

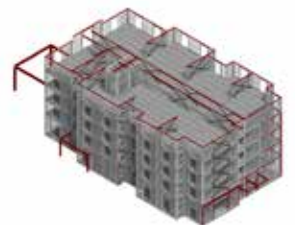
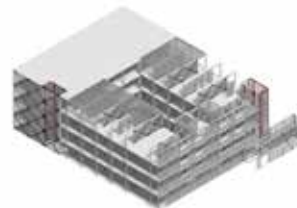
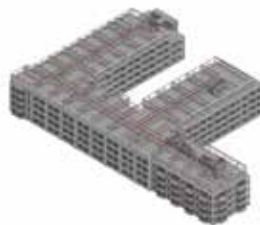


Panel Systems, Inc.



# Prefabricated Light Weight Steel Structures

WALLS, FLOORS, TRUSSES



## Company Overview

Established in 1979, Panel Systems, Inc. provides the ultimate in Load Bearing, Light Gauge, Panelized Structures. Our In-House Engineering, Fabrication, Delivery, and Installation Departments optimizes cost, efficiency, quality and speed while our ultimate goal is to meet our commitments, do what's best for the job and provide an excellent product.

Our Design Teams Light Gauge experience stems from the on-set of the product as a Structural Component. We provide full specialty engineering services for our structures in accordance with the generally accepted rules governing the relationships between the Structural Engineer of Record (SER) and the Specialty Engineer.

We are eager to participate in the early design phase to assist in selecting the most economical structural system for the project.



## Our Walls

Typically, PSI includes all (Cold-Formed Metal) Exterior Walls, Interior Load Bearing Walls as well as all Shear Walls and Shear Wall "hardware." This normally encompasses all work described under CSI Specification Section 05400. In addition, Structural Steel components such as HSS posts, distribution plates and/or corridor beams are often included in this wall "package."

PSI panels are factory-fabricated with all GMAW (Mig) welded connections, performed by Welders who have been Qualified in accordance with American Welding Society guidelines for the specific equipment and materials employed.

We utilize the state-of-the-art "Vertex BD Framing for Light Gauge Steel Program" for our design/material procurement, quality control and labeling procedures for each individual panel. Distributed by Argos Systems, Vertex BD is a highly customizable BIM application continuously employed by PSI since 1999. Batts Insulation is factory-installed in exterior wall headers/boxed assemblies that otherwise would be inaccessible after fabrication.

Typically, we exclude wall insulation, interior drywall and all finishes from our bid. Structural (non gauge-metal) Steel is also excluded, except for members which can readily be integrated into the wall panel installation.

DESIGN

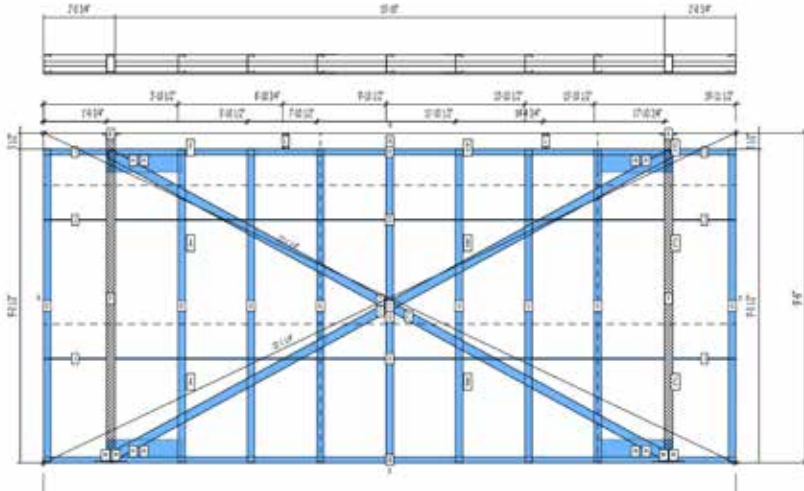


FABRICATION



INSTALLATION





## Submittals

We employ a two-part submittal process.

First, an overall engineering submittal is made, including Design Criteria and calculations in an 8 ½ x 11 format, as well as Large Scale Plans, Sections & Details.

Second, we prepare all the individual panel elevations and site layout plans which are submitted for record following approval of the Engineering Submittal.

## LATERAL BRACING DESIGN

The SER defines load paths in the structure, in accordance with the "AISI Code of Standard Practice," PSI will then design each Shear Wall accordingly. It is assumed that the SER will designate an adequate quantity of Shear Wall locations to allow the use of Light Gauge Straps for the Typical conditions. (PSI is capable of integrating Structural Steel Posts and/or "K-Frames" at select conditions).

## BRIDGING-BRACING

Horizontal Bridging in the Panels is designed to incorporate the latest AISI requirements including diagonal members to "brace the bracing." Our standard Horizontal Bridging technique, (for studs up to 6") thick, is to thread 16 ga. Cold Rolled Channel (CRC), through "punch-outs" and weld the flanges to the studs.

## BLAST RESISTANCE & PROGRESSIVE COLLAPSE

Panelized Light Gauge Framing lends itself well to these new structural requirements for Government Buildings. Enhanced Jambs, Sills, Headers and Slab Connections around openings, help meet blast design requirements.

Proper bottom-chord bracing and reinforcing fabric in concrete decks afford the necessary strength to resist upward blast pressures. Continuous HSS distribution plates, rebar, and vertical straps provide the horizontal and vertical ties required to prevent progressive collapse.

## LEEDS Considerations

Cold-Formed Metal Framing is a 100% Recyclable product. Under Leed-NC standards, Total Points Available are 69, with Platinum Certification requiring a minimum of 52 points. Local manufacturing plants and low product weight minimize the "carbon footprint" of shipping.

## Fabrication, Delivery & Installation

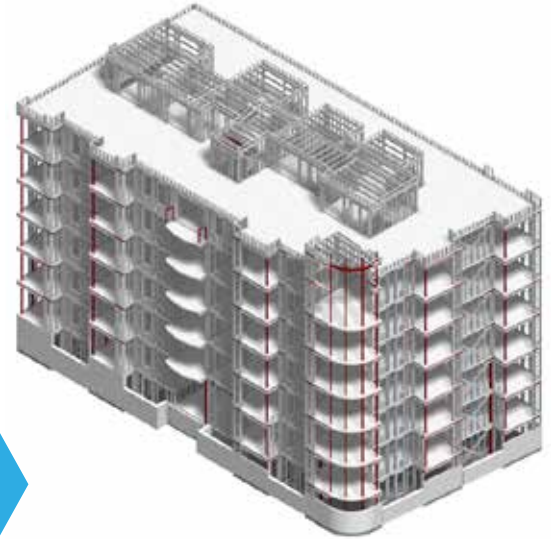
PSI manufactures and installs its own Wall Panels. Field Welders are trained and Qualified per AWS Standards. We utilize a custom designed Quality Control program for every panel. We have the experience and equipment to guarantee on-time Deliveries and Installation in accordance with the strictest Safety & Scheduling standards.

# PSI System "A"

## 3" Composite Metal Deck

System "A" consists of load-bearing structural stud (braced) walls with a 3 inch deep, 18 gauge metal deck acting as a permanent form to receive a composite concrete slab. Key to the system is the alignment of the vertical studs (@ 24" oc), with the corresponding flutes of the floor deck, thus eliminating the need for load-distribution plates at the top of the stud walls.

Given the span characteristics of the 18 gauge metal deck, this system is especially suited for multi-story hotels, dormitories and apartments with stacked bearing walls up to 14 feet apart.



### ADVANTAGES:

- Speed (No Shoring 14' Span)
- Cost (Non Proprietary Pricing)
- Quantity of Walls Included
- Floor-to-Floor Height

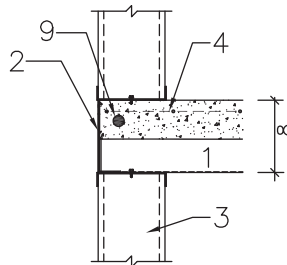
### CONSIDERATIONS:

- Relatively Short Span
- Open Deck Flutes
- Bulkheads for HVAC

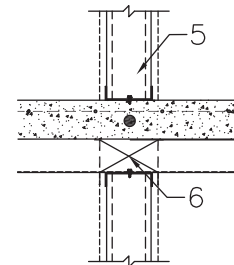
## Typical Details

1. 3" Composite Deck
2. Pour-Stop (16 Ga. Typ.)
3. 3 5/8, 4" or 6" Studs @ 24" o.c.
4. Wire mesh reinforcing
5. Line of Drywall
6. Head of Wall Fireproofing as required
7. Load Bearing Framing beyond
8. 5 1/2" to 7 1/2" Slab thickness
9. Rebar

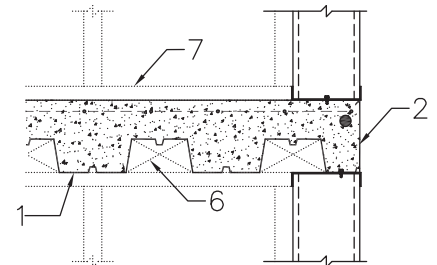
END/BEARING WALL



INTERIOR/BEARING WALL



SIDE WALL/ ELEVATION



### FIRE PROTECTION - WALLS:

Load-Bearing Wall UL ratings are achieved through the use of layers of 5/8" Firecode sheathing on each side; (one layer = 1 hr/UL #U-425).

### FIRE PROTECTION - FLOOR:

UL ratings for the Composite Deck system range from 1 hour to 3 hours per UL #D913, and are achieved without protection of the deck by an additional fire-rated ceiling assembly.

### UL DESIGN # D913

Restrained Assembly Rating Hr	Concrete (Type)	Concrete Unit Weight pcf	Concrete Thkns In.
1	Normal Weight	---	3-1/2
1-1/2	Normal Weight	---	4
2	Normal Weight	---	4-1/2
1	Lightweight	107-113	2-1/2
2	Lightweight	107-113	3-1/4
2	Lightweight	107-120	3-1/2

REF: PCSI

### FIREPROOFING OF FLUTES

UL system	Firestopping Properties		
	Wall construction	Floor construction	Hourly rating
XHBN.HW-S-0040	1 hr. gypsum wall	Steel fluted deck	1
XHBN.HW-S-0040	2 hr. gypsum wall	Steel fluted deck	2

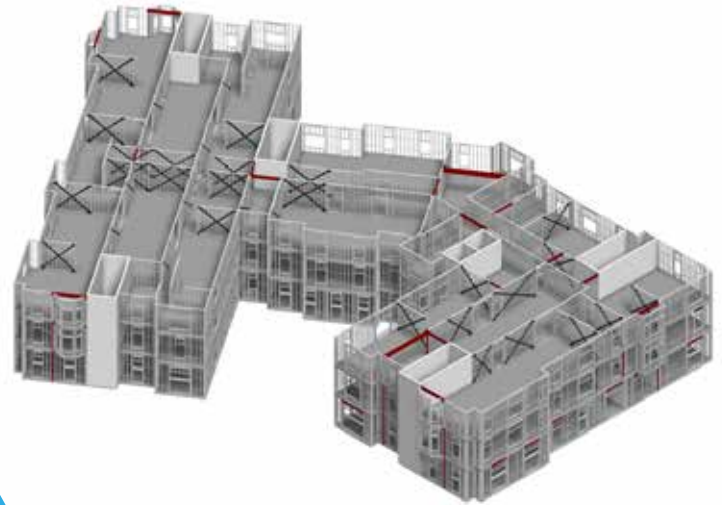
REF: IBM FIRENAM



## Dovetail Deck

System "B" consists of load-bearing structural stud (braced) walls with a 2" inch deep, Dovetail formed metal deck acting as a permanent form to receive a composite concrete slab. This system affords long spans, typically 16 to 20 feet, with continuous bearing, eliminating the need for load distribution members.

The longer spans allow more flexibility in locating load-bearing walls, suitable for almost any type of multi-story residential construction.



### ADVANTAGES:

- Long Spans
- Thin Slabs (less concrete)
- Standard Wall Fireproofing techniques

### CONSIDERATIONS:

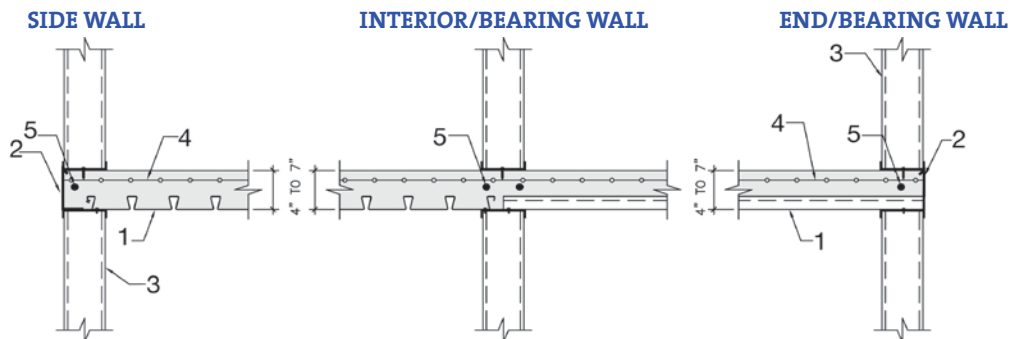
- Shoring/Re-shoring requirements.
- Negative reinforcing steel.

## Typical Details

1. 2" DOVETAIL DECK
2. POUR-STOP (16 GA. TYP.)
3. 3 5/8", 4" OR 6" STUDS
4. WIRE MESH REINFORCING
5. REBAR

### FIRE PROTECTION - FLOOR:

UL ratings for the Dovetail composite deck system range from 1 hour to 3 hours per UL #D904, and are achieved without protection of the deck by an additional fire-rated ceiling assembly.



### FIRE RESISTANCE

Restrained Ratings (Hr.)	Total Depth Normal-weight Concrete	Total Depth Light-weight Concrete
1 Hr.	4"	NA
2 Hr.	5.25"	4.5"
3 Hr.	6.75"	5.25"

### SOUND TRANSMISSION

Dovetail Deck 6" Total Depth normal weight concrete	Grade I STC (min)	Grade II STC (min)	Grade III STC (min)
58	55	52	48

### LINKS:

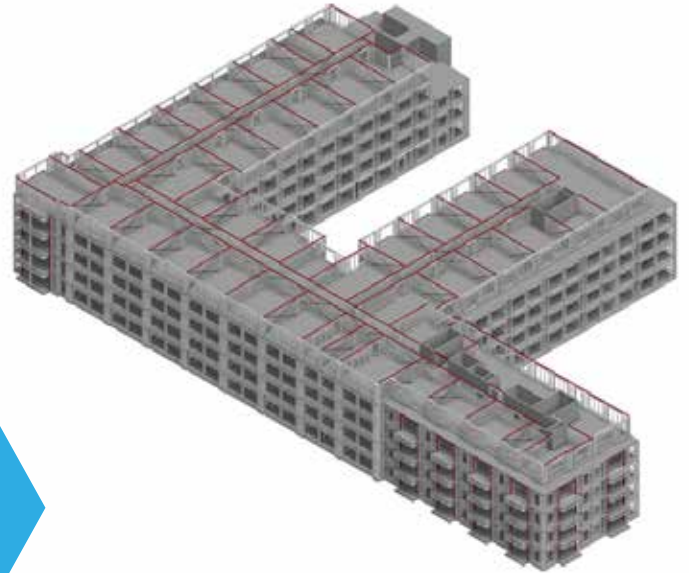
[www.marlynsteel.com](http://www.marlynsteel.com)  
[www.3m.com/firestop](http://www.3m.com/firestop)  
[www.metaldek.com](http://www.metaldek.com)



# PSI System "C"

## Composite Joists

System "C" consists of load-bearing structural stud (braced) walls supporting a composite floor system consisting of bar joists at 48" oc., which receive a steel deck fastened with Shear screws that provide a verifiable composite lock between the joists and a 3 1/2" (standard) concrete slab. The floor system is manufactured by Vulcraft under the trade name Ecospan™ This system provides great economy at spans of 20 to 35 feet and permits the most floor plan flexibility, without shoring or formwork.



### ADVANTAGES:

- Long Spans
- Fewer Bearing Walls
- Plenum Space for Mechanicals
- Joists manufactured locally for LEED calculations.
- Standard Concrete-over-Deck installation techniques.
- No down-time for other trades once concrete is poured.

### CONSIDERATIONS:

- Distribution Plate may be required
- Floor-to-Floor height greater than with Composite Deck.

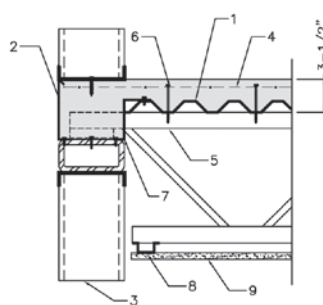
### LINKS:

[www.ecospan-usa.com](http://www.ecospan-usa.com)

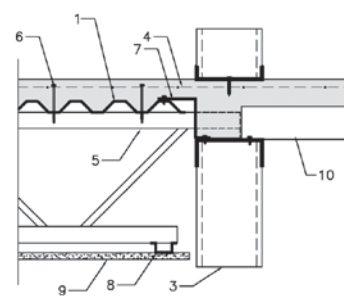
## Typical Details

1. 1" 26 GA. (TYP.) FORM DECK
2. POUR-STOP
3. 3 5/8", 4" OR 6" STUDS (TYP.)
4. WELDED WIRE FABRIC REINF.
5. ECOSPAN™ STEEL JOIST (2 1/2" MIN. BRG.)
6. SHEARFLEX™ SHEAR CONNECTOR
7. E-CLOSURE™ CONCRETE STOP
8. 7/8" FURRING CHANNEL AT 24" o.c.
9. 5/8" GYPSUM BOARD
10. COMPOSITE DECK AT CORRIDOR

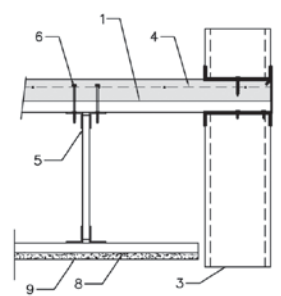
END/BEARING WALL



INTERIOR/BEARING WALL



SIDE WALL/ELEVATION



### FIRE PROTECTION - FLOOR:

The Ecospan™ Composite Floor System is listed by Underwriters Laboratories Inc. with multiple Fire Ratings (1 hr. to 3hrs.) for Acoustical and Gypsum ceiling applications. The most common UL code encountered in construction utilizing the Ecospan™ Composite Floor System is UL Code G561

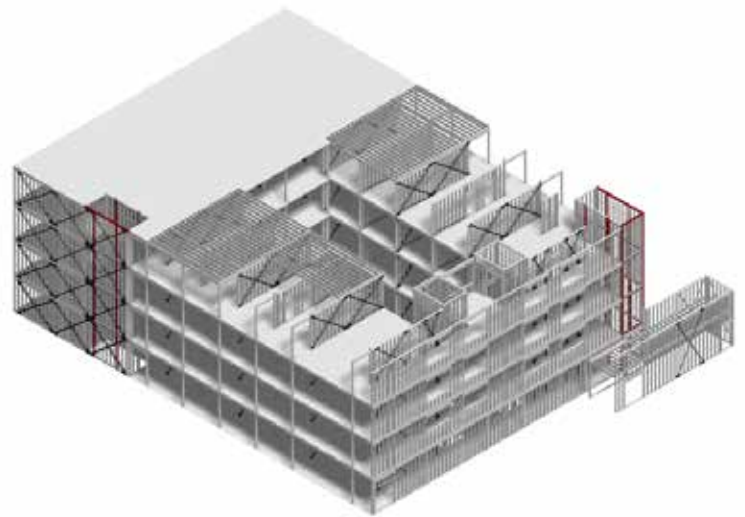
### SOUND TRANSMISSION

Flooring Materials/Thickness	IIC	STC
<b>Bare Concrete</b>	26, 30*	57
<b>Carpet</b>		
1. 6 PCF PAd (0.4")	77	57
2. 100% Pet polyester carpet (0.438")		
<b>Ceramic Tile</b>		
1. Loose-laid cork (0.235")	51	N/A
2. Thinset mortar	54*	
3. Glazed ceramic tile (0.3")		



## Cold Formed Joists

System "D" comprises load-bearing structural stud (braced) walls with a light gauge "C-Joist" Floor framing assembly topped with (either) poured gypsum-cement on metal deck, or reinforced interlocking 3/4" thick Structural Cement Panels fastened directly to the joists. This system eliminates all concrete on the elevated decks, while providing a two hour rated floor assembly (poured gyp) with only one layer of Firecode Gypsum Board. It is suitable for all medium ( $\pm$  20 ft.) span applications.



### ADVANTAGES

- Installation
- Plenum space
- Fire Ratings
- No Concrete
- Prefab Floors

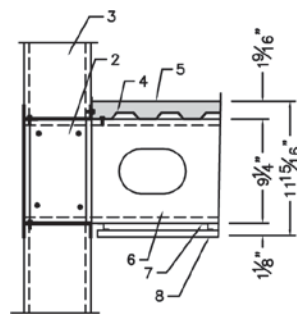
### CONSIDERATIONS:

- Floor-to-Floor Height
- No Floor Diaphragm

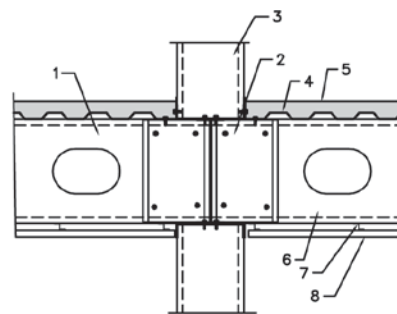
## Typical Details

1. 9 1/4" (MIN) 16 GAUGE JOISTS @ 24" o.c.
2. WEB STIFFENER
3. 3 5/8, 4" OR 6" WALL STUDS
4. 9/16" 22 GA. GALV. METAL DECK
5. 1 9/16" POURED GYPSUM TOPPING
6. 3 1/2" FR GLASS FIBER INSULATION
7. 1/2" 25 GA. RESIL. CHANNELS @ 12" o.c.
8. 5/8" FC GYPSUM BOARD
9. 3/4" STRUCTURAL CEMENT PANEL

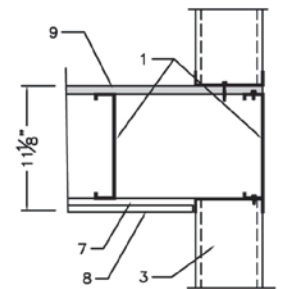
**END/BEARING WALL  
W/ POURED GYPSUM**



**INTERIOR BEARING WALL  
W/ POURED GYPSUM**



**SIDE NON-BEARING WALL  
W/ CEMENT PANELS**



### FIRE RESISTANCE

Materials	HR RATING	UL #
Poured Gyp	2	G-563
One layer 5/8" FC Gyp Bd.		G-574
		G-559
Structural Cement Panels		
One layer 5/8" FC Gyp Bd.	1	G-556
Two layers 5/8" FC Gyp Bd.	2	G-557

### SOUND TRANSMISSION

Flooring Materials	STC	IIC
Ceramic Tile & mat (Poured Gyp)	58	46
Carpet & Pad (Poured Gyp)	56	65
Carpet & Pad Structural Cement Panel	52	67

### LINKS:

[www.cemcosteel.com](http://www.cemcosteel.com)  
[www.marinoware.com](http://www.marinoware.com)

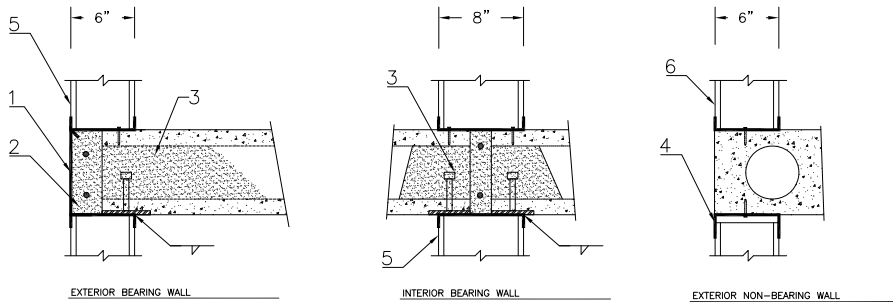


# PSI System "E"

## Precast Concrete Plank

System "E" consists of load-bearing structural stud (braced) walls with precast plank of various thicknesses. The plank can have a structural topping applied before the next level of bearing walls is set, or non-structural gypsum concrete leveling can be applied after the structure is complete. Six inch studs are used at the exterior bearing wall while eight inch studs are used at interior walls to provide adequate bearing length for the plank. Stud spacing can be 16 or 24 inches oc depending on the requirements of sheathing.

Given the span characteristics of plank bearing walls can be spaced up to 30 feet apart. This system is especially suited for suite type hotels where plenum spaces or highly finished ceilings are not required.



### Typical Details

1. POUR STOP
2. GROUT FOR STUD BEARING
3. GROUT PLANK VOIDS
4. DEFLECTION TRACK
5. BEARING STUDS
6. INFILL FRAMING

## Trusses

### Panel System Trusses

Panel Systems originated cold-formed steel truss design and fabrication in the DC Metropolitan Region. Starting with "C-Stud" trusses, and now the TrusSteel system utilizing Alpine software. With higher relative stiffness than competitive products, TrusSteel requires less horizontal bracing and is easier and safer to handle, resulting in less damage to the trusses during unloading, hoisting and installation. When necessary, Tube Steel (HSS) Girder trusses may be integrated into the design.

### ADVANTAGES OVER WOOD

NON-COMBUSTIBLE  
INSECT AND ROT RESISTANT  
DIMENSIONALLY STABLE.  
INSPECTION FRIENDLY  
CURVED CHORD OPTION

### LEEDS CHARACTERISTICS

MR 4.1 (1 POINT)  
MR 4.2 (1 POINT)  
MR 3.1 & 3.2 (100% RECYCLABLE)  
POST CONSUMER RECYCLED CONTENT: 30.9%  
PRE-CONSUMER RECYCLED CONTENT: 11%

### FIRE RATED ASSEMBLIES

UL File Number	Design Number	Assembly Description
BXUV.P525	P525	TrusSteel Roof Trusses-1, 1-1/2 and 2 Hour Assemblies with a SINGLE layer of gypsum wallboard (steel roof deck).
BXUV.P526	P526	TrusSteel Roof Trusses-1 Hour Assembly with a SINGLE layer of gypsum wallboard (plywood as roof deck).

