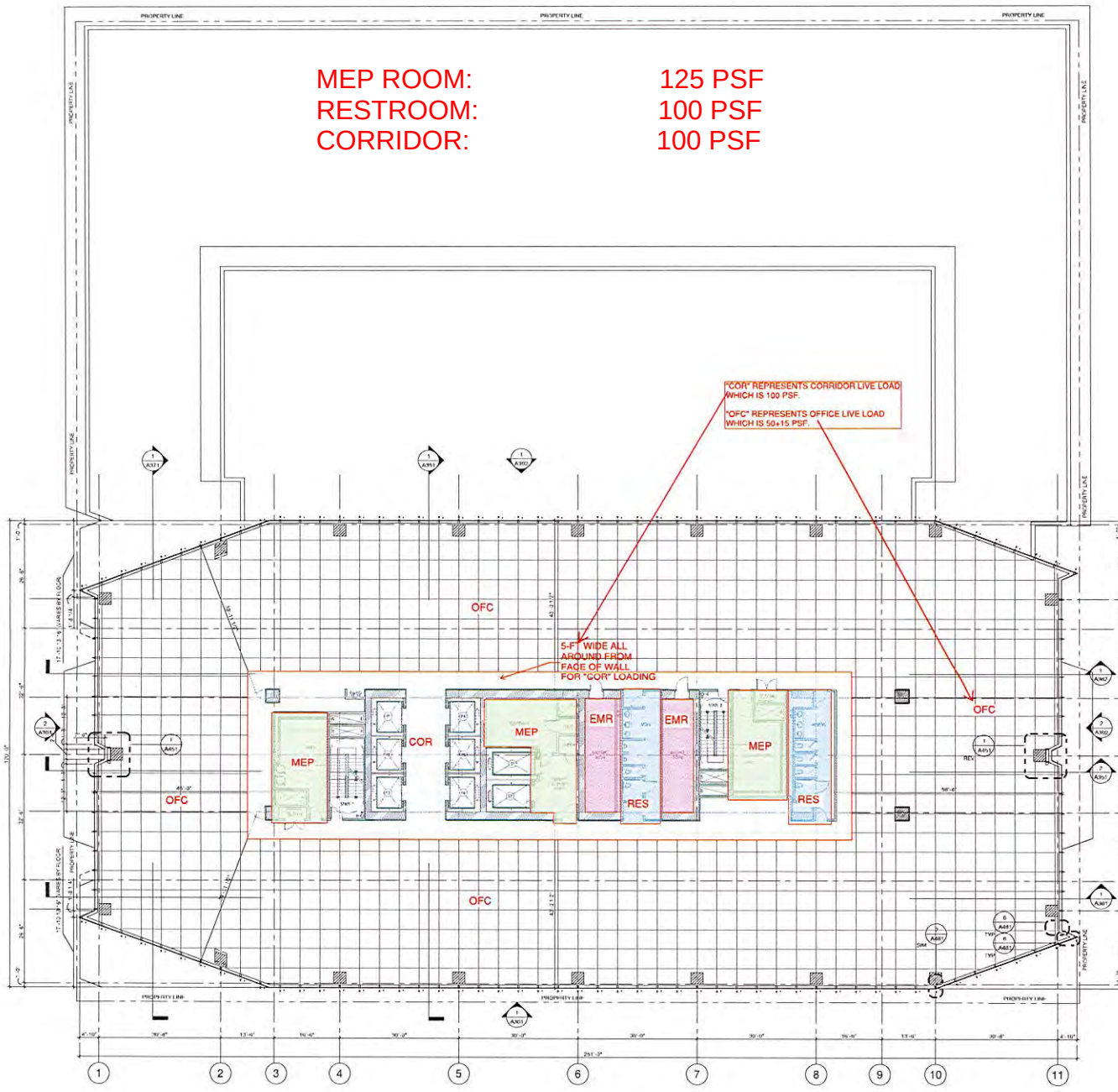
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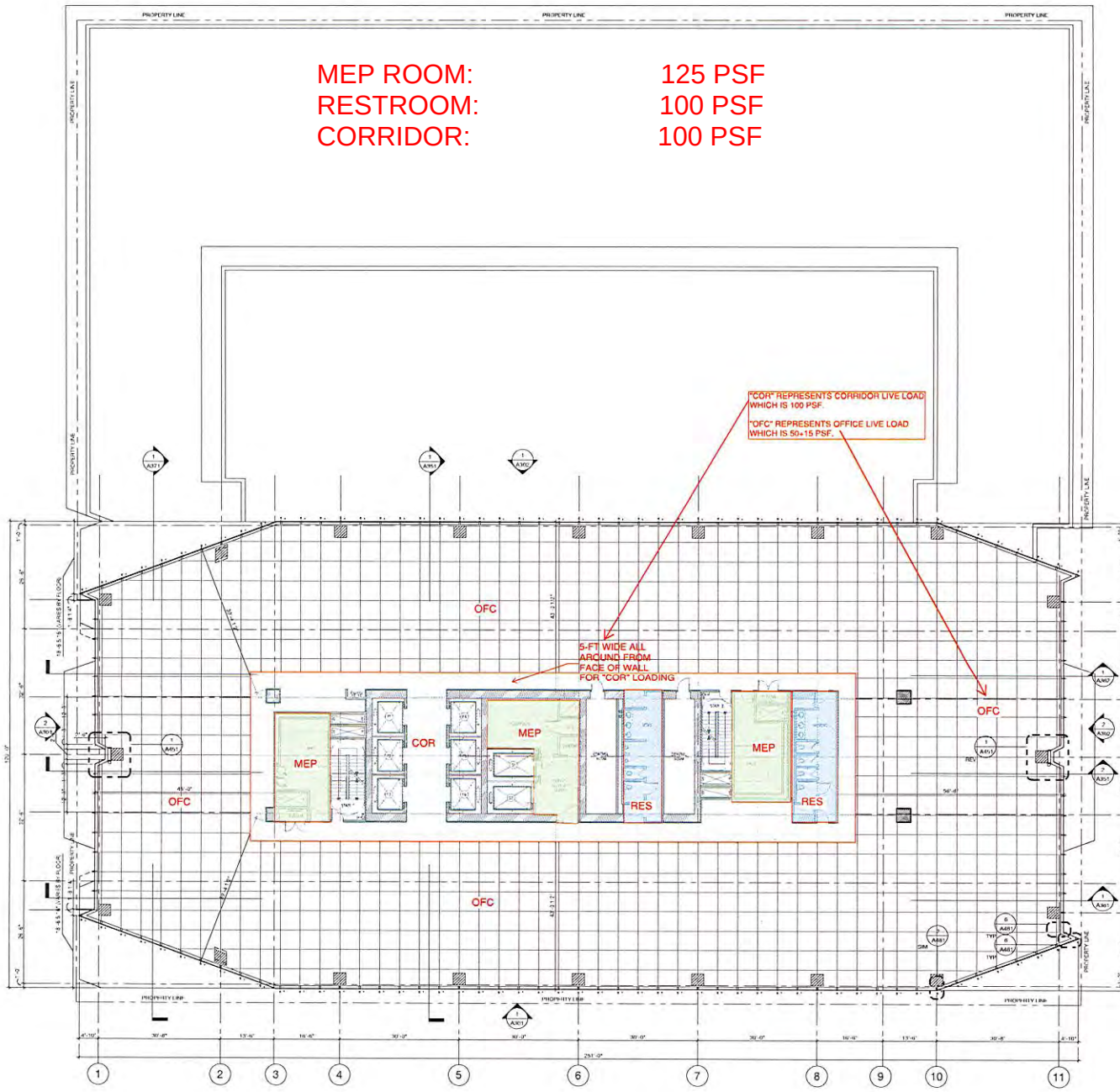
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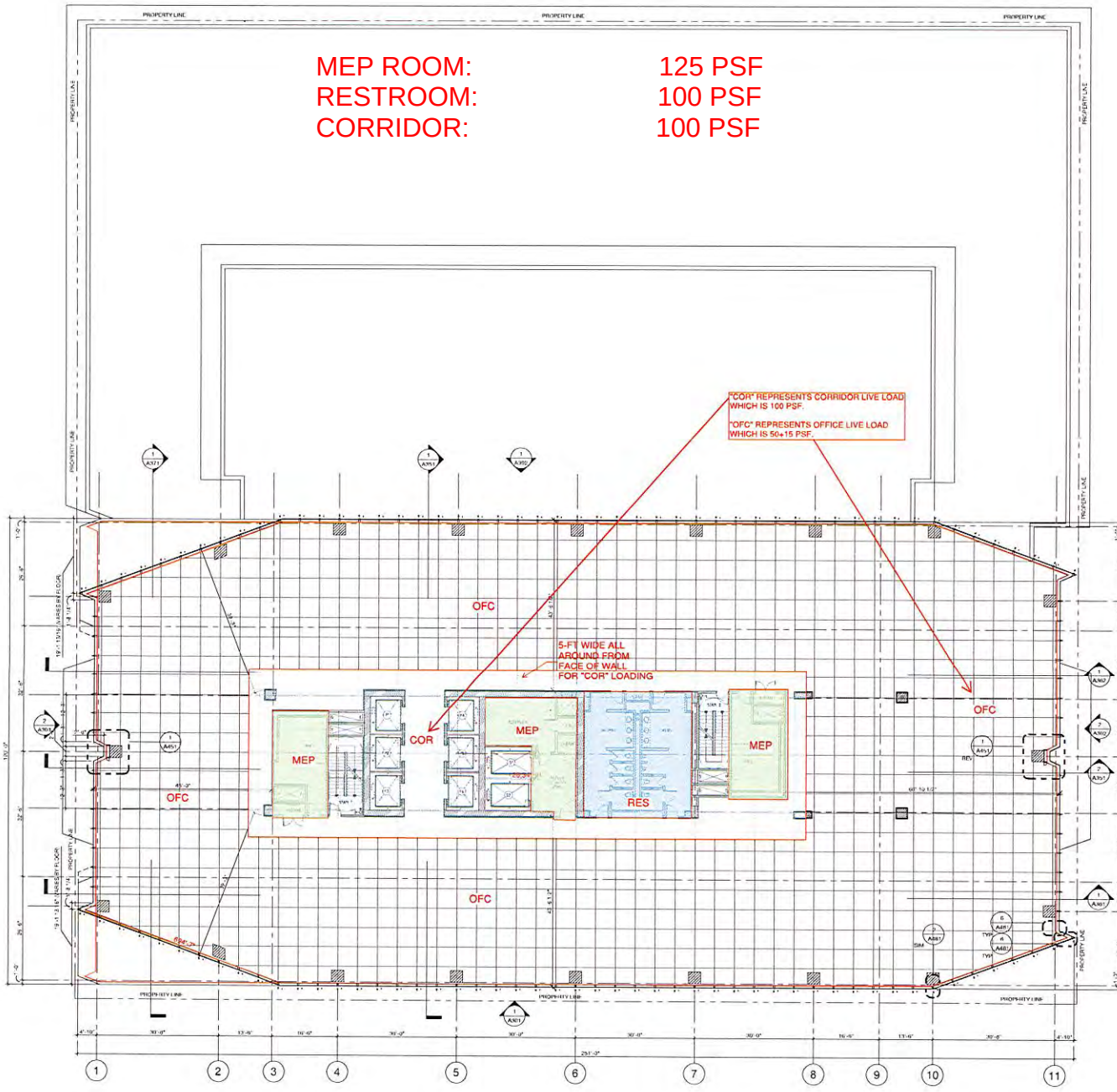
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