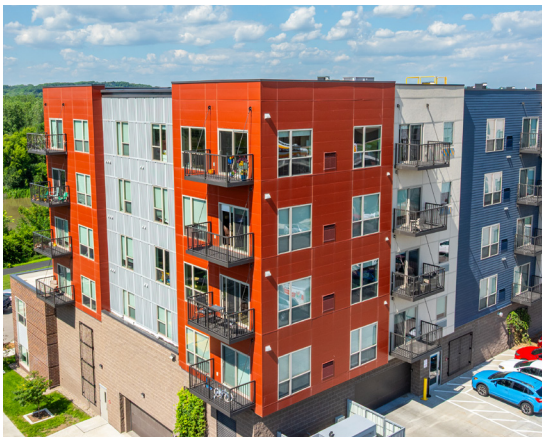
Hollowcore
Design Handbook



COUNTY™
PRESTRESS & PRECAST, LLC

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An Ideal Choice

for Safer, Longer-Span Projects

Hollowcore planks from County Prestress & Precast, LLC deliver long spans and high load capacities, ideal for creating expansive, column-free spaces in podiums and total precast systems. Precision-cut during production, these prestressed concrete components streamline construction timelines while ensuring exceptional performance.

This guide highlights the versatility of hollowcore in various building systems. Whether used as a standalone solution or integrated into larger structures, hollowcore offers key benefits, including:

- Cost-Effectiveness: Reduced material and installation costs
- Efficient Construction: Accelerated timelines with prefabrication
- Durability: Minimal maintenance requirements
- Sustainability: Eco-friendly compared to traditional materials

Featuring continuous voids to reduce weight and cost, hollowcore planks maintain exceptional fire resistance. Common applications include multi-family housing, hospitality venues, dormitories, nursing homes, and mixed-use buildings. Key features include fire and moisture resistance, sound insulation, flexible floor plans, and energy efficiency. Hollowcore is also ideal for commercial and mixed-use projects:

- Structural strength and vibration resistance
- Wide clear spans and high load capacities
- Penetrations for electrical, plumbing, and HVAC systems are easily achievable

This guide includes technical specifications, installation guidance, and best practices for maximizing the effectiveness of hollowcore planks. Load tables are provided for reference, with final designs customized by our engineering team in collaboration with the Structural Engineer of Record (SER).

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Versatile Building Applications

Hollowcore delivers strength, durability, and design flexibility.

Hollowcore planks are prestressed concrete slabs with tubular voids that reduce weight while maintaining structural integrity, making them ideal for various construction applications.

Hospitality and Residential

Hollowcore planks provide durable, cost-effective solutions for a wide range of residential and hospitality projects. Lightweight and easy to install, they ensure structural integrity and safety, making them ideal for apartments, hotels, dormitories, and assisted living facilities. Their fire resistance, sound insulation, and ability to create flexible layouts meet the demands of modern living and guest accommodations.

Mixed-Use Structures

Hollowcore planks excel in mixed-use developments by forming a strong base structure (podium) along with the precast beams and columns. The hollowcore podium acts as a horizontal fire barrier, supports upper-level gravity loads, and transfers lateral loads to shear walls. This design enables versatile ground-level spaces such as parking, retail, or recreational areas, seamlessly integrating the structure into urban environments while maintaining safety and performance.

Mid-Rise and High-Rise Buildings

In mid-rise and high-rise construction, hollowcore planks are valued for their ability to accelerate timelines and minimize on-site labor. By reducing the need for additional support structures, they allow for rapid floor completions, enabling other trades to proceed without delay. Used in combination with precast walls, beams, and columns, hollowcore offers design flexibility to meet diverse architectural and functional requirements.

Manufacturing and Commercial

Hollowcore planks are a top choice for manufacturing and commercial facilities, offering long spans that create wide, open spaces free of multiple support columns. This adaptability is ideal for warehouses, factories, retail spaces, and industrial buildings, accommodating irregular bearing geometries and flexible layouts to meet operational needs.

Office Buildings

In office construction, hollowcore systems deliver versatile, open-plan spaces that support dynamic work environments. Their structural strength, fire resistance, and vibration control ensure a safe and comfortable setting for employees. Additionally, hollowcore's ability to incorporate electrical, and plumbing systems simplifies building integration.

The Benefits of Hollowcore

Lightweight

Hollowcore planks are lighter compared to solid concrete slabs, allowing for easier handling and transportation, reducing construction time and costs.

Fire Resistance

Concrete inherently has good fire resistance, and the hollow cores in these slabs contribute to improved fire safety.

Sound Insulation

Precast hollowcore slabs are well-suited for providing effective sound insulation, meeting or exceeding the code-specified Sound Transmission Class (STC) criteria for various types of buildings.

Customization

Hollowcore slabs can be manufactured in various widths, depths, and lengths to suit specific project requirements.

Ease of Installation

They are prefabricated off-site, ensuring high quality and precision, and can be quickly installed, contributing to faster construction schedules.

System Features and Advantages

Prestressed hollowcore offers a cost-efficient and swift building solution without compromising quality or structural integrity, enabling rapid completion at an economical cost.

Design and Construction Benefits

County Prestress & Precast provides full-service support, from design assistance to product delivery.

Once installed, hollowcore planks provide an immediate work platform for subsequent construction activities. This reduces downtime between construction phases and accelerates overall project completion.

Long spans with shallow sections enable high span-to-depth ratios, resulting in more interior space with reduced structural depth and fewer columns obstructing the layout.

Design Flexibility and Quality Control

Design flexibility allows for spaces with fewer interior support columns, accommodating diverse floor plans and intricate details.

Increased Load Capacity For Floors

Greater quality control and consistency through in-plant production, reduces on-site labor and enhances finish consistency.

Durability, Safety, and Functional Benefits

- Long-term durability with low maintenance compared to conventional building materials
- Excellent fire resistance, vibration resistance, and moisture control
- Hollowcore planks provide robust structural stability, minimizing the risk of collapse during seismic events or extreme weather conditions.
- Mold and mildew resistance, insect-proofing, and acoustical control for reduced noise transmission between spaces

Aesthetic and Finishing Advantages

Offers smooth-finished ceilings that can be left exposed or painted, eliminating the need for suspended ceilings

Provides floors requiring minimal preparation before becoming ready for the final application of the finished floor

How Hollowcore is Made

Prestressed, precast hollowcore planks are produced through a highly efficient and precise manufacturing process, optimized for structural performance and long-term durability. These planks are made using either Elematic or Ultra-span equipment at our advanced manufacturing facilities, ensuring consistency and high quality.

The process begins with prestressing, where high-strength steel strands are tensioned along the length of the casting bed. This tensioning provides the necessary compressive force to counteract tensile stresses that occur under load, enhancing the plank's strength and load-carrying capacity. Concrete is then machine-extruded around the tensioned strands. The extrusion process forms the hollow cores, which reduce the plank's weight without compromising its structural integrity, and improve thermal efficiency.

Once cast, the planks undergo controlled curing to achieve the desired strength and durability. They are then cut to the specified lengths using precision saws, ensuring exact dimensions for each project. They are then inspected for quality and prepared for delivery to the construction site, ready to be integrated into the building's structure with minimal additional work.

Hollowcore System Properties

Bearing Systems

Hollowcore planks offer versatile support options, including precast beams or walls, steel sections, cast-in-place components, or masonry. The system's connections are designed to work integrally with any chosen support method, allowing flexibility for a wide range of structural designs.

Available Sizes

Hollowcore planks are available in various sizes to accommodate different project needs. They are offered in 4-foot widths with thicknesses of 8, 10, and 12 inches. Additionally, all hollowcore planks can be ripped to suit specific project requirements.

Surface Preparation

The machine-finished surface of the hollowcore has been found to provide adequate horizontal shear strength according to the PCI Manual for the Design of Hollowcore Slabs (MNL-126). Therefore, no additional surface preparation is required to achieve a fully composite section.

The joints at the bottom of the planks, which are grouted from above, can be caulked if requested.

Delivery and Equipment Use

Our precast hollowcore planks are shipped by truck/trailer to the crane on site. Our project management team will coordinate overall schedule, erection sequence, safety plans, and other project parameters with each customer to ensure on-time delivery.

Guidelines for Equipment Use During Construction

- The operation of any vehicle shall be limited to areas where the plank is supported at both ends. Avoid driving on cantilevers and near large openings.
- Plank keyways must be grouted.
- Stockpiling of materials (e.g., drywall, ceiling tiles, wood joists, roofing materials) on plank where the equipment is being operated is strictly prohibited.
- Plank topping, if any, need not be present.
- Operation of multiple vehicles is permitted but should be limited to a clear distance of 15ft or ½ the plank span.
- Perimeter beams, ledger beams, and beams loaded on one side should be braced to prevent turning of the beam due to torsional effects.
- The allowable rated weight of the equipment is shown below. For longer spans or heavier equipment consult with County Prestress & Precast's engineering team.

Plank Thickness (in.)	Max Span (ft)	Allowable Rated Weight (lb)
12	30	20,000
8	20	10,000

NOTES:

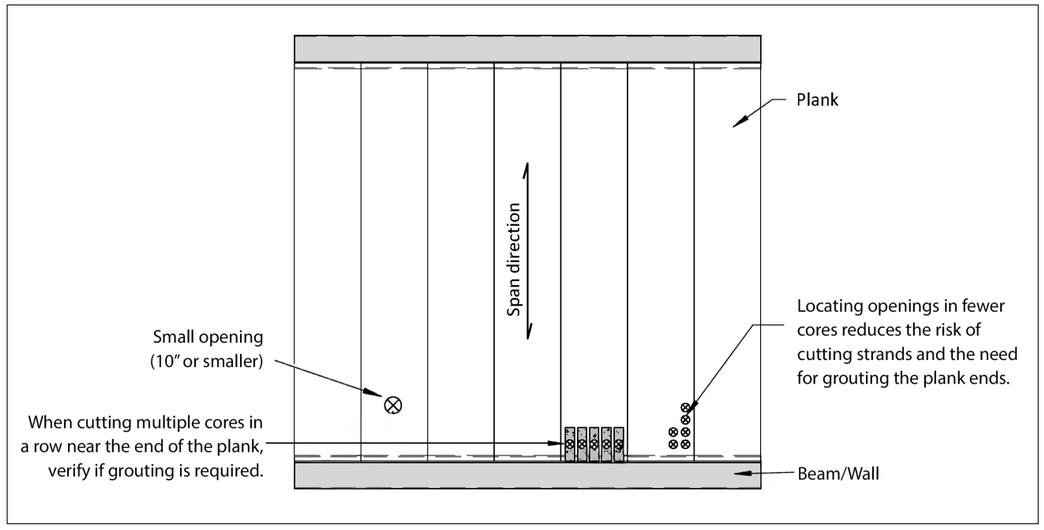
- The allowable rated weight includes the operating vehicle weight plus the maximum lift capacity of any vehicle configuration.
- The equipment is assumed to be free to tip on one axle. Hence, the entire self-weight and tipping load are applied to a single axle. When tipping on one axle is intentionally restricted, the allowable weight can be increased by 70%.
- Two tires are assumed per axle at minimum spacing of 4.75ft.

Penetrations and Openings

Field-Cutting Guidelines – Small Openings

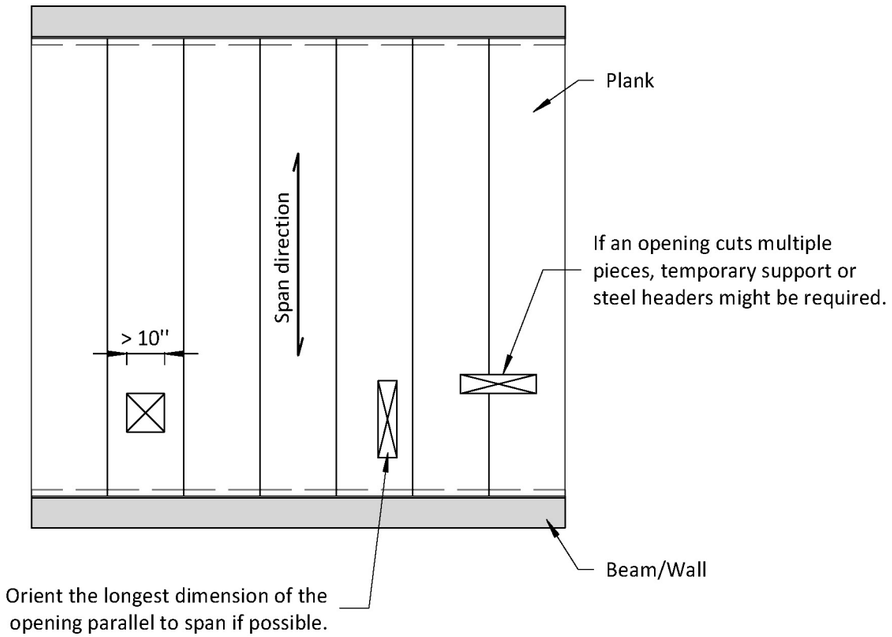
While large openings are shown on the construction drawings and their location and size are coordinated during the design process, smaller openings (less than 10"x10") are generally created in the field using a core drill process.

Hammer-drilled holes smaller than 2½" in diameter can be installed in various locations within the system. Whether large or small, openings must always be placed in a manner that reduces the number of prestressing strands being cut.



- Openings smaller than 10" in size, can be field-cut even if they are not shown on the plans and without prior approval by County Prestress & Precast as long as they are located such as to avoid cutting strands.
- If you are not sure about the location of a field-cut opening of any size, then markup the approximate location(s) on the plan and ask for approval by engineering.
- Recommended procedure for cutting small openings in the field:
  - All trades should layout their openings prior to cutting.
  - Avoid cutting as many strands as possible by aligning the openings in the direction of the span rather than transverse to it. Remember to ask for approval before cutting strands.
  - Use a template plate when laying out openings. See product charts for drill zone measurements.
  - Drilling pilot holes is recommended. Especially when openings are laid out for multiple precast levels.
  - A cored hole that has not been used must be grouted solid to maintain the fire rating of the floor.

Field-cutting Guidelines – Large Openings



All field-cut large openings with one or more dimensions greater than 10", and not shown on the plans, must be approved by County Prestress & Precast engineering before proceeding.

Recommended procedure for laying out large openings in the field:

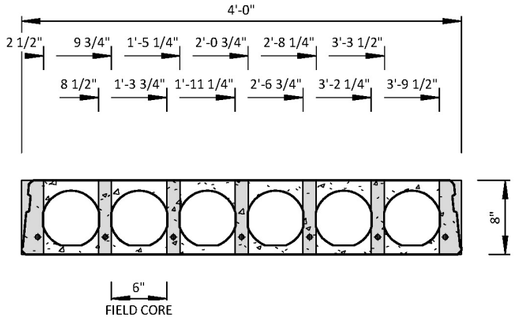
- All trades should layout their openings prior to cutting.
- Avoid cutting as many strands as possible. By orienting the longest dimension of the opening parallel to span or aligning multiple openings in the direction of span.
- Attempt to locate the openings near the bearing ends. Additional grouting of the cores may be required and performed in the field.
- Avoid sawcutting near heavy point loads or loadbearing walls.

Recommended procedure for cutting large openings in the field:

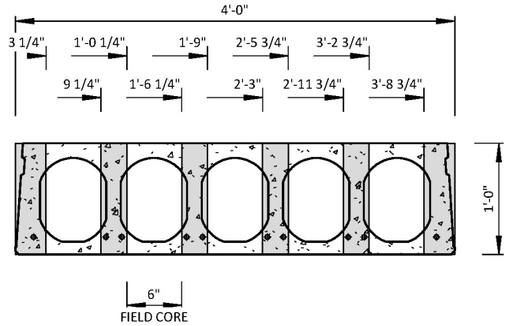
- Plank keyways must be grouted prior to any field cutting.
- Lay out all openings prior to cutting.
- Start with a pilot hole at each corner of the opening.
- If necessary, to avoid overcutting, enlarge the pilot holes inside the perimeter of the opening.
- Sawcut the opening edges running parallel to span direction first.
- Sawcut the opening edges running transverse to span.

Penetrations and Openings

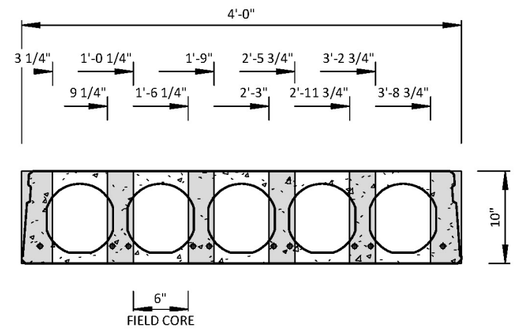
DO-NOT-DRILL ZONE



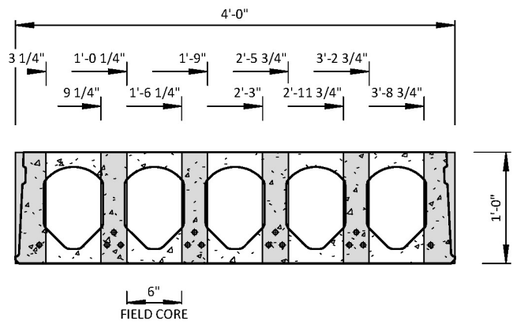
8" ELEMATIC HOLLOWCORE - (E8)



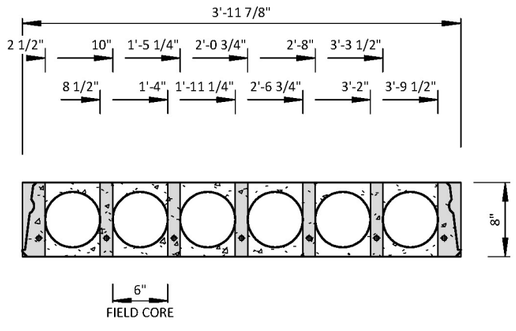
12" ELEMATIC HOLLOWCORE - (E12)



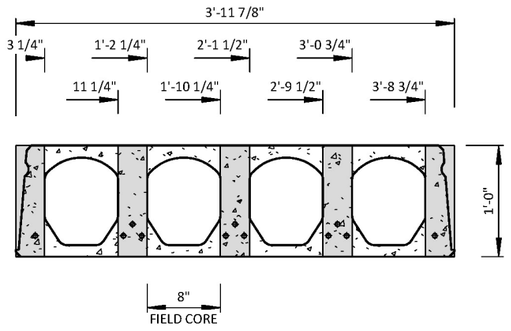
10" ELEMATIC HOLLOWCORE - (E10)



12" ELEMATIC HEAVY HOLLOWCORE - (E12H)

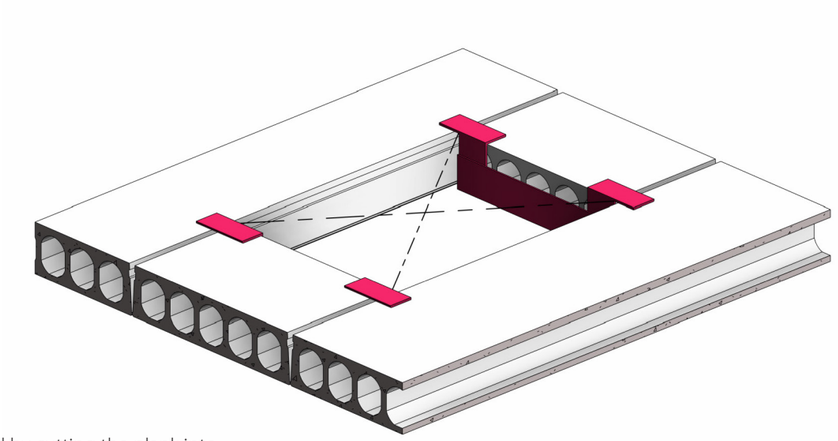


8" ULTRASPAN HOLLOWCORE - (U8)



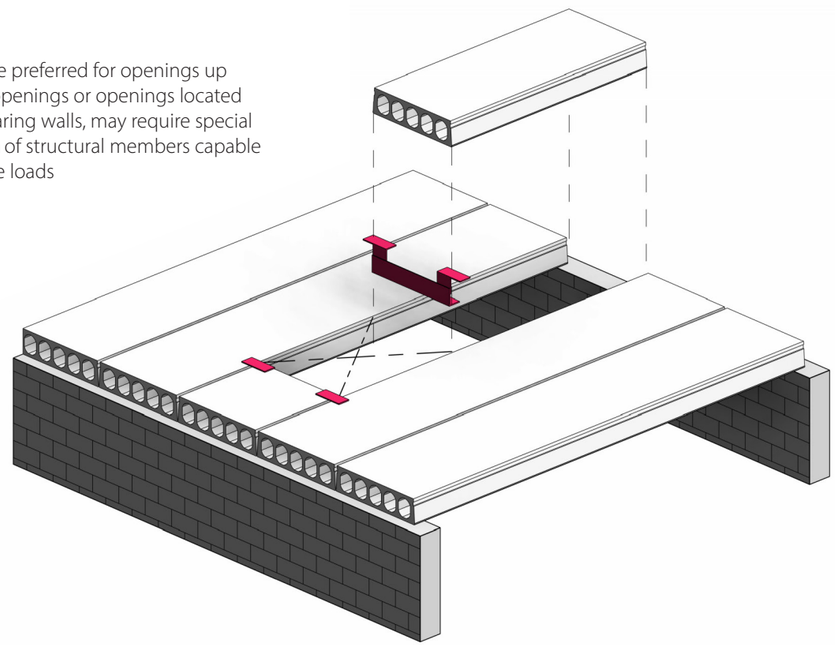
12" ULTRASPAN HEAVY HOLLOWCORE - (U12H)

Steel Headers



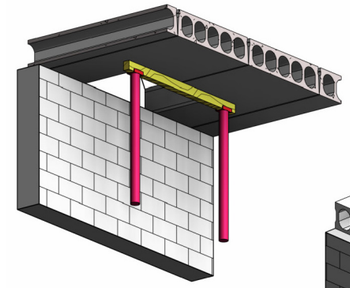
Large openings formed by cutting the plank into multiple pieces should be supported by steel headers. A steel header will span the opening and transfer the load to the adjacent slabs. Large openings necessitating the use of steel headers should be coordinated with the precast design team during the design process.

Typical steel headers are preferred for openings up to 4-ft in width. Wider openings or openings located near heavily loaded bearing walls, may require special headers or the addition of structural members capable of safely transferring the loads

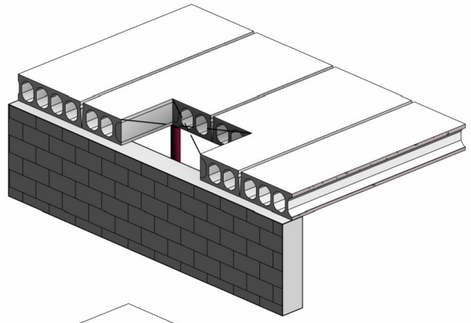


Penetrations and Openings

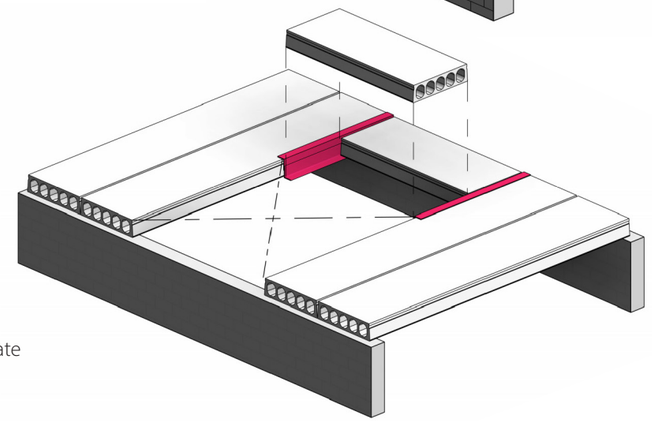
Alternate Framing and Shoring



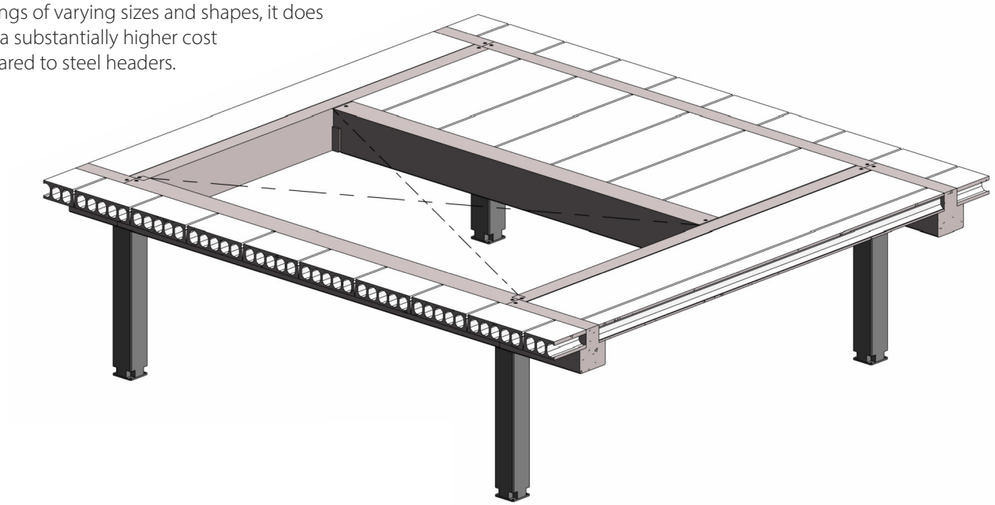
Until the keyways are grouted, large openings cutting multiple pieces should be shored.



Modifications to the precast framing, along with the utilization of specialized steel hangers, provide cost-effective solutions. Reach out to one of our sales representatives for personalized assistance in identifying the solution that aligns best with your needs.



Considerably wider openings may necessitate the incorporation of extra precast framing components. While this approach provides unparalleled versatility in accommodating openings of varying sizes and shapes, it does entail a substantially higher cost compared to steel headers.



Plank Design Considerations

When selecting the appropriate plank sizes for a project, architects and structural engineers should take the following key factors into account:

Loading Conditions

- For preliminary design, the thickness of the hollowcore can be selected based on the span-to-depth ratio and the function of the hollowcore slabs (floor vs. roof).
- When uniform loading is known, use County Prestress & Precast load charts to select the appropriate hollowcore sections. In addition to uniform loading, the load charts account for fire rating, topping, and deflections.
- At locations of heavy point loads, solid slabs or transfer beams may be required.
- For more complex loading conditions, where a combination of point and line loads is present. A refined analysis of the hollowcore strength is required. County Prestress & Precast offers comprehensive pre-con-struction services to support our clients from project inception to completion. Our team of experts is ready to assist with design-build projects, providing innovative solutions and technical expertise to ensure efficient, cost-effective designs.

Building Services

Building service needs can be incorporated into the precast system, with elements customized to include required holes.

Topping Considerations

- Specify whether the concrete topping will be composite or non-composite:
  - Composite (structural) topping: Acts integrally with the hollowcore slabs to provide increased strength. It is considered part of the floor system and cannot be interrupted by walls or expansion joints. In addition, a structural topping offers a convenient solution to diaphragm design if perimeter beams cannot be used for chord reinforcement. However, fibers or welded wire fabric reinforcement are necessary to control cracking.
  - Non-composite topping: while this type of topping does not contribute to the structural strength of the floor system, it still plays a crucial role in providing a level surface that compensates for any camber in the precast planks. Toppings that include a vapor barrier or insulation are not bonded to the plank and are treated as superimposed dead loads.
- Precast hollowcore slabs contain prestressed strands, which naturally create camber at midspan. For composite concrete toppings, a minimum of 1½ inches of topping is recommended at midspan to achieve a level finished-floor elevation, with additional thickness required at the plank ends. For non-composite toppings, such as Gypcrete®, an allowable topping thickness of approximately 2 inches is recommended to accommodate camber and ensure adequate coverage at midspan.
- Camber on a particular job cannot be predicted with a singular value. It varies due to multiple factors, including plank thickness, prestressing amount, span length, curing method, storage duration, and ambient temperature.

Surface Finish

- For untopped hollowcore planks, a leveling compound can be applied to address uneven joints or surface variations between slabs.
- If composite bonding is required – when specified by the design engineer – a light broom or rake finish can be applied to the top surface of each plank to improve bonding for composite action with cast-in-place slab.
- The underside of the planks can serve as a finished ceiling and can be left as-is, painted, or treated with acoustical spray.

Fire Rating Guidelines

Fire rating requirements are a critical design consideration, just like other structural parameters. These ratings are established by the project Architect and must align with the overall fire safety criteria for the project.

Precast hollowcore plank fire ratings are typically determined using one of the following methods:

- PCI 124, Specification for Fire Resistance of Precast/ Prestressed Concrete
- IBC, the International Building Code
- UL Fire Rating, Underwriters Laboratories Certification Program

Fire Rating Procedure According to PCI 124 and IBC

PCI 124 and IBC provide a similar procedure for determining the fire rating of precast concrete slabs. The three main requirements that the slabs have to meet are structural integrity, heat transmission, and flame passage.

- Structural strength: the load-bearing strength of the hollowcore slabs must be maintained for the duration of the fire. This is typically achieved through providing adequate cover to the prestressing strands or by performing a specialized rational design analysis.
- Heat transmission: this requirement is meant to prevent the average temperature of the unexposed surface of the floor from increasing more than 250°F. The thickness of the selected hollowcore is primarily responsible for satisfying this condition.
- Integrity: holes, gaps, and penetrations through the hollowcore floor must be grouted or fireproofed to prevent flames and hot gases from passing through.

County Prestress & Precast does not maintain an active participation in the Underwriters Certification Program.

Thermal R Values

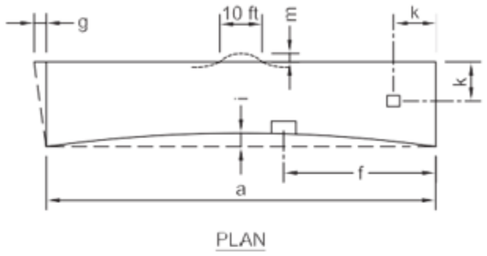
County Prestress & Precast can provide insulation within the cores when required. However, because concrete is a poor insulator, the webs between the insulated cores will act as thermal bridges. A more effective solution is to provide continuous insulation above or below the hollowcore slabs. For example, a common practice at balconies is to drop the plank below the floor elevation, install a layer of continuous insulation, and then add a sloped layer of concrete on top to drain water away.

Sound Rating

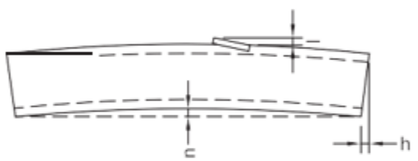
The Sound Transmission Class (STC) is a standardized metric used in building science to quantify the effectiveness of a wall, floor, or ceiling assembly in attenuating airborne sound transmission. Higher STC ratings correspond to greater sound insulation capabilities. The values for the Sound Transmission Class are determined for each hollowcore profile and listed in the following table.

	STC
E8, U8	51
E10	52
E12	54
E12H, U12H	55

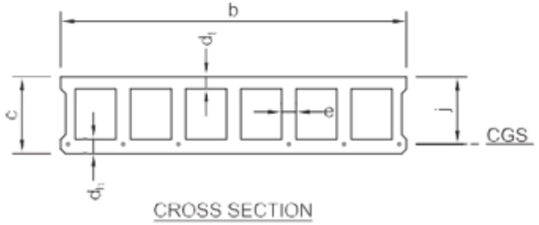
Tolerances



PLAN



ELEVATION



CROSS SECTION

Source: PCI Hollowcore Design Manual, MNL-126.

Product Tolerances: Hollowcore Slabs

a = Length. . . . . ±1/2 in.

b = Width . . . . . ±1/4 in.

c = Depth . . . . . ±1/4 in.

d_t = Top flange thickness

Top flange area defined by the actual measured values of average d t x b shall not be less than 85% of the nominal area calculated by d t nominal x b nominal.

d_b = Bottom flange thickness

Bottom flange area defined by the actual measured values of average d b x b shall not be less than 85% of the nominal area calculated by d b nominal x b nominal.

e = Web thickness

The total cumulative web thickness defined by the actual measured value ∑e shall not be less than 85% of the nominal cumulative width calculated by ∑e nominal.

f = Blockout location. . . . . ±2 in.

g = Flange angle . . . . . 1/4 in. per 12 in., 1/2 in. max.

h = Variation from specified end squareness or skew . . . . . ±1/2 in.

i = Sweep (variation from straight line parallel to centerline of member) . . . . . ±3/8 in.

j = Center of gravity of strand group

The CG of the strand group relative to the top of the plank shall be within ±1/4 in. of the nominal strand group CG. The position of any individual strand shall be with ±1/2 in. of nominal vertical position and ±3/4 in. of nominal horizontal position and shall have a minimum cover of ±3/4 in.

k = Position of plates. . . . . ±2 in.

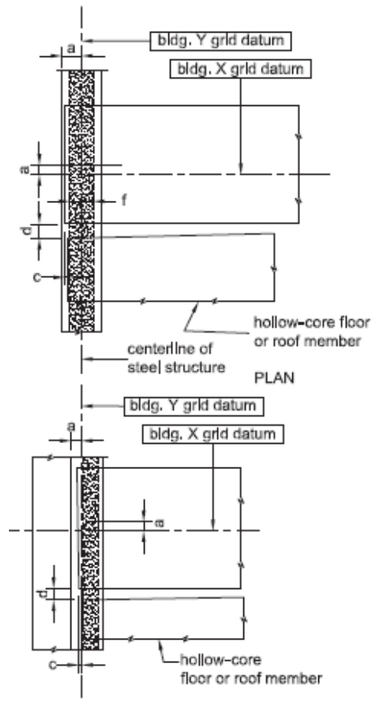
l = Tipping and flushness of plates. . . . . ±1/4 in.

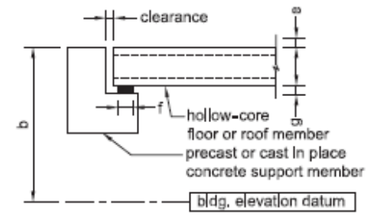
m = Local smoothness. . . . . ±1/4 in. in 10 ft.

(does not apply to top deck surface left rough to receive a topping or to visually concealed surfaces) Plank weight: Excess concrete material in the plank internal features is within tolerance if the measured weight of the individual plank does not exceed 110% of the nominal published unit weight used in the load capacity calculation.

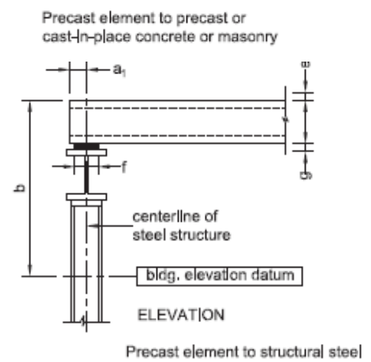
n = Applications requiring close control of differential camber between adjacent members of the same design should be discussed with the producer to determine applicable tolerances.

Tolerances





ELEVATION



Source: PCI Hollowcore Design Manual, MNL-126.

Erection Tolerances: Hollowcore Floor & Roof Members

a = Plan location from building grid datum . . . . . ±1 in.

a_1 = Plan location from centerline of steel[1] . . . . . ±1 in.

b = Top elevation from nominal elevation at member ends

Covered with topping . . . . . ±3/4 in.

Untopped floor . . . . . ±1/4 in.

Untopped roof . . . . . ±3/4 in.

c = Maximum jog in alignment of matching edges (both topped and untopped construction). . . . . ±1 in.

d = Joint width

0 to 40 ft. member length. . . . . ±1/2 in.

41 to 60 ft. member length . . . . . ±3/4 in.

61 ft. plus . . . . . ±1 in.

e = Differential top elevation as erected

Covered with topping . . . . . 3/4 in.

Untopped floor . . . . . 1/4 in.

Untopped roof[2] . . . . . 3/4 in.

f = Bearing length[3] (span direction) . . . . . ±3/4 in.

g = Differential bottom elevation of exposed hollowcore slabs[4] . . . . . 1/4 in.

[1] For precast concrete erected on a steel frame building, this tolerance takes precedence over tolerance on dimension "a".

[2] It may be necessary to feather the edges to ±1/4 in. to properly apply some roof membranes.

[3] This is a setting tolerance and should not be confused with structural performance requirements set by the architect/engineer.

[4] Untopped installation will require a larger tolerance here.

Tolerances

Blockouts and Openings

Specify tolerances for blockouts based on their function, size, and location on the shop drawings. Instead of detailing tolerances for each blockout, you can show typical tolerances on a general project tolerance drawing. For instance, tolerances for a window blockout, which will house a prefabricated window frame, should be tighter than those for a blockout for field-installed piping. Consider the need for draft on the sides of blockouts.

For dimensions controlling the alignment of open-shaped panels, required tolerances should be noted on the shop drawings. These tolerances may need to be 50 to 75 percent tighter than standard to ensure a visually acceptable match.

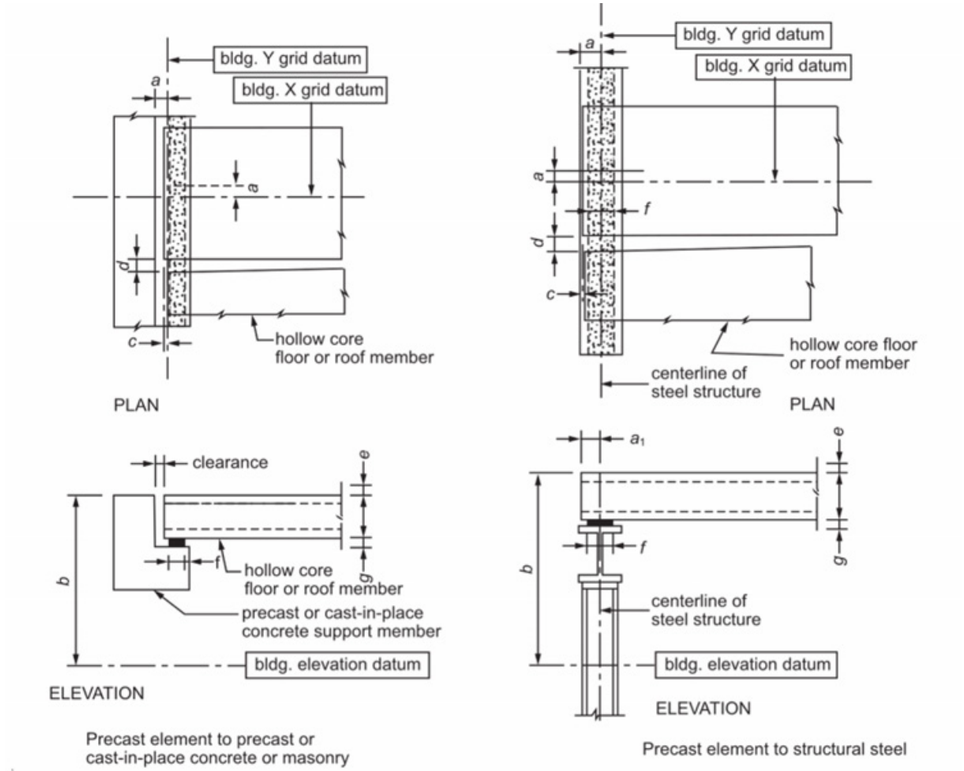
Tolerances for Sweep or Horizontal Alignment

Sweep refers to variations in horizontal alignment, often caused by prestress eccentricity in narrow members or form and member width tolerances.

Bowing and Warping Tolerances

Bowing and warping in panels can result from differential temperature effects, moisture absorption, prestress eccentricity, and shrinkage differences between face and backup concrete mixes. These tolerances are primarily relevant at the time of panel erection. Proper pre-erection storage is crucial, as storage conditions significantly impact panel bowing and warping.

Differential bowing should be considered for panels viewed together on the completed structure.



Load Chart Instructions

Purpose and Scope

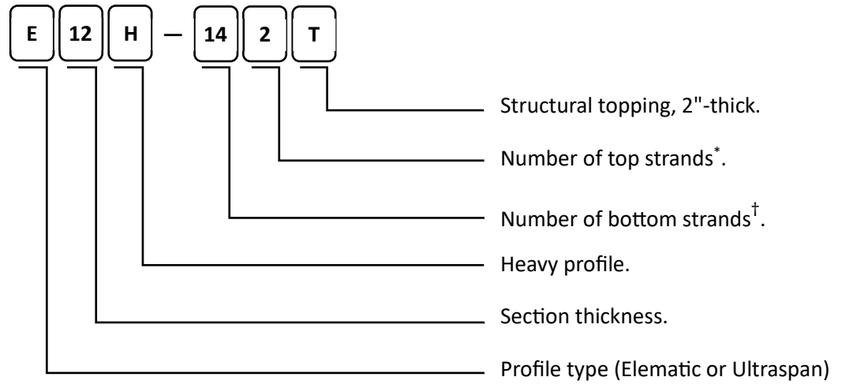
The allowable superimposed load charts are primarily developed to be an estimating tool. They are designed to help determine the appropriate plank size and reinforcement based on a known span and distributed loads. Nonetheless, a licensed engineer must conduct the final design to ensure compliance with all relevant codes and project-specific requirements.

NOTE:
County Prestress & Precast produces two different hollowcore profiles (Elematic and Ultraspan). Although both profiles are very similar, slight variations in shape, weight, and strength do exist. Please contact a sales representative to verify which sections are available in your area.

The values obtained from the charts represent the allowable superimposed live load that a hollowcore slab can take in addition to its self-weight and the weight of the topping. While the topping thickness is assumed to be a constant 2", this is only achieved by specifying a minimum topping thickness of 2". The maximum amount will be near the ends of the slab because of the camber at mid-span. If the specified topping is 3" or thicker, use the charts for a 2" topping and add the extra weight to the superimposed loads. If the specified topping is 2", it must be noted as a minimum thickness. Otherwise, assume no structural topping when determining the allowable load.

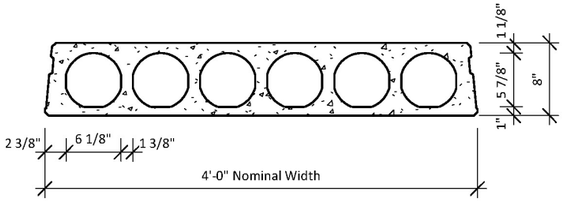
Strand Pattern Designation and Cross Sections

*Top strands are always placed in a single row 2" below the top of the hollowcore plank. Typically used to control camber or in lightly loaded cantilevers.

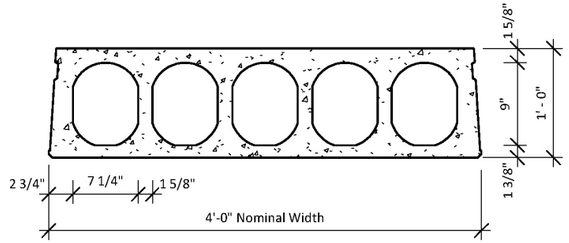


†Total number of bottom strands. For spacing and placement, see the load charts. All strands are uncoated ½"Ø 270 ksi Low-Lax stressed to 65% fpu (26.9 kip).

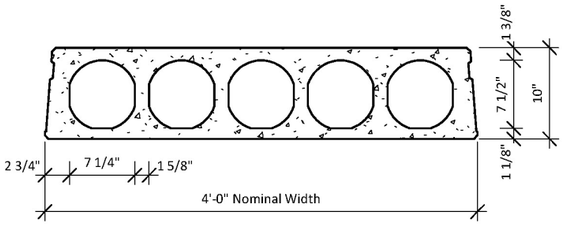
Load Chart Instructions



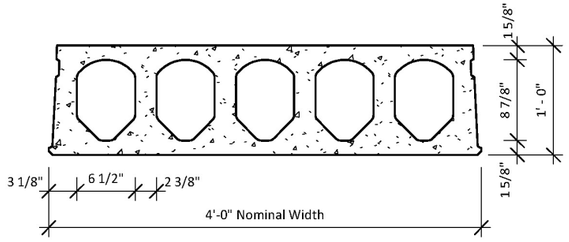
8" ELEMATIC HOLLOWCORE - (E8)
WEIGHT = 54 PSF



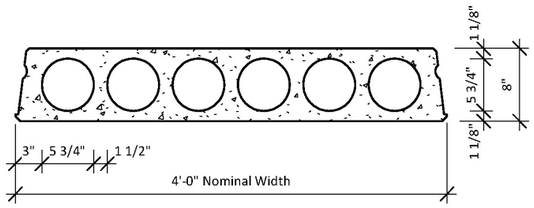
12" ELEMATIC HOLLOWCORE - (E12)
WEIGHT = 77 PSF



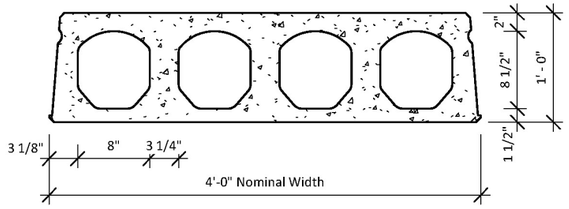
10" ELEMATIC HOLLOWCORE - (E10)
WEIGHT = 67 PSF



12" ELEMATIC HEAVY HOLLOWCORE - (E12H)
WEIGHT = 88 PSF



8" ULTRASPAN HOLLOWCORE - (U8)
WEIGHT = 59 PSF



12" ULTRASPAN HOLLOWCORE - (U12H)
WEIGHT = 88 PSF

UNIT WEIGHT OF DRY CAST CONCRETE: 158 lb/ft^3

Deflection and Span-to-Depth Ratio

For prestressed hollowcore slabs, the PCI Design Handbook suggests a span-to-depth ratio of up to 50 for slabs incorporated into roofing systems, whereas this ratio decreases to 40 for slabs utilized in flooring applications. This difference is due to the fact that loads and serviceability requirements are typically less demanding for roofs compared to standard floors. Therefore, as a general rule, the table provided below should serve as a reference for selecting the suitable plank thickness according to the intended span and application.

		Plank Thickness		
		8"	10"	12"
Span (ft)	Floor	26.7	33.3	40.0
	Roof	33.3	41.7	50.0

Table 1 Maximum Span Based on Floor or Roof Thickness

Camber

The load charts do not account for camber. Camber is a natural characteristic of all prestressed concrete products, resulting from the eccentric prestressing forces designed to resist applied loads. Camber for two slabs of identical length and prestressing may be different because of concrete and curing variations. It should be noted, however, that as the span length increases, camber also increases. The combined effects of camber, camber growth, and deflections should be considered during the design process.

In addition, planks stored for extended periods (over six weeks), often due to changes in construction schedules, may exhibit additional camber growth.

Material Properties

The hollowcore slabs are dry-cast concrete with a 28-day compressive strength of up to 9,000 psi.

Section Properties

	Section					
	E8	E10	E12	E12H	U8	U12H
A (in.^{2})	198	245	281	321	215	321
I (in.^{4})	1,597	3,093	5,196	5,509	1,656	5,494
y_t (in.)	3.92	4.91	5.91	6.21	4.06	5.88
I_c (in.^{4})	2,845	4,982	7,826	8,447	-	-
y_{tc} (in.)	4.67	5.64	6.56	6.95	-	-
b_w (in.)	10.49	10.84	10.82	14.33	11.93	14.41

Table 2 Hollowcore Section Properties

A = cross-sectional area.
I = moment of inertia.
y_t = distance to centroid from top.
I_c = composite moment of inertia (2" topping).
y_{tc} = distance to centroid from top of composite section (2" topping).
b_w = shear width.

Load Chart Instructions

Flexural and Shear Strength Considerations

- The load charts return the maximum allowable superimposed live load based on the flexural strength and a load combination of 1.2DL + 1.6LL. The self-weight and topping are included as a dead load.
- Strand development is accounted for.
- Minimum flexural reinforcement (ACI 318-19 §7.6.2) is not considered. Short spans with high loading will require supplemental mild reinforcement in grouted cores at each end.
- When the applied load is above the strand pattern's dashed line, then grouting some or all the end cores is required. The number of grouted cores is directly proportional to the load intensity. The critical shear section is conservatively assumed to be at the support.
- At very high loads, grouting cores near the middle third of the span will be required.
- The 2"-composite topping does not contribute to the shear strength. Instead, the horizontal shear strength is assumed to be exceeded near the ends and the bond is broken.
- The charts do not account for distribution of point and line loads, transverse bending, cantilevers, and large floor openings.

Minimum Bearing

Hollowcore units require a minimum bearing of ℓ/180 or at least 2". When supported on concrete, they are typically detailed with a 1/8"-thick continuous bearing pad. For concrete, a minimum bearing of 3" – 3-1/2" is preferred, while steel bearing can be as small as 2".

Fire Endurance

Generally, a 2-hour or a 3-hour fire rating is required by the building code. PCI 124 stipulates that precast members must meet the following three end-point criteria as set by ASTM E119:

1. **Structural:** precast members must maintain adequate structural strength to withstand all service loads for the length of the specified fire endurance rating. The allowable loads obtained from the charts will meet this requirement.

   The charts are developed based on the assumption that all precast members are unrestrained. However, if the precast is designed to be restrained for thermal expansion or if it is unrated for fire purposes, then use the curves for the 2-hr rating.

2. **Heat transmission:** the temperature on the hollowcore face not exposed directly to the fire cannot be allowed to rise excessively. Therefore, PCI 124 imposes a minimum equivalent thickness that the precast floor must meet in addition to maintaining structural strength. The allowable-load charts do not account for this requirement. Instead, a minimum amount of concrete topping might be necessary as shown in the following table.

Plank Designation	2-hr Rating	3-hr Rating
E8	½"	1 ½"
E10	None	½"
E12	None	None
E12H	None	None
U8	¼"	1 ¼"
U12H	None	None

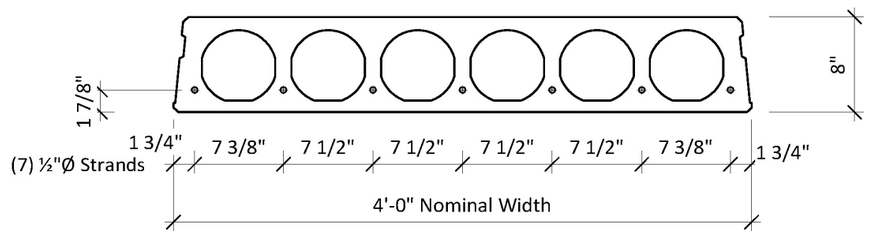
Table 3 Required Minimum Topping for Fire Rating

3. **Integrity:** the passage of flame or gases hot enough to ignite combustible material before the end of the desired fire endurance period is prohibited. This requirement is achieved through fireproofing of all openings and through-penetrations.

Load Charts

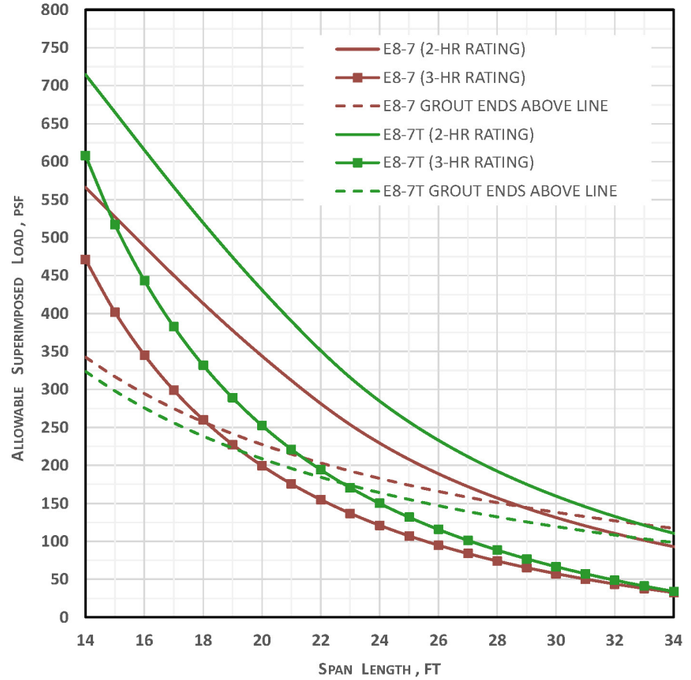
8" Elematic Hollowcore - (E8)

ELEMATIC



E8-7

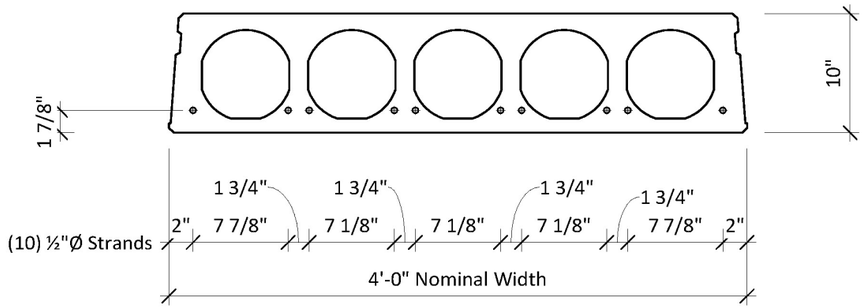
LBS **54 PSF**



Load Charts

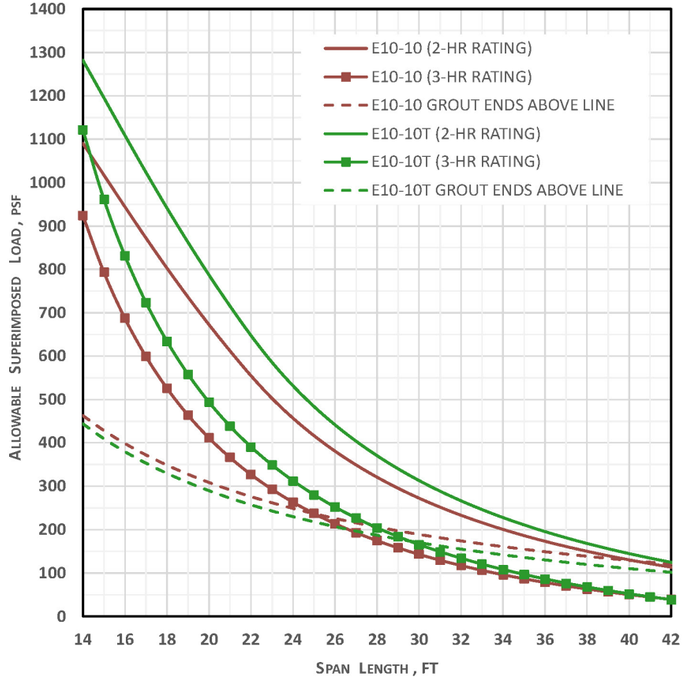
10" Elematic Hollowcore - (E10)

ELEMATIC



E10-10

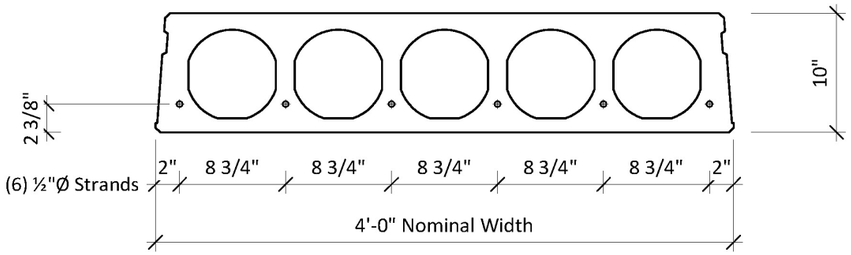
LBS **67 PSF**



Load Charts

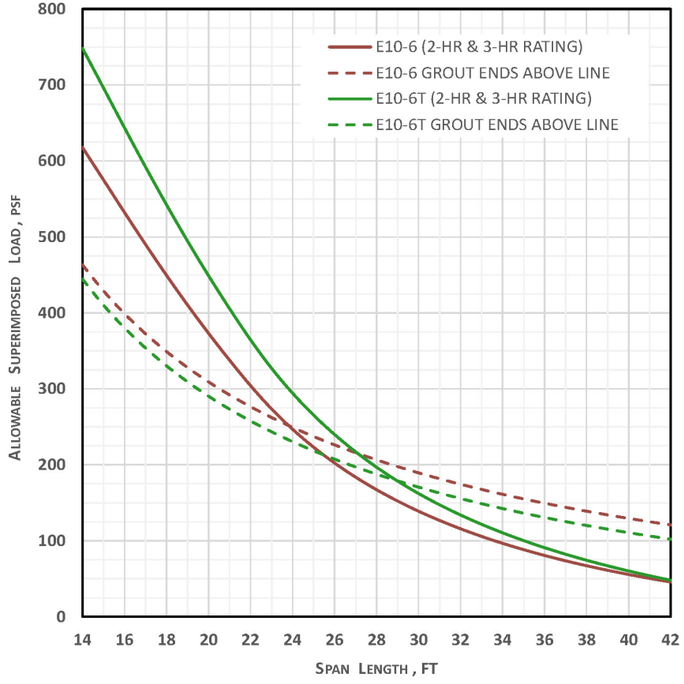
10" Elematic Hollowcore - (E10)

ELEMATIC



E10-6

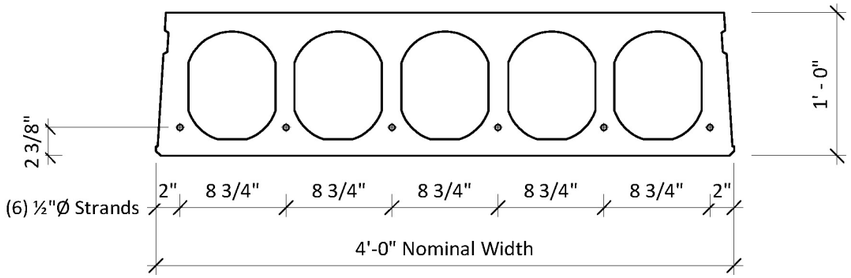
LBS **67 PSF**



Load Charts

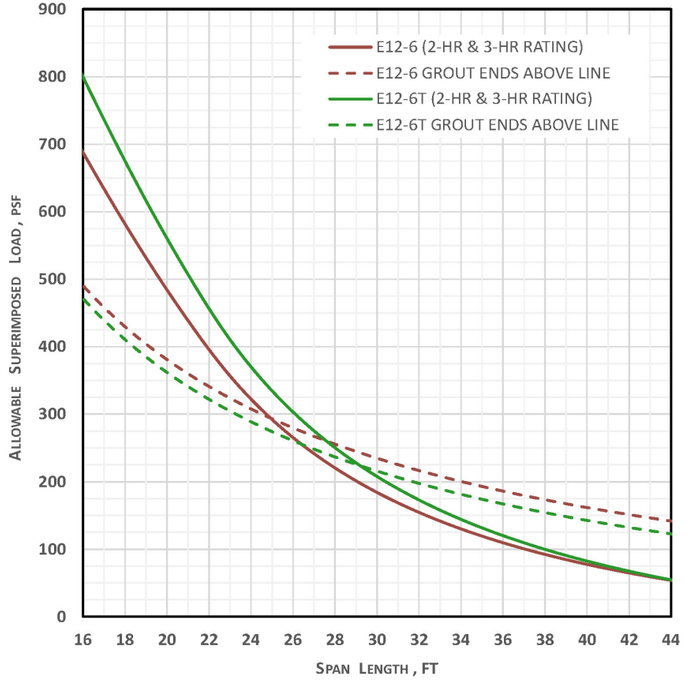
12” Elematic Hollowcore - (E12)

ELEMATIC



E12-6

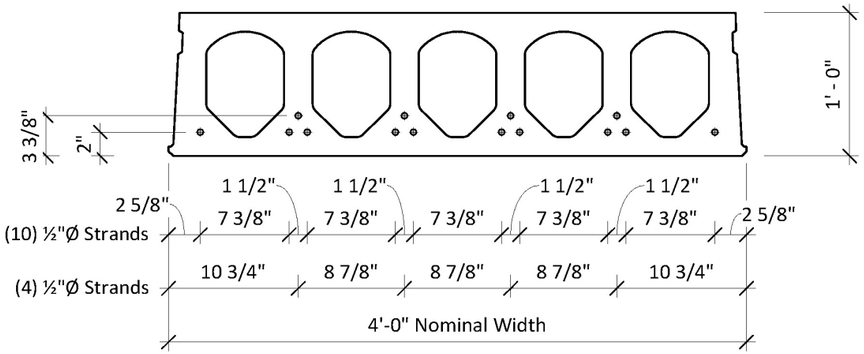
LBS 77 PSF



Load Charts

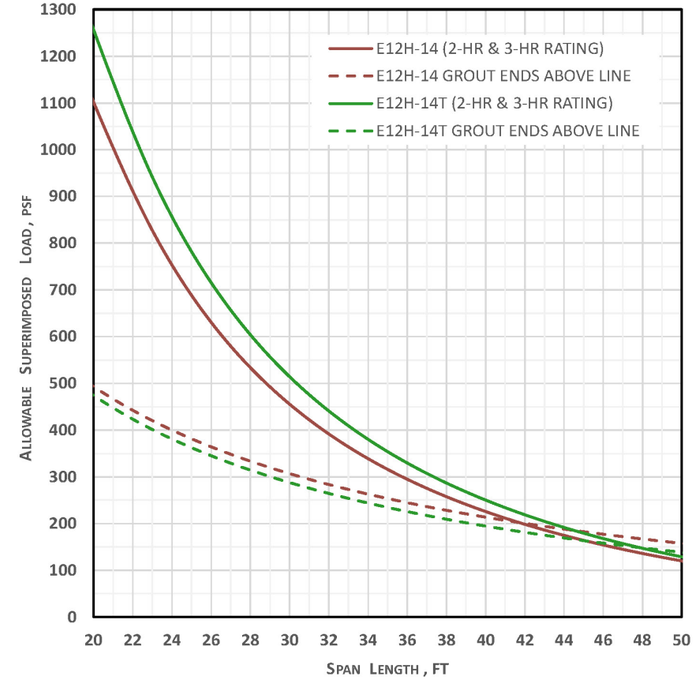
12” Elematic Hollowcore - (E12)

ELEMATIC



E12H-14

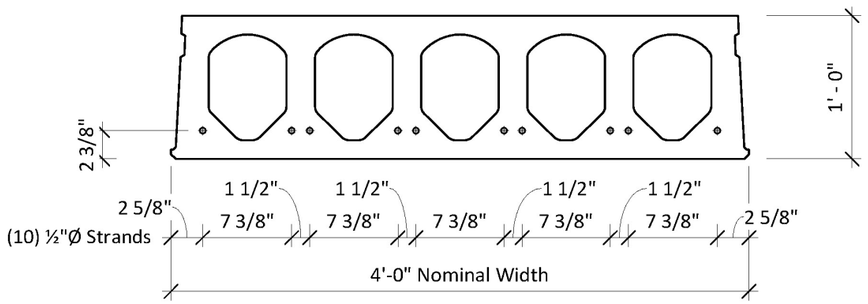
LBS 88 PSF



Load Charts

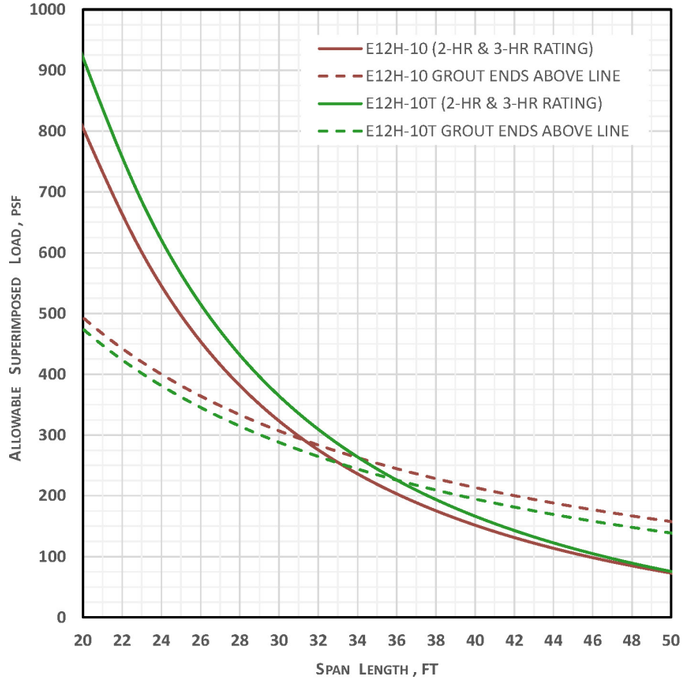
12” Elematic Heavy Hollowcore - (E12H)

ELEMATIC



E12H-10

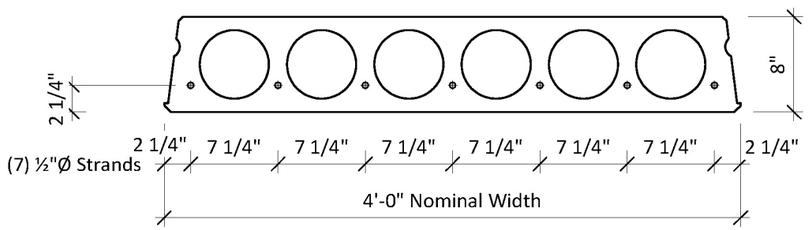
LBS **88 PSF**



Load Charts

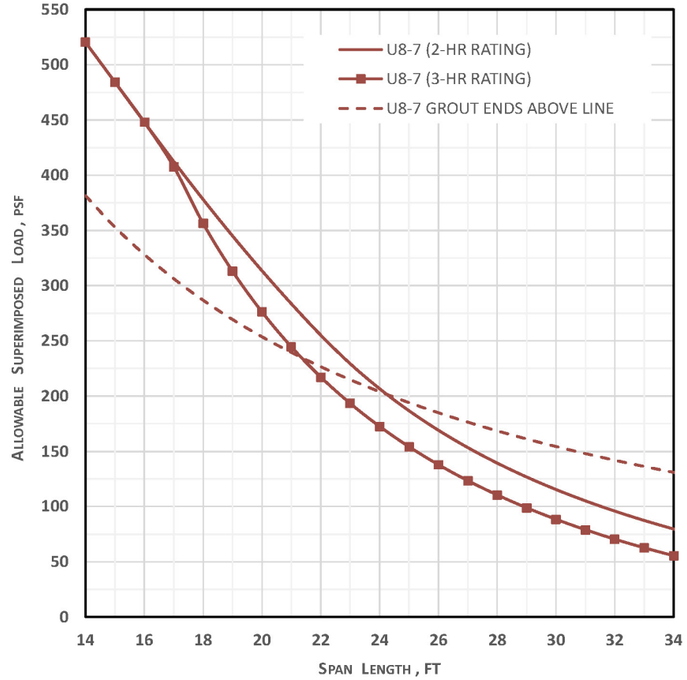
8” Ultraspan Hollowcore - (U8)

ULTRASPAN



U8-7

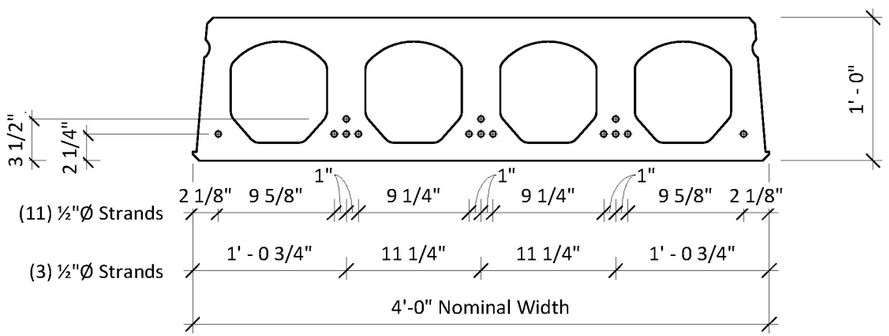
LBS **59 PSF**



Load Charts

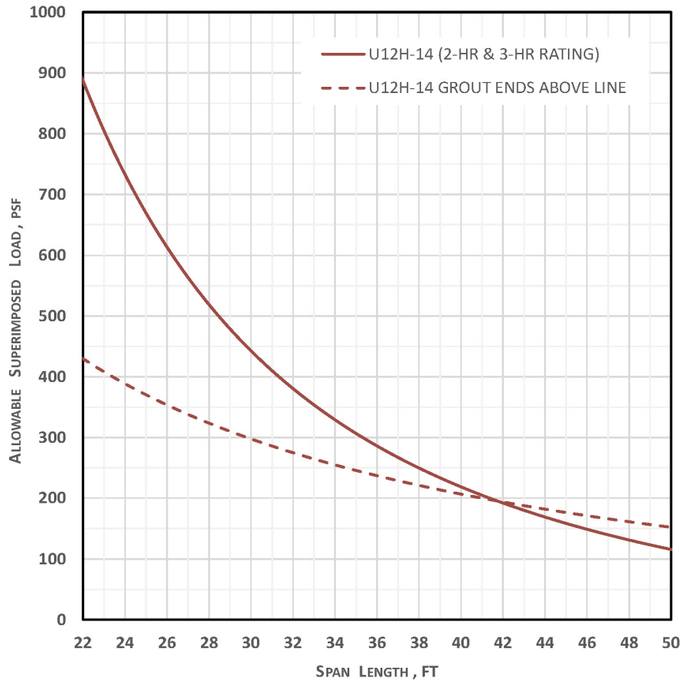
12” Ultraspan Heavy Hollowcore - (U12H)

ULTRASPAN



U12H-14

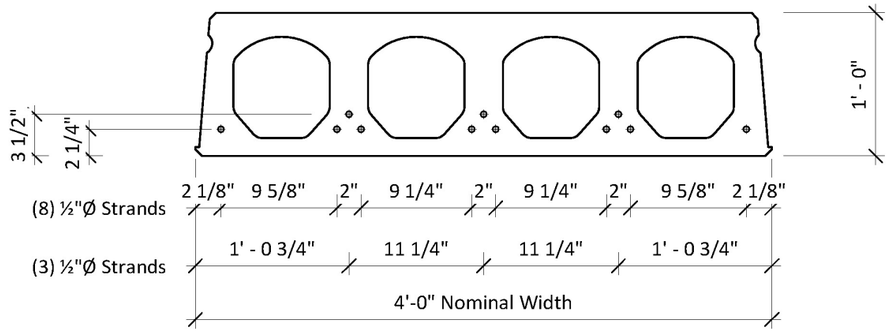
LBS **88 PSF**



Load Charts

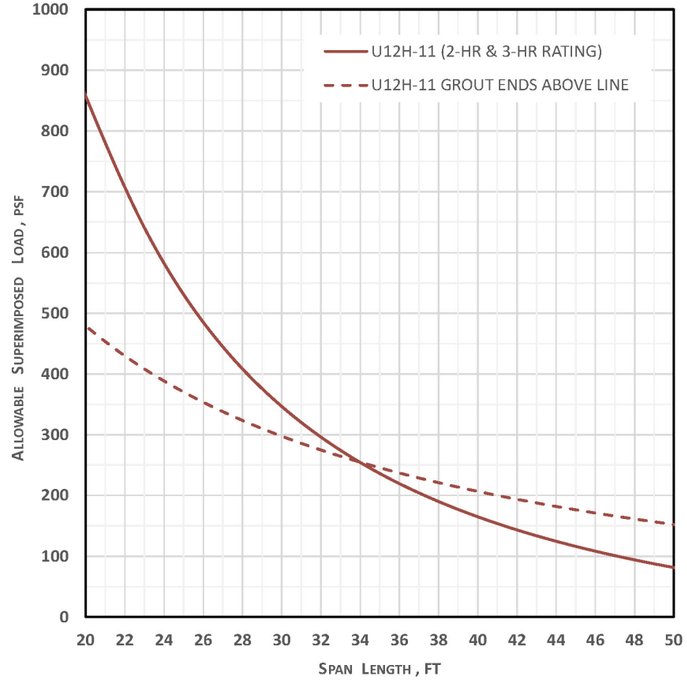
12” Ultraspan Heavy Hollowcore - (U12H)

ULTRASPAN



U12H-11

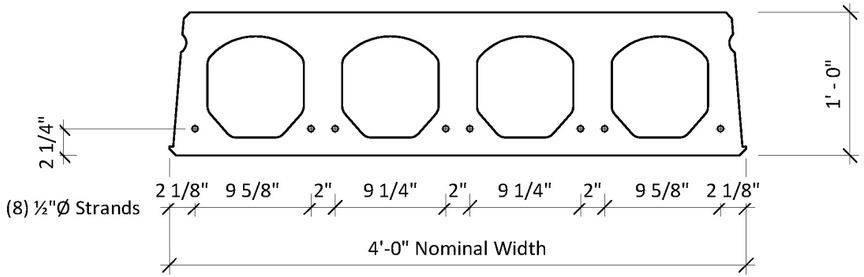
LBS **88 PSF**



Load Charts

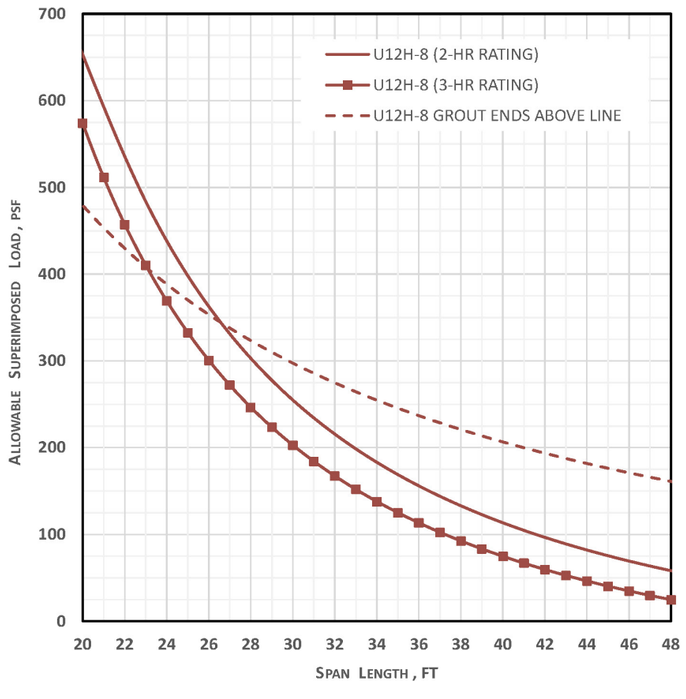
12" Ultraspan Heavy Hollowcore - (U12H)

ULTRASPAN



U12H-8

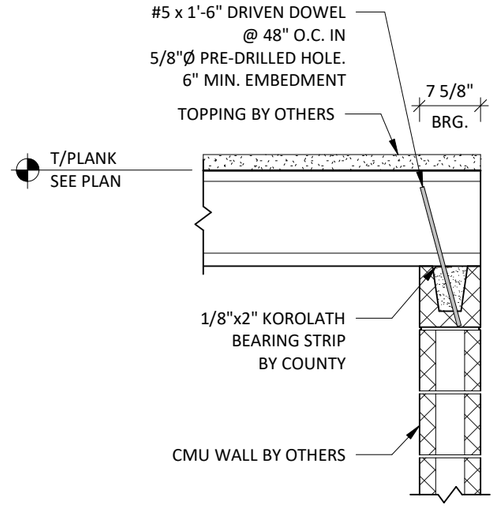
LBS **88 PSF**



Common Details

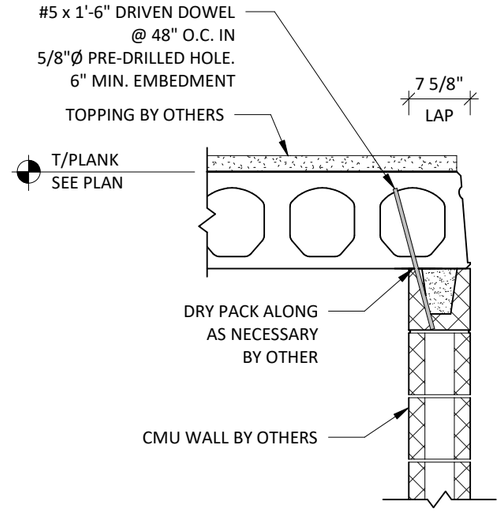
D41

Plank Full Brg 8" CMU



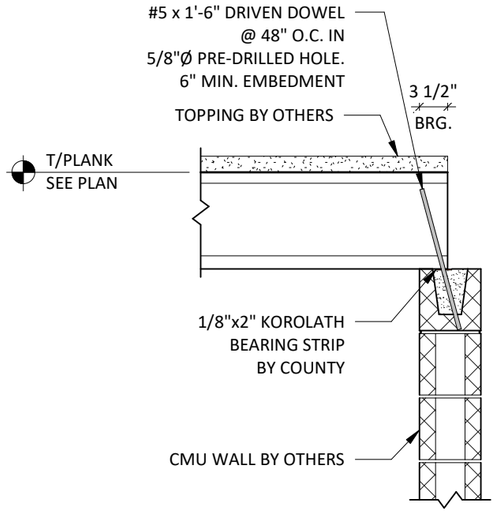
D42

Plank Full Lap 8" CMU



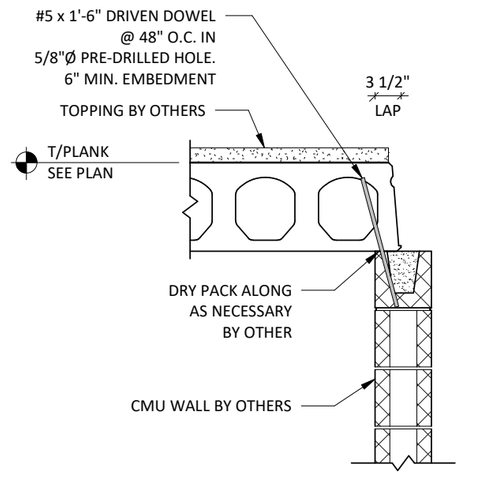
D43

Plank Partial Brg 8" CMU



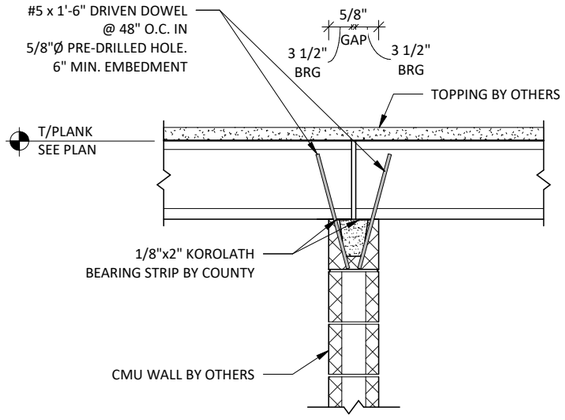
D44

Plank Partial Lap 8" CMU

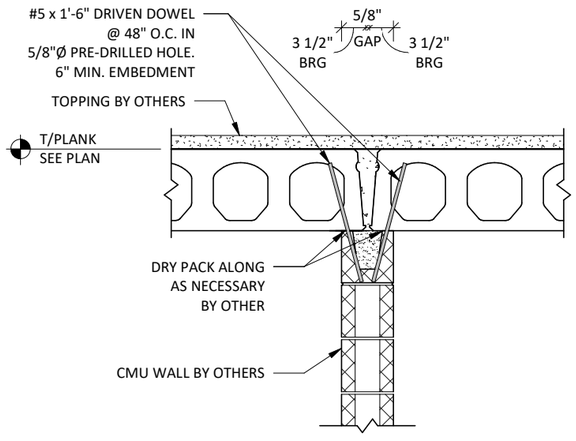


Common Details

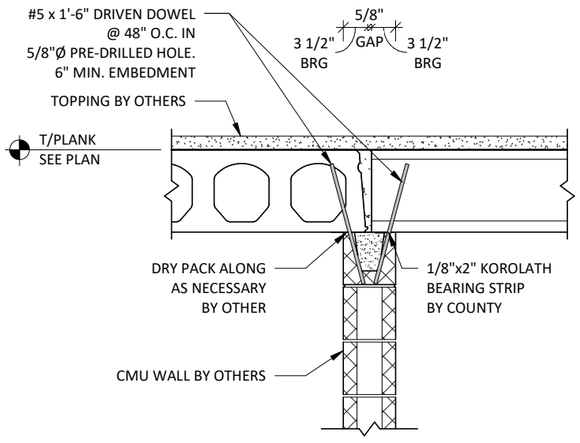
D45
Plank Brg/Brg 8” CMU



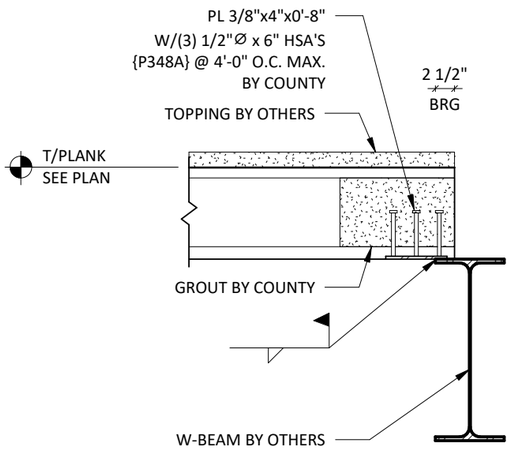
D46
Plank Lap/Lap 8” CMU



D47
Plank Brg/Lap 8” CMU



D48
Plank Partial BRG W-Beam



Hollowcore

Prestressed hollowcore offers a cost-efficient and swift building solution without compromising quality or structural integrity, enabling rapid completion at an economical cost.

Hollowcore

Your Full-Service Partner

County Prestress & Precast is your source for reliable concrete construction solutions. Our long-lasting products are readily available and easy to install. We perform extensive quality testing to deliver satisfactory results. Rely on us to deliver precast concrete products to meet the toughest project schedules.

COUNTY™
PRESTRESS & PRECAST, LLC

County Prestress & Precast, LLC
740 Pasquinelli Drive, Suite 100
Westmont, IL 60559

(708) 562-7700
info@countyprestress.com

countyprestress.com

1158406040_1125