

# Hollow core 101



## How to use Hollow core for inexpensive Space under your Garage

Thousands of residential garages throughout the Northeast have been built with hollow core floors, providing large, open spaces below for additional parking, storage, shop and living space -- even swimming pools and storm shelters.

Hollow core is a prestressed concrete product for floors and roofs. It is machine extruded and saw cut to specified lengths for each project. Four foot widths are standard but if necessary, narrow widths can be provided from standard units.

A residential garage floor would be typically designed for a minimum one-hour fire rating, but can be fire rated up to four hours. Hollow core also is resistant to high levels of sound transmission and noise impact. It is very durable and is rot and termite proof.

Consult this guide on how to design, specify and order hollow core for your home project. Consult our web site or an Oldcastle Precast representative for more information.

### Common Practice: Residential Garage

### Whether you know it or not, floors are the

key element when it comes to architectural freedom and design: their load bearing capacity has a direct influence on the need for partition walls and other structural elements of a building. Hollow core slabs are prestressed floor elements with voids. Their excellent load-bearing capacity and structural efficiency allow you to build large areas with fewer partition walls. Ultimately, this means greater freedom in design and architecture during and after construction as well as savings in material costs.

See our web site for additional topics on hollow core plank: camber, toppings, finished floor systems, openings, installation and more.

#### Locations:

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**P**lank is manufactured in standard depths of 6"; 8"; 10", 12" and 16". The depth required for your project is dependent upon plank spans and loading requirements. The most common plank depths used for residential garages, based on typical loading, are 8" for spans up to 30' and 12" for spans up to 40'.

**P**lank notches and or openings required for your floor layout will be cut prior to shipping or in the field. Small openings are usually provided by other trades.

**L**ive load requirements for residential garage floors in most areas is equal to 50 psf. Hollow core can be designed to handle additional loads such as unbonded concrete topping, partition walls or the roof.

**T**he erection process for a typical garage floor takes less than a day. A mobile crane and experienced erection crew hoist the plank from a flatbed trailer, place them directly on the supporting structure and make all necessary plank to wall and/or beam connections. Plank to plank joints are first leveled and then grouted, which emulates a monolithic floor system.



## Get to know more about **Hollow core Plank for your single family garage**

### Wide Open Spaces



Hollow core plank can provide long, clear spans with column-free interior spaces for your garage, pool, shop, storage or living areas.

**The erection  
process for your  
garage takes less  
than one day.**

### **Your Guide to Ordering Hollow core Plank**

Provide Oldcastle Precast Building Systems with a plan showing the dimensions of your project, the type and thickness of bearing walls, the size and location of any beams and especially the size and locations of the openings. Advise Oldcastle of any problems that could affect crane and truck access. Oldcastle Precast will then develop an estimate for your use.

When you place your order, provide a schedule and final plans with a map locating your project. Oldcastle Precast will prepare and submit for your approval an erection drawing showing your garage plank layout with dimensions and details.

Completely review and check all dimensions and details on the drawing submittal. Mark any changes and discrepancies, return promptly and note with your signature: "approved", "approved as noted" or "revise and resubmit". Your project will not be manufactured until your written approval is received.

Confirm the delivery /installation schedule requirements with Oldcastle Precast when you have assurance of a completion date for your garage walls, as well as any steel beams and lintels. Take into consideration that concrete and masonry walls require curing time prior to plank erection.

Oldcastle Precast will determine the length of hollow core plank by adding the amount of bearing required to the inside-to-inside dimension of your bearing walls. Hollow core plank typically requires 3.5" bearing surface for concrete and masonry. For masonry bearing, a bond beam is required. A multi-monomer plastic strip or approved equal is placed on the wall 1/2" from the inside edge to ensure proper plank bearing.

A mechanical connection between the hollow core plank and your structure may be required. If necessary, bent bar connections are provided by your erector or Oldcastle Precast. These connections will be shown on the erection drawings.

Cold weather locations may require insulation at the entire perimeter of the garage. Consult with your design team regarding the proper location and thermal performance that is best for your garage.

A water-proofing membrane is recommended to be installed on top of the plank prior to placement of concrete topping. The membrane is commercially available and should be capable of flexibly bridging the insulation and small gaps around the perimeter walls. It should return up the walls and terminate at the top of the topping slab.

The membrane is necessary to prevent water from penetrating the plank, which could cause deterioration of the reinforcing and concrete in the future. It will also act as a vapor barrier in cold climates where the area below the floor is heated.



## Finalizing your residential garage by specifying Hollow core Plank

### Your Garage



**Hollow core plank typically requires 3.5 inches of bearing surface for concrete and masonry.**

Quality, high-strength, air-entrained concrete placed by qualified personnel, is the final important step to your project. Minimum concrete topping thickness is 2-inches and must positively slope to the garage door to ensure drainage and prevent water from ponding on the floor. If interior drains are used, the concrete should be sloped to the drains and drain fixture details should be capable of draining moisture from the membrane. Reinforcing is recommended in the topping, and a concrete sealer should be applied after curing.

Additional reinforcing, such as mesh, properly placed in the topping at the door entrance, can minimize the possibility of a crack developing in the topping along the base of your overhead door. At steel beams, plank bearing must extend at least 1-inch past the beam-web center to prevent beam rotation. A weld plate, or other mechanical connection, is required. This detail should be shown on the erection drawing.

Masonry should not be installed above plank bearing elevation prior to plank erection, as it is highly susceptible to damage during plank erection. If you have specified a poured concrete wall, at least one edge (above plank bearing elevation) on the plank bearing wall has to be left down to provide ample space for erection tolerances. Grout plank keyways with the recommended mix design.

# Standard Specification for Oldcastle Precast Hollow core Plank

**Description:** Work included: Manufacture, transportation and erection of precast, prestressed concrete hollow core including grouting of joints between adjacent units.

**Quality Assurance: Manufacturer's Qualifications:** The precast concrete manufacturing plant shall conform to the requirements of the Prestressed Concrete Institute (PCI) Plant Certification Program prior to the start of production. Manufacturer shall be certified in category C2. The manufacturer shall retain a registered structural engineer to certify that manufacturing is in accordance with design requirements.

**Erector Qualification:** PCI Qualified and regularly engaged for at least 5 years in the erection of precast structural concrete similar to the requirements of this project. Retain a registered structural engineer or certify that erection is in accordance with design requirements. **Qualification of Welders:** In accordance with AWS D1.1.

**Testing:** In general compliance with applicable provisions of Prestressed Concrete Institute MNL-116.

**Requirements of Regulatory Agencies:** All local codes plus applicable sections of ACI 318, AWS and ASTM.

**Submittals and Design: Shop Drawings and Design Criteria:** Provide plans locating all hollow core planks, all major openings, sections and details showing connections, weld plates and edge and support conditions. List all dead, live and other applicable loads used in the design. Also list fire rating.

**Approvals:** Submit copies of erection drawings for approval prior to fabrication. Fabrication shall not proceed prior to receipt of approved drawings.

**Tests:** Test reports on concrete and other materials shall be submitted upon request.

**PRODUCTS: Materials:** Portland Cement (Type I or III), admixtures and aggregates in accordance with applicable ASTM standards.

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

**Reinforcing Steel and Welded Studs:** Bars, wires and structural steel in accordance with applicable ASTM standards. Studs in accordance with AWS D1.1.

**Prestressing Strand:** Uncoated 7-wire, low lax strand ASTM A416 including supplements - Grade 250k or 270k.

**Grout:** A mixture of not less than one part Portland cement to three parts fine sand.

Grout that seeps from the joint shall be completely removed before it hardens. Minimum 28-day compressive strength of 2,000 psi.

**Bearing Strips:** Multi-monomer plastic or approved equal.

**Concrete Mixes:** 28 day compressive strength: 5,000 psi minimum. Use of calcium chloride is not permitted.

**Manufacture:** Hollow core plank shall be machine cast under the trade name Elematic® as manufactured by Oldcastle Precast Building Systems.

**Finishes:** Bottom surface shall be flat and uniform as resulting from an extrusion process without major chips, spalls and imperfections. Top surface shall be machine troweled.

**Execution: Product Delivery, Storage & Handling**

**Delivery and Handling:** Hollow core plank shall be lifted and supported during manufacturing, stockpiling, transporting and erecting only at the lifting or support points, designated by Oldcastle Precast. Transportation, site handling and erection shall be performed by qualified personnel with acceptable equipment and methods and by qualified personnel.

Store all units off ground on firm level surfaces with dunnage placed at bearing points. Place stored units so that identification marks are discernible. Separate stacked units by dunnage across the full width of each plank.

**Erection: Site Access:** Erection access suitable for cranes and trucks to move unassisted from public roads to all crane working areas as required by erection 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.

**Preparation:** The General Contractor shall be responsible for: 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. All pipes, stacks, conduits and other such items shall be stubbed off at a level lower than the bearing plane until after the plank are set. Masonry, concrete or steel shall not be installed above plank bearing surface until after the plank is in place.

**Installation:** Members shall be lifted with slings at points determined by Oldcastle. 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 the manufacturer's engineer.

**Alignment:** Members shall be properly aligned. Variations between adjacent members shall be reasonably leveled out by jacking, bolting or any other feasible method as recommended by the manufacturer.

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

**Attachments and Small Holes:** subject to approval of the Architect/ Engineer, hollow core plank units may be drilled or shot provided no contact is made with the prestressing steel. Round holes and those less than 8-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.

**Clean up:** Remove rubbish and debris resulting from hollow core plank work from premises upon completion.

**Safety:** The general contractor will provide and maintain all safety barricades, rebar caps and opening covers required for plank in accordance with current industry safety practices.

If your design calls for radiant heat, you can add the wiring for a heated floor into the topping that is placed over your hollow core slabs.

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