INTRODUCTION

The purpose of this technical data is to provide assistance in selecting and detailing precast concrete hollowcore plank manufactured by Wells Concrete. The load tables presented herein are intended as a guide only. Final design is determined by our engineering department based on information presented in the final plans and specifications. To ensure the optimum selection for your application, please contact Wells Concrete for assistance.

Although care has been taken to provide the most accurate data possible, Wells Concrete does not assume responsibility for errors and omissions.

Reinforced concrete members must carry their own weight in addition to any applied superimposed loads. Short spans and thick depths of section are common limiting factors in conventionally reinforced members. Efforts to overcome these limitations resulted in the development of prestressing the precast concrete members. The major advantage of prestressed concrete is its ability to span longer distances with much thinner sections while carrying heavier loads. Span and load requirements determine the member thickness and the amount of prestressing force. It is important to note that camber is a result of the design and is not a design parameter.
Advantages of Hollowcore

• Provides clear spans in excess of 40 feet while maintaining a very thin cross section. Available in depths of 8, 10, and 12 inches
• Compatible with steel, masonry, cast-in-place, and other precast structures
• Indoor manufacturing ensures consistent quality and allows for year-round production
• Speed of erection schedule reduces down time for other trades and decreases the overall build time; speed of construction can reduce overall project time, increasing speed to market and reducing cost
• The steel form finish on the underside allows for a smooth paintable surface for a finished ceiling
• Fire resistant—offering up to 3-hour fire ratings with no additional fireproofing required, this can reduce insurance cost and potential loss of life and property
• Sound resistant, providing STC ratings of 50 or more
• Provides economical and efficient floor and roof systems
• Costly repairs or replacement due to water damage or other types of accidents are drastically reduced when compared with wood construction
• Precast/Prestressed Concrete Institute (PCI) Certified Plant insures a quality product manufactured under strict regulations

PRODUCT OVERVIEW

Hollowcore is an extruded, prestressed concrete slab with continuous voids to reduce weight and cost. It is primarily used as a floor and roof deck system. Hollowcore is very economical and provides great design flexibility. It is used in many different building systems. This unique product is strong, durable, and allows for significant floor loading and clear spans.

A. The Manufacturing Process

Ultra-Span is a machine-extruded, precast, prestressed hollowcore plank. The plank is manufactured on 500-foot long beds in a standard width of 48 inches and thicknesses of 8, 10, and 12 inches. Plank is cut to length for each project. High-strength prestressing strands are cast into the plank at the spacing and location required for the given span, loading, and fire cover requirements.

All Ultra-Span materials equal or exceed the requirements of applicable ASTM specifications. The concrete mix is designed to have a release strength of 3,500 psi and a 28-day compressive strength of 7,000 psi. The prestressing strands are uncoated, seven-wire, low-lax with a minimum ultimate strength of 270,000 psi.

B. Plank Design Considerations

The following items will affect the selection of appropriate plank sizes and should be carefully reviewed by the architect/engineer while developing the plans and specifications for a project:

1. Fire Rating
   • The fire rating requirement should be clearly specified in the contract documents.
2. Loading Conditions
   • Specify all uniform loading requirements on structural plans.
   • Identify line and point loads resulting from bearing walls, masonry walls, columns, mechanical equipment, etc.
   • Identify diaphragm forces and lateral loads resulting from wind or earth pressures.
   • Review roof plans for vertical protrusions such as parapets, penthouses, and adjacent buildings that could require designing for snow drift loads.
   • Size and number of openings can affect design.
   • Plank supporting stairs require special loading considerations.

C. Bottom Finishes

Bottom finish is the result of the extrusion process. Wells hollowcore is produced on a smooth steel form resulting in a flat, paintable finish.

D. Fire Ratings

Fire Rating Specifications are an important part of any building construction project and are often dealt with during the beginning of the design process. They sometimes drive the materials selected for the structure, its framing and exterior components for the need to protect the new structure from a fire event in an adjacent structure. Depending on the area of the project, there are a few different methods that can be utilized to determine the requirements. This is a brief overview of what is common in our area, however each project is unique and local codes should be consulted to ensure that the method selected is allowed. There is also a difference between Fire Rating and Fire Separation. A fire rating typically means the duration for which a passive fire protection system can withstand a standard fire resistance test. Fire Separation is a floor or wall having a fire rating required by appropriate authorities that acts as a barrier against the spread of fire within a building. Another factor in the fire rating of floors and roof members is the use of end conditions. Plank can be considered restrained by the Architect or Engineer of Record based on if thermal expansion is resisted by adjacent construction. Restrained bearing conditions offer longer fire endurances due to the restriction of the ends of the plank to move during an event.

RESTRAINED

UNRESTRAINED
Typical Methods to Determine Fire Endurance in Plank:

1. 2012 International Building Code (IBC)

International Building Code (IBC):

There are two requirements that have to be met in this code to achieve the desired fire endurance. They are the minimum total slab thickness and strand clear cover. Below is a step by step process on how Wells’ hollowcore can perform under the IBC code.

**Wells Hollowcore Values**

<table>
<thead>
<tr>
<th>Hollowcore Cross Section</th>
<th>Cross-Sectional Area, (in²)</th>
<th>Equivalent Thickness, (in²/in)</th>
<th>Strand Clear Cover (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>226</td>
<td>4.70</td>
<td>1.50</td>
</tr>
<tr>
<td>10&quot;</td>
<td>248</td>
<td>5.17</td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>275</td>
<td>5.74</td>
<td></td>
</tr>
</tbody>
</table>

1. Equivalent concrete thickness. All Wells’ hollowcore sections are made with a siliceous concrete type. This value can be found in the table above under “Equivalent Thickness”. Equivalent thicknesses can be calculated by dividing the cross-sectional area by the nominal plank width (48”). To obtain a higher slab thickness, normal carbonate concrete field topping can be added to gain a higher total slab thickness. Other topping materials such as gypcrete can be added to achieve a fire endurance using different tables.

Example: Slab thickness = 8” Hollowcore + 2” of topping = 4.70 in + 2.0 in = 6.70 in ≥ 6.2 in. Therefore, we meet the requirement for a 3 hour slab thickness, but the strand clear cover needs to be met too!

**Table 722.2.1**

<table>
<thead>
<tr>
<th>Concrete Type</th>
<th>Minimum Slab Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fire-Resistance Rating (hours)</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Siliceous</td>
<td>3.5</td>
</tr>
<tr>
<td>Carbonate</td>
<td>3.2</td>
</tr>
<tr>
<td>Sand-lightweight or lightweight</td>
<td>2.7</td>
</tr>
<tr>
<td>Lightweight</td>
<td>2.5</td>
</tr>
</tbody>
</table>

IBC, 2012, pp. 172

1. Bottom strand clear cover over the prestressing strand is 1.5”. Fire ratings utilizing this method are also impacted by the bearing condition, which can be restrained or unrestrained.

Example: Unrestrained hollowcore bays that requires a 3 hour rating. Strand cover = 1.50 in ≤ 2.25 in. Therefore, we only meet the requirement for a 1.5 hour cover thickness.

Example: Restrain every hollowcore bay that requires a 3 hour rating. Standard strand cover = 1.50 in ≤ 0.75 in. Therefore, we meet the requirement for a 3 hour cover thickness.

**Table 722.2.3 (2)**

<table>
<thead>
<tr>
<th>Concrete Aggregate Type</th>
<th>Fire-Resistance Rating (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Restrained</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Siliceous</td>
<td>0.75</td>
</tr>
<tr>
<td>Carbonate</td>
<td>0.75</td>
</tr>
<tr>
<td>Sand-lightweight or lightweight</td>
<td>0.75</td>
</tr>
</tbody>
</table>

PCI Design by Rational Analysis

PCI MNL-124 allows a method defined as “rational analysis” for determining the fire rating of the precast and prestressed members. This is the preferred method for determining a fire rating of our precast cross sections for both walls and floor members. Actual practice has provided evidence that this method is conservative when compared to the IBC method. This method utilizes elevated temperatures in the prestressing strands to determine the moment capacities based on reduced capacities in the strand. These reductions are compared to the moments required for service loads. Prestressing strand temperatures are based on the amount of cover provided and the standard fire exposure as defined by the time-temperature relationship provided in ASTM E-119. Unlike the IBC rating, the PCI design does not require the distinction of restrained vs unrestrained.
### Hollowcore Slabs Product Tolerances

**E. Production and Erection Tolerances**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Length</td>
</tr>
<tr>
<td>b</td>
<td>Width (overall)</td>
</tr>
<tr>
<td>c</td>
<td>Web width:</td>
</tr>
<tr>
<td>d</td>
<td>Depth (overall)</td>
</tr>
<tr>
<td>e</td>
<td>Top flange depth:</td>
</tr>
<tr>
<td>f</td>
<td>Bottom flange depth:</td>
</tr>
<tr>
<td>g</td>
<td>Minimum cover:</td>
</tr>
<tr>
<td>h</td>
<td>Maximum jog alignment of matching edges</td>
</tr>
<tr>
<td>i</td>
<td>Local smoothness of any surface</td>
</tr>
<tr>
<td>j</td>
<td>Variation from specified end squareness or skew</td>
</tr>
<tr>
<td>k</td>
<td>Variation from specified elevation end squareness or skew</td>
</tr>
<tr>
<td>l</td>
<td>Variation from specified plan end squareness or skew</td>
</tr>
<tr>
<td>m</td>
<td>Maximum variation from specified elevation</td>
</tr>
<tr>
<td>n</td>
<td>Variation from specified height</td>
</tr>
<tr>
<td>o</td>
<td>Variation from specified weight</td>
</tr>
</tbody>
</table>

**Note:** When bearing pads are used at unarmored edges they should be set back a minimum of 1/2 in. (13mm) from the face of the support or at least the chamfered dimension at chamfered edges.

- For precast concrete erected on a steel frame building, this tolerance takes precedence over tolerance on dimension "a".
- It may be necessary to feather the edges to \( \pm \frac{1}{4} \text{ in.} \) (6 mm) to properly apply some roof membranes.

### Hollowcore Slabs Erection Tolerances

The primary control surfaces are usually as shown. A majority of the time there is no designated vertical primary control surface, and in some scenarios there are no primary control surfaces at all. This needs to be determined on a job-by-job basis.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Plan location from building grid datum</td>
</tr>
<tr>
<td>b</td>
<td>Plan location from centerline of steel support</td>
</tr>
<tr>
<td>c</td>
<td>Top elevation from building elevation datum at member ends:</td>
</tr>
<tr>
<td>d</td>
<td>Untopped roof... ( \pm \frac{1}{4} \text{ in.} ) (( \pm 19 \text{ mm} ))</td>
</tr>
<tr>
<td>e</td>
<td>Untopped tee at driving lanes/carpet direct hollowcore... ( \pm \frac{1}{4} \text{ in.} ) (( \pm 19 \text{ mm} ))</td>
</tr>
<tr>
<td>f</td>
<td>Pretopped tee at driving lanes/carpet direct hollowcore... ( \pm \frac{1}{4} \text{ in.} ) (( \pm 6 \text{ mm} ))</td>
</tr>
<tr>
<td>g</td>
<td>Maximum bottom elevation of exposed hollowcore slabs... ( \pm \frac{1}{4} \text{ in.} ) (( \pm 6 \text{ mm} ))</td>
</tr>
</tbody>
</table>

**Note:** When bearing pads are used at unarmored edges they should be set back a minimum of 1/2 in. (13mm) from the face of the support or at least the chamfered dimension at chamfered edges.

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

**This** is a setting tolerance and should not be confused with structural performance requirements set by the architect/engineer. The nominal bearing dimensions and the allowable variations in the bearing length and width should be specified by the engineer and shown on the erection drawings.

**Untopped installations will require a larger tolerance.**
F. Narrow Hollowcore Widths

Wells Concrete’s standard manufactured hollowcore width is 4 feet. Most building layouts require a small amount of plank to be delivered in widths less than the standard 4 feet. Refer to the guidelines below for allowable ranges of narrow hollowcore widths. Note that not all narrow width slabs are available due to safety concerns during handling and erection.

### SPECIFICATIONS FOR PRECAST, PRESTRESSED HOLLOWCORE PLANK

#### A. General

1.01 Description

A. Work Included:

1. These specifications cover manufacture, transportation, and erection of precast/prestressed concrete hollowcore plank, including grouting of joints between adjacent units.

B. Related Work Specified Elsewhere:

1. Cast-in-place concrete; architectural precast concrete; precast structural concrete; underlayments (floor and/or roof leveling); caulking and sealants; small holes for mechanical/plumbing; cast-in-place embedments; steel bearing lintels; insulation in plank cores.

1.02 Quality Assurance

A. All precast/prestressed concrete shall be designed to support the loads shown on the drawings.

B. Manufacturer Qualifications: The precast concrete manufacturing plant shall be certified by the Prestressed Concrete Institute (PCI) Plant Certification Program prior to the start of production.

The manufacturer shall retain a registered structural engineer to certify that manufacturing is in accordance with design requirements; or the manufacturer shall, at his expense, meet the following requirements:

1. The basis of inspection shall be the Prestressed Concrete Institute’s “Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products,” MNL-116, and the criteria for acceptance shall be the same as the Plant Certification Program.

2. Retain a full-time structural engineer to certify that manufacturing is in accordance with design requirements.

C. Erector Qualifications: Must be a PCI certified erector and regularly engaged for at least five years in the erection of precast structural concrete similar to the requirements of this project. Retain a registered structural engineer to certify that erection is in accordance with design requirements.

D. Welder Qualifications: In accordance with AWS D1.1

E. Testing: In general compliance with applicable provisions of Prestressed Concrete Institute MNL-116, “Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products.”

F. Requirements of Regulatory Agencies: All local codes plus the following specifications, standards and codes are a part of these specifications:

1. ACI 318-89 – “Building Code Requirements for Structural Concrete”. All definitions of terms and symbols shall be defined in ACI 318-89

2. AWS D1.1 – Structural Welding Code-Steel

3. AWS D1.4 – Structural Welding Code-Reinforcing Steel

4. ACI 301-84 (Revised 1987) – “Specifications for Structural Concrete Buildings”

5. PCI-MNL 116 – “Manual of Quality Control for Plant and Products of Precast”

6. ASTM Specifications – As referred to in Part 2-Products, of this Specification

1.03 Submittals and Design

B. Approvals:
1. Submit erection drawings for approval prior to fabrication. Fabrication not to proceed prior to receipt of approved drawings. Any changes made after approval may delay delivery schedule.

C. Product Design Criteria:
1. Loadings for design:
   - Initial handling and erection stresses.
   - All dead and live loads as specified on the contract documents.
2. Design shall be submitted for approval upon request.
3. Design shall be in accordance with ACI 318 and applicable codes.

D. Permissible Design Deviations:
1. Design deviations will be permitted only after the architect/engineer's written approval of the manufacturer's proposed design supported by complete design calculations and drawings.
2. Design deviations shall provide an installation equivalent to the basic intent without incurring additional cost to the owner.

E. Test Reports: Test reports on concrete and other materials shall be submitted upon request.

1.04 Quality Control and Inspection

A. Release strength must be a minimum of 3,500 psi with minimum of 7,000 psi at 28 days. Panel design may require higher strengths due to project requirements.

B. All products in this section shall be inspected prior to shipment by the manufacturer for conformance to these specifications.

B. Products

2.01 Materials

A. Slabs shall be manufactured by the continuous extrusion process.

B. Concrete for precast/prestressed concrete shall be by central batching plant operated or controlled by the manufacturer to insure specified quality.

C. Materials used shall conform to ACI 318.

D. Use of calcium chloride will not be allowed.

E. Portland Cement:
   - ASTM C150-Type I or III.

F. Admixtures:

G. Aggregates:
   - 1. ASTM C33 or C330

H. Water:
   - 1. Potable or free from foreign materials in amounts harmful to concrete and embedded steel.

I. Reinforcing Steel:
   - 1. Uncoated, 7-wire strand complying with ASTM A-416, Grade 270K.
   - Deformed Low Alloy Steel: ASTM A706.
   - Deformed Rail Steel: ASTM A616.

J. Prestressing Strand:
   - 1. Uncoated, 7-wire, Low Lax strand: ASTM A416 – Grade 270K.
   - Deformed Rail Steel: ASTM A616.
   - Deformed Axle Steel: ASTM A617.
   - Deformed Low Alloy Steel: ASTM A706.

K. Welded Studs: In accordance with AWS D1.1.

L. Structural Steel Plates and Shapes: ASTM A36.
2.02 Concrete Mixes
A. 28-day compressive strength: minimum of 7,000 psi.
B. Release strength: minimum of 3,500 psi.
C. Use of calcium chloride or admixtures containing chlorides is not permitted.

2.03 Manufacture
A. Hollowcore plank shall be machine-cast in 48-inch widths as manufactured by Wells Concrete under the trade name Ultra-Span®.
B. Manufacturing procedures and tolerances shall be in general compliance with PCI MNL 116.
C. Openings: Manufacturer shall provide for rectangular openings 10 inches or larger on all sides and as clearly shown on the architectural and structural drawings. They shall be located by the trade requiring them and field cut by the erector. Round and small openings (less than 10 inches) shall be drilled or cut by the respective trades after grouting. Openings requiring cutting of prestressing strand shall be approved by manufacturer before drilling or cutting.
D. Finishes: Bottom surface shall be flat and uniform as resulting from an extrusion process cast on a smooth steel form, without major chips, spalls and imperfections. Top surface shall be machine troweled. Finish shall be standard grade. The steel form finish on the underside allows for a smooth paintable surface for a finished ceiling.
E. Patching: Will be acceptable providing the structural adequacy of the hollowcore unit is not impaired.

2.04 Erection
A. Site Access: Erection access suitable for cranes and trucks to move unassisted from public roads to all crane working areas as required by erector, or otherwise indicated herein, will be provided and maintained by the general contractor. Obstructing wires shall be shielded or removed and, when applicable, snow removal and winter heat will be provided by the general contractor.
B. Preparation: The general contractor shall be responsible for:
1. Providing true, level, bearing surfaces on all field-placed bearing walls and other field-placed supporting members. Masonry wall bearing surfaces shall be bond beams with properly filled and cured concrete.
2. Assuring that all structural framing to support precast/prestressed concrete is braced against horizontal displacement or any other movement during erection.
3. All pipes, stacks, conduits and other such items shall be stubbed off at a level lower than the bearing plane until the plank is in place.
C. Installation: Installation of hollowcore slab units shall be performed by manufacturer. Members shall be lifted with slings at points determined by manufacturer. Bearing strips shall be set where required. Grout keys shall be filled. Openings shall be field cut only after grout has cured, unless authorized by manufacturer's engineer.
D. Alignment: Members shall be properly aligned. Variations between adjacent members shall be reasonably leveled out by jacking, loading or any other feasible method as recommended by manufacturer.

3.01 Product Delivery, Storage, and Handling
A. Delivery and Handling:
1. Hollowcore plank shall be lifted and supported during manufacturing, stockpiling, transporting and erection operations only at the lifting or supporting points designated by manufacturer.
2. Transportation, site handling, and erection shall be performed with acceptable equipment and methods, and by qualified personnel.
B. Storage:
1. Store all units off ground on firm, level surfaces with dunnage placed at bearing points.
2. Place stored units so that identification marks are discernible.
3. Separate stacked units by dunnage across full width of each plank.

3.02 Erection
A. Site Access: Erection access suitable for cranes and trucks to move unassisted from public roads to all crane working areas as required by erector, or otherwise indicated herein, will be provided and maintained by the general contractor. Obstructing wires shall be shielded or removed and, when applicable, snow removal and winter heat will be provided by the general contractor.

3.03 Field Welding
A. Field welding is to be done by qualified welders using equipment and materials compatible to the base material.

3.04 Attachments and Small Holes
A. Subject to approval of the architect/engineer, hollowcore plank units may be drilled or “shot” provided no contact is made with the prestressing steel. Round holes and those less than 10 inches on any side shall be drilled or cut by the respective trades. Should spalling occur, it shall be repaired by the trade doing the drilling, shooting, or cutting.

3.05 Clean Up
A. Remove rubbish and debris resulting from hollowcore plank work from premises upon completion.

3.06 Safety
A. All safety barricades and opening covers will be provided by Wells Concrete during the precast installation process. Once installation is complete, this becomes the responsibility of the general contractor.
The tables herein list allowable live loads in pounds per square foot for uniformly distributed loading. Non-uniform loading conditions resulting from point loads, line loads, openings, and cantilevers require special design consideration.

The allowable load is sometimes governed by the ultimate capacity of the section. As a design aid, the ultimate moment capacities in foot-kips per foot of width are listed in the tables.

Short span allowable live loads for untopped plank may be governed by the shear capacity of the section. For topped plank, the governing criterion for short spans may be the horizontal shear stress between the plank and the topping.

Allowable live loads for long-span, heavily reinforced sections are limited to loads that result in a bottom-tension stress equal to the cracking stress, assumed to be $7.5\sqrt{F'}c$. Loads beyond this limit may result in deflections that exceed the allowable value set forth in the ACI Code.

The load tables are based on a plank concrete strength of 7,000 psi. Tables for topped sections are based on a topping strength of 3,000 psi and a minimum thickness of 2 inches.

Maximum spans and loads shown are not absolutes. Longer spans or heavier loads may be achieved under certain conditions or different criteria than assumed in the tables. Contact Wells Concrete for design assistance.
**8” Wells Hollowcore Load Tables**

Allowable load in PSF. These tables are for general descriptive purposes only. Actual design load tables are dependent on local codes and standards, material properties and product end usage.

- Blue shaded values are controlled by shear. Filling of cores may be requested.

### Series Designation Example

- **8808T**
  - **INDICATES COMPOSITE TOPPING**
  - **NUMBER OF STRANDS**
  - **PLANK THICKNESS**

<table>
<thead>
<tr>
<th>Series</th>
<th>Area of Steel (In²)</th>
<th>Mn (kip-ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8804</td>
<td>0.612</td>
<td>30.01</td>
</tr>
<tr>
<td>8805</td>
<td>0.765</td>
<td>37.19</td>
</tr>
<tr>
<td>8807</td>
<td>1.071</td>
<td>51.16</td>
</tr>
</tbody>
</table>

### 1.5 Hour Fire Rating, No Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours.

<table>
<thead>
<tr>
<th>Series</th>
<th>Area of Steel (In²)</th>
<th>Mn (kip-ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8804T</td>
<td>0.612</td>
<td>92.79</td>
</tr>
<tr>
<td>8805T</td>
<td>0.765</td>
<td>112.9</td>
</tr>
<tr>
<td>8807T</td>
<td>1.071</td>
<td>149.8</td>
</tr>
</tbody>
</table>

### 2 Hour Fire Rating, 2” Minimum Composite Topping

<table>
<thead>
<tr>
<th>Series</th>
<th>Area of Steel (In²)</th>
<th>Mn (kip-ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8804T</td>
<td>0.612</td>
<td>22.83</td>
</tr>
<tr>
<td>8805T</td>
<td>0.765</td>
<td>26.33</td>
</tr>
<tr>
<td>8807T</td>
<td>1.071</td>
<td>30.01</td>
</tr>
</tbody>
</table>

### 3 Hour Fire Rating, 2” Minimum Composite Topping

<table>
<thead>
<tr>
<th>Series</th>
<th>Area of Steel (In²)</th>
<th>Mn (kip-ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8804T</td>
<td>0.612</td>
<td>17.44</td>
</tr>
<tr>
<td>8805T</td>
<td>0.765</td>
<td>21.67</td>
</tr>
<tr>
<td>8807T</td>
<td>1.071</td>
<td>29.98</td>
</tr>
</tbody>
</table>

### Estimated Camber

<table>
<thead>
<tr>
<th>Series</th>
<th>Span in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>8804T</td>
<td>14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35</td>
</tr>
<tr>
<td>8805T</td>
<td>62.7 68.3 74.0 79.8 85.5 91.2 96.9 102.7 108.4 114.1 119.8 125.5 131.2 136.9 142.6 148.3 154.0 159.7 165.4</td>
</tr>
<tr>
<td>8807T</td>
<td>89.6 95.3 101.0 106.7 112.4 118.1 123.8 129.5 135.2 140.9 146.6 152.3 158.0 163.7 169.4 175.1 180.8 186.5 192.2</td>
</tr>
</tbody>
</table>

### Selection Properties

<table>
<thead>
<tr>
<th>Area</th>
<th>225.78 IN²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moment of Inertia</td>
<td>1767.9 IN⁴</td>
</tr>
<tr>
<td>Center of Slab Bottom</td>
<td>4.00 IN</td>
</tr>
<tr>
<td>Section Modules, Top</td>
<td>442.22 IN³</td>
</tr>
<tr>
<td>Section Modules, Bottom</td>
<td>442.22 IN³</td>
</tr>
<tr>
<td>Web Width</td>
<td>12.94 IN</td>
</tr>
<tr>
<td>V/S Ratio</td>
<td>2.13 IN</td>
</tr>
<tr>
<td>Self Weight</td>
<td>63 PSF</td>
</tr>
<tr>
<td>Strength at Transfer</td>
<td>3,500 PSI</td>
</tr>
</tbody>
</table>

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours.

### Net Area

225.78 IN²

### Strength of Concrete

7,000 psi

### Unit Weight of Concrete

150 PCF

### Ultimate Steel Strength

270 KSI

### Strand Jacking Stress

202.5 KSI

### Strand Type

Low Relaxation

### Thermal Resistance

R = 1.34

### Sound Transmission Class

STC = 50

### Impact Insulation Class

IIC = 28
10" Wells Hollowcore Load Tables

Allowable load in PSF. These tables are for general descriptive purposes only. Actual design load tables are dependent on local codes and standards, material properties and product end usage.

- Blue shaded values are controlled by shear. Filling of cores may be requested.
- Bold or gray shaded values: live load deflection exceeds L/360 or total deflection exceeds L/240.

Series Designation Example

10808T

INDICATES COMPOSITE TOPPING
NUMBER OF STRANDS
STRAND DIAMETER (10THS)
PLANK THICKNESS

1.5 Hour Fire Rating, No Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours

<table>
<thead>
<tr>
<th>Series</th>
<th>Date of Manufacture</th>
<th>Span in Feet</th>
<th>Moment of Inertia</th>
<th>Unit Weight of Concrete</th>
<th>Net Area</th>
<th>Strength of Concrete</th>
<th>Strength at Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>10804T</td>
<td>0.612</td>
<td>23.16-26</td>
<td>68.05</td>
<td>140</td>
<td>55</td>
<td>400</td>
<td>426</td>
</tr>
<tr>
<td>10808T</td>
<td>0.612</td>
<td>28.01-31</td>
<td>122.00</td>
<td>150</td>
<td>70</td>
<td>700</td>
<td>662</td>
</tr>
</tbody>
</table>

2 Hour Fire Rating, No Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours

<table>
<thead>
<tr>
<th>Series</th>
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<th>Span in Feet</th>
<th>Moment of Inertia</th>
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<td>700</td>
<td>662</td>
</tr>
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</table>

3 Hour Fire Rating, No Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours

<table>
<thead>
<tr>
<th>Series</th>
<th>Date of Manufacture</th>
<th>Span in Feet</th>
<th>Moment of Inertia</th>
<th>Unit Weight of Concrete</th>
<th>Net Area</th>
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<td>122.00</td>
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<td>70</td>
<td>700</td>
<td>662</td>
</tr>
</tbody>
</table>

Estimated Camber

at erection, cambers in inches

<table>
<thead>
<tr>
<th>Series</th>
<th>Date of Manufacture</th>
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<th>Moment of Inertia</th>
<th>Unit Weight of Concrete</th>
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</table>

Selection Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Area</td>
<td></td>
<td>247.99 IN2</td>
</tr>
<tr>
<td>Moment of Inertia</td>
<td></td>
<td>3262.4IN4</td>
</tr>
<tr>
<td>Centrif From Slab Bottom</td>
<td></td>
<td>5.00 IN</td>
</tr>
<tr>
<td>Section Modules, Top</td>
<td></td>
<td>652.46 IN3</td>
</tr>
<tr>
<td>Section Modules, Bottom</td>
<td></td>
<td>652.46 IN3</td>
</tr>
<tr>
<td>Web Width</td>
<td></td>
<td>9.25 IN</td>
</tr>
<tr>
<td>V/S Ratio</td>
<td></td>
<td>2.28 IN</td>
</tr>
<tr>
<td>Self Weight</td>
<td></td>
<td>69.0 PSF</td>
</tr>
<tr>
<td>Strength at Transfer</td>
<td></td>
<td>3,500 PSI</td>
</tr>
</tbody>
</table>

1.5 Hour Fire Rating, 2” Minimum Composite Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours

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2 Hour Fire Rating, 2” Minimum Composite Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours

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<thead>
<tr>
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3 Hour Fire Rating, 2” Minimum Composite Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours

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12" Wells Hollowcore Load Tables

Allowable load in PSF. These tables are for general descriptive purposes only. Actual design load tables are dependent on local codes and standards, material properties and product end use.

- Blue shaded values are controlled by shear. Filling of cores may be requested.

Series Designation Example

12808T

INDICATES COMPOSITE TOPPING
NUMBER OF STRANDS
STRAND DIAMETER (16THS)
PLANK THICKNESS

1.5 Hour Fire Rating, No Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours.

1.5 Hour Fire Rating, 2" Minimum Composite Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours.

1.5 Hour Fire Rating, No Topping

If hollowcore can be considered restranded, use this load chart for fire ratings up to 3 hours.

2 Hour Fire Rating, No Topping

Selection Properties

Net Area

275.35 IN²

Strength of Concrete

7,000 psi

Moment of Inertia

5332.7 IN⁴

Unit Weight of Concrete

150 PVC

Controll From Slab Bottom

6.00 IN

Ultimate Steel Strength

270 KSI

Section Moduless, Top

892.12 IN³

Strand Jacking Stress

202.5 KSI

Section Moduless, Bottom

892.12 IN³

Strand Type

Low Relaxation

Web Width

8.50 IN

Thermal Resistance

R = 1.91

V/S Ratio

2.47 IN

Sound Transmission Class

STC = 54

Self Weight

78.0 PSF

Impact Insulation Class

IIC = 38

Strength at Transfer

3,500 PSI

3 Hour Fire Rating, No Topping

Estimated Camber

at erection, cambers in inches

2 Hour Fire Rating, 2" Minimum Composite Topping

Selection Properties
ERECTION PROCEDURES AND RECOMMENDATIONS

The following recommendations are provided as a guide to assist in the proper and efficient installation of the hollowcore roof and floor assembly. Some projects may have special applications that will need to be addressed on a per-job basis. When erecting Ultra-Span, use the right tools, correct procedures, and work safely.

These recommendations are furnished in the interest of good construction practice for typical installation. Job requirements and conditions will vary. Wells Concrete assumes no liability for any claim, loss, or injury arising from installation practices or procedures conducted by others, whether or not in accordance with these recommendations.

If you plan to set Ultra-Span plank instead of having Wells Concrete do it, be aware of two important points:

- You are accepting full responsibility for installing the plank properly, including all of the work normally handled by Wells Concrete.
- Wells Concrete will not be responsible for any problems or damage which result from incorrect procedures once the material is loaded on your trucks or delivered to the job-site.

A. Pre-Erection Stage

PRIOR TO SCHEDULING DELIVERY, GO OVER THIS LIST CAREFULLY.

1. The erector should familiarize themselves with shop drawings (provided by Wells Concrete), the architectural and structural plans and specifications as well as the job-site conditions. Access for erectors crane and suppliers rigs should be pre-planned paying close attention to overhead clearance, surface stability and underground obstacles. The general contractor is responsible for providing access to job-site.

2. Erect all materials strictly in accordance with the shop drawings.

3. Other trades should be made aware of the requirements for dimensional accuracy of supporting walls and beams, uniform level bearing surfaces and anchorage locations.

4. The general contractor must determine which point of the structure to use as a starting point and sequence of erection. This information should be given to Wells prior to scheduling delivery time so as to allow Wells to prepare a load list.

5. Coordinate delivery times with Wells Concrete and/or the trucking company in advance.

6. Check product weights and determine the crane size required.

7. Make sure access is available for the crane and trucks.

8. Determine that the proper equipment is available for erecting the plank.

9. Have all erecting equipment sized by a competent rigger.

10. Check building dimensions and lay out the job. Become familiar with plank tolerances, and note that plank will have camber, and may gain or lose in dimensions. Make sure all bearing supports are in place.

11. Review the load lists and shipping sequence with Wells Concrete.

12. Insure that the crew, crane, delivery, grout or grout materials, and required tools are coordinated with the job schedule. Ultra-Span plank can usually be hoisted directly from the delivery truck into final position on the structure in one smooth, efficient operation. The allowable off-loading time per delivery truck is one hour. Trucks can be off loaded well within this amount of time with proper coordination. A typical shipping schedule would provide for sequential delivery trucks to arrive in one- to two-hour intervals after the first. This will be coordinated between the general contractor, erector, and Wells Concrete.

13. Be sure that personnel supervising and performing the erection are qualified.

14. INSIST ON SAFE WORKING CONDITIONS AND SAFE PROCEDURES AT ALL TIMES.
All keyways between adjacent planks should be fully grouted by either the erector or responsible parties with a 3:1 sand cement grout having an approximate 6-inch slump. Grout may be mixed with portable mixer or purchased from ready mix suppliers. Wheel barrows are normally used for delivery to grout box or trough which is used to place grout in to the keyways. 

3. The erector shall remove excess grout from the top of the keyway joints with care as not to effect the bonding of the composite topping, leaving a flush and finished appearance to the joint.

4. Erector shall remove excess grout from the bottom chamber portion of the plank joint.

5. Erector is responsible for cleaning up any grout that flows through keyway joint and falls to floor below. This can be greatly reduced by utilizing a foam backer rod.

6. When “feathering” of keyway joints is required as part of the job specifications, the erector shall taper the keyway grout pour away from the keyway so as to present a surface without sharp or noticeable vertical rises between slabs. The correction of “grout shrinkage” is the responsibility of the erector.

7. Erector shall properly form any openings as required to prevent grout from falling through using plywood and hilti shots or other method.

8. Prior to grouting the keyways, variations between adjacent members should be reasonably leveled out by jacking, loading or other feasible methods in accordance with recommendations provided by Wells Concrete.


10. To assure a good bond, wet down the keyways prior to grouting. This is especially important in hot weather.

11. Make sure grout is cured prior to placing loads of construction materials on the deck.

12. Standard procedure for grouting plank keyways during cold weather is as follows:

a) No grouting will be done at temperatures below 20° F, unless the desk is covered and heated. Grouting will be done when the temperature is at least 20° F (and rising), with the following precautions.

- Keyways must be clean and free of ice and snow.
- A warm grout mix with an appropriate accelerator will be used.
- Freezing of the grout after it has reached its initial set is acceptable, but care must be taken to ensure that the in-place grout is not subjected to repeated freeze/thaw cycles.

b) Above 32 degrees, normal grouting procedures will be used.

13. When concrete topping is required, the plank must be grouted first. Unless specified otherwise, the Ultra-Span deck surface must be clean and thoroughly damp with no standing water. Precautions must be taken to clean the Ultra-Span surface of all laitance.

B. Erection Stage - Handling and Setting Ultra-Span

Ultra-Span plank must be shipped, lifted, and handled properly to ensure good results.

1. Make sure dunnage and pickup points line up when plank are being shipped or stacked.

2. To avoid unnecessary handling or stockpiling, lift and place plank directly off the truck.

3. Your plank will be delivered with the correct side up. Always handle with this side up.

4. When lifting, make sure slings or chokers are located no more than 12 inches from the ends. NEVER LIFT FROM THE MIDDLE. One exception would be a cantilevered plank. Consult Wells Concrete in this instance.

5. Never cantilever (overhang) plank unless it has been designed as a cantilever.

6. Allow sufficient bearing. Minimum bearing is shown on the approved shop drawings.

7. Place bearing strips in accordance with the shop drawings.

8. Set each plank as close as possible to its final position, allowing just enough room to remove the slings. After removing slings, skid the plank into final position against the adjacent one.

9. Split or saw plank to obtain special widths as shown on shop drawings.

10. Be sure that the plank is being set squarely.

11. Make connections carefully. Bend and place bars or make welds per shop drawings and/or construction documents.

12. Depending on individual job requirements, erector shall arrange for crane of adequate capacity with two-way cable rigging of sufficient length and capacity to handle the maximum length and weight of the hollowcore plank.

13. General contractor or responsible subcontractor shall check for readiness of structure for hollowcore units. This includes accessibility by crane, delivery trucks, checking bearing surfaces, and dimensions of shop drawings.

14. Erector shall place Ultra-Span planks on supporting structure in conformance with shop drawings. All details indicated on shop drawings must be adhered to. Any deviation must be approved by Wells Concrete engineers.

15. Erector shall notify Wells Concrete if any plank is damaged upon arrival at job-site. This will insure that the unit can be taken care of or replaced in a timely manner.

16. Hollowcore units should never be lifted into place by any means other than as shown in the Visual Installation Guide. This includes placing bars into the hollow voids, using lift trucks, etc.

17. Any notching or cutting of the units shall be done in a workmanlike manner and in accordance with the Wells plans and drawings. Notching or cutting may be necessary around building members that interfere with unit placement. If the erector is unfamiliar with hollowcore erection and cutting, call Wells Concrete for general and specific guidelines.

18. Erection shall proceed in workmanlike manner until completion of erection phase. Check for proper alignment of the plank according to the shop drawings beforeleveling or grouting takes place.

19. Erector shall furnish all material required for erection, leveling, grouting or patching.

20. Erector shall install bearing pads and steel hangers (when required). Bearing pad and hangers are usually furnished by Wells Concrete.

C. Leveling & Grouting

1. Erector should be alert to replace defective units prior to grouting and to conduct a final check of leveling and alignment prior to grouting.

2. All keyway joints between adjacent planks should be fully grouted by erector or responsible parties with a 3:1 sand cement grout having an approximate 6-inch slump. Grout may be mixed with portable mixer or purchased from ready mix suppliers. Wheel barrows are normally used for delivery to grout box or trough which is used to place grout in to the keyways.

3. The erector shall remove excess grout from the top of the keyway joints with care as not to effect the bonding of the composite topping, leaving a flush and finished appearance to the joint.

4. Erector shall remove excess grout from the bottom chamber portion of the plank joints.

5. Erector is responsible for cleaning up any grout that flows through keyway joint and falls to floor below. This can be greatly reduced by utilizing a foam backer rod.

6. When “feathering” of keyway joints is required as part of the job specifications, the erector shall taper the keyway grout pour away from the keyway so as to present a surface without sharp or noticeable vertical rises between slabs. The correction of “grout shrinkage” is the responsibility of the erector.

7. Erector shall properly form any openings as required to prevent grout from falling through using plywood and hilti shots or other method.

8. Prior to grouting the keyways, variations between adjacent members should be reasonably leveled out by jacking, loading or other feasible methods in accordance with recommendations provided by Wells Concrete.


10. To assure a good bond, wet down the keyways prior to grouting. This is especially important in hot weather.

11. Make sure grout is cured prior to placing loads of construction materials on the deck.

12. Standard procedure for grouting plank keyways during cold weather is as follows:

a) No grouting will be done at temperatures below 20° F, unless the desk is covered and heated. Grouting will be done when the temperature is at least 20° F (and rising), with the following precautions.

- Keyways must be clean and free of ice and snow.
- A warm grout mix with an appropriate accelerator will be used.
- Freezing of the grout after it has reached its initial set is acceptable, but care must be taken to ensure that the in-place grout is not subjected to repeated freeze/thaw cycles.

b) Above 32 degrees, normal grouting procedures will be used.

13. When concrete topping is required, the plank must be grouted first. Unless specified otherwise, the Ultra-Span deck surface must be clean and thoroughly damp with no standing water. Precautions must be taken to clean the Ultra-Span surface of all laitance.
D. Cutting Openings

1. All hole cutting should be approved by Wells Concrete.
2. Plank is designed to support the required loads with the openings shown on the approved shop drawings. Do not cut openings that are not shown.
3. Openings should not be cut until the joints are grouted and the grout has reached 85% of its design strength (normally design strength is 3,000 psi). Holes are generally laid out by the trades requiring them.
4. Holes that are drilled or cut through the voids are acceptable. Holes or openings that cannot be shifted to miss all prestressed strands must be approved by Wells. This should be done during the shop drawing process. Additional cost may be incurred if this is done after shop drawings have been engineered.

E. Precautions

1. Good construction practice must be maintained during erection and related operations.
2. Do not lift planks with hooks in end cores.
3. Do not lift planks by means other than support at both ends. Units are not designed to be lifted at or near the center of the span. Lifting points shall not be more than 18 inches from each end of panel.
4. If restacking of the planks is necessary, planks must be supported only at the dunnage points at or near the ends. Dunnage must be kept in close vertical alignment and only identical units stacked together.
5. End walls or other supports should be adequately braced to accommodate temporary loads if required.
6. Planks must not be inverted or turned upside down.
7. Prestress strands must not be cut unless shown on shop drawings or approved by a Wells Concrete engineer.

F. Visual Installation Guide