LAFARGE
Building better cities™

HOLLOWCORE
FLOOR & ROOF SOLUTIONS

PRODUCED TO CPCI STANDARDS

CERTIFIED QA PLANT
(CPCQA) CANADIAN PRECAST CONCRETE QUALITY ASSURANCE CERTIFICATION PROGRAM

Concrete hollowcore Solutions

Precast hollowcore concrete is widely used in various residential, commercial and municipal applications that require a floor or roof system comprised of standard components, manufactured in a controlled environment.

Due to the significant benefits of superior fire resistance, sound control, durability and low maintenance, owners and designers alike can take advantage of rapid construction techniques and an attractive exterior

- Hollowcore slabs conform to the current edition of CSA and CPCI related standards.
- Estimated values of cambers and deflections can be supplied upon request.
- **For superimposed loads greater than 10 kPa and fire resistance ratings greater than 2 hours, special design requirements and different materials may be required. Please contact your local Lafarge representative.**

Fire Resistance Ratings

- Precast prestressed concrete elements can be designed with any degree of fire resistance that may be required by building codes, insurance companies and other authorities.
- The fire resistance of building assemblies is determined from standard fire tests as defined by ULC Standard current CAN/ULE-S101 "Standard Methods of Fire Endurance Tests of Building Construction and Materials".

	203mm (8") Hollowcore		250mm (10") Hollowcore		305mm (12") Hollowcore	
Topping Options (Type S Concrete)	Equivalent Thickness (mm)	Fire Endurance (hours)	Equivalent Thickness (mm)	Fire Endurance (hours)	Equivalent Thickness (mm)	Fire Endurance (hours)
No Topping	120	2	155	3	170	3.5
13mm Cementations Topping	133	2.25	168	3.5	183	3.75
38mm Cementations Topping	158	3	195	4	208	4

Sound Insulation Ratings

- Mandatory sound insulation requirements between adjoining dwellings are generally specified in building codes and equivalent regulations.
- For example: City of Vancouver Building By-Law 6164, requires a Apparent Sound Transmission Class (ASTC) of 50 for all residential suites. It has been shown by extensive research that the STC rating of various components is related to the surface density of the materials.
- Class (IIC) is derived from ASTM Standard Method E492, "Laboratory Measurements of Impact Sound Transmission Through Floor Ceiling Assemblies Using the Tapping Machine."

	203mm (8") Hollowcore			250mm (10") Hollowcore			305mm (12") Hollowcore		
Assembly Normal Density Concre	Mass (kg/m2)	ASTC	IIC	Mass (kg/m2)	ASTC	IIC	Mass (kg/m2)	ASTC	IIC
Slab Only	293	50	28	376	51	30	396	52	31
Hollowcore Plus Carpet & Pad	298	50	70	381	51	72	401	52	73

For more information see CPCI Metric Design Manual, 4-th Edition, Chapter 6-21

Precast hollowcore Cross Section

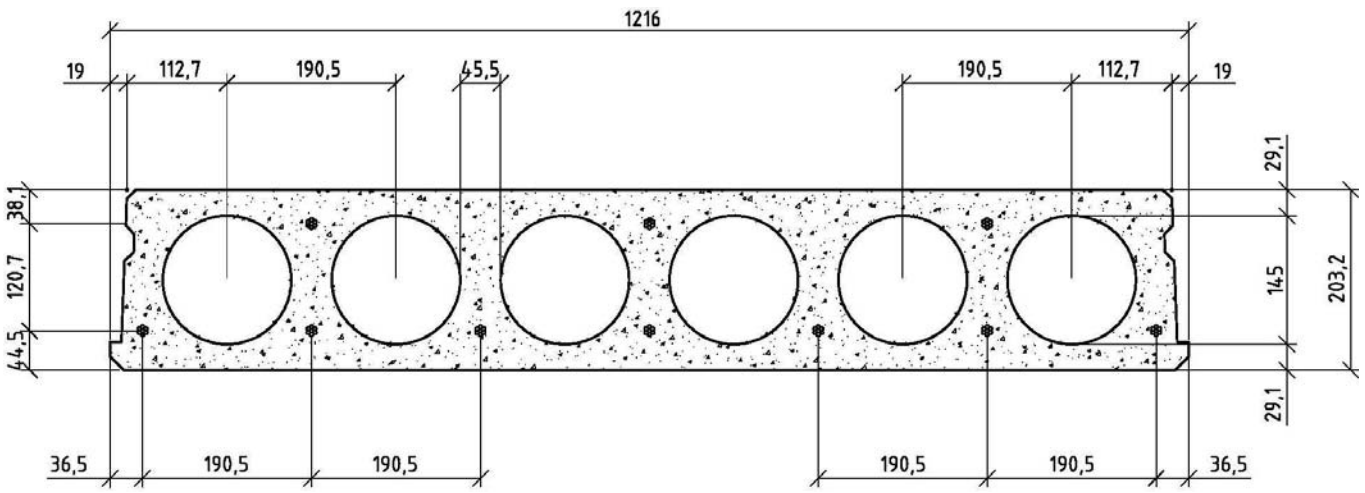


Figure 1 - 203 Deep x 1200 Wide Hollowcore Panel

Slab Section and Material Properties 8" Hollowcore (203 x 1220)

Net Area	148,700 mm^2	Strength of Concrete	40 MPa
Moment of Inertia	718 x 10^6 mm^4	Strength at Release	25 MPa
Centroid From Slab Bottom	101 mm	Unit Weight of Concrete	2400 kg/m^3
Section Modulus, Top	7080 x 10^3 mm^3	Ultimate Steel Strength	1860 MPa
Section Modulus, Bottom	7110 x 10^3 mm^3	Strand Jacking Stress	1302 MPa
V/S Ratio	53 mm	Strand Type	Low Relaxation
Self Weight (May Vary)	2.87 kN/m^2		

The above properties may vary. Please contact Lafarge for other sections, material properties and structural information.

Precast hollowcore Cross Section

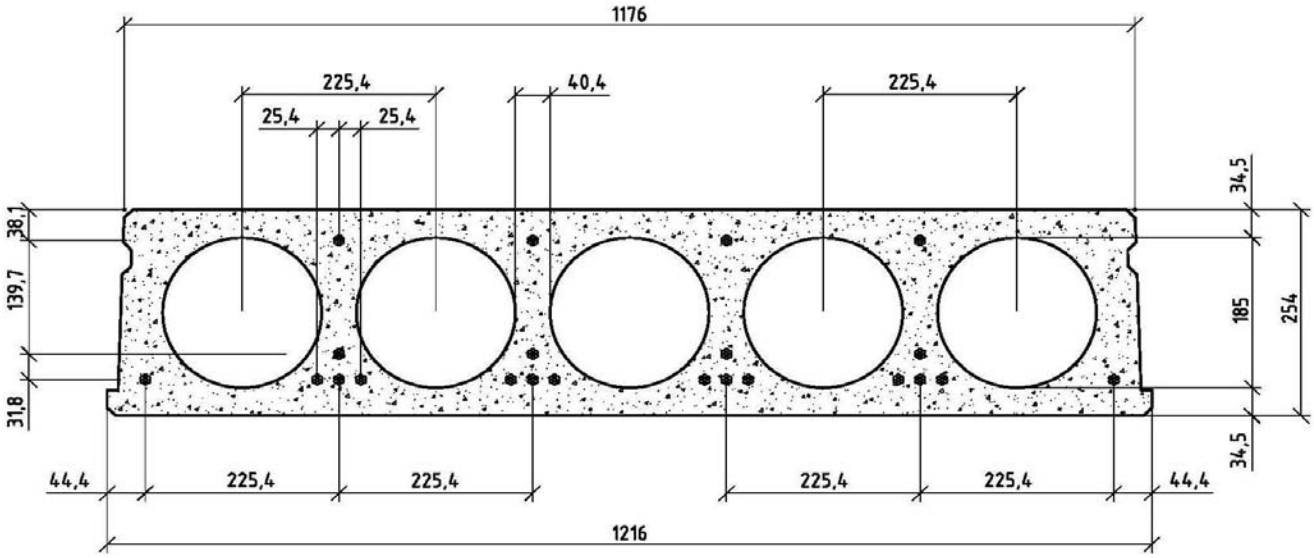


Figure 1 - 254 Deep x 1200 Wide Hollowcore Panel

Slab Section and Material Properties 10" Hollowcore (254 x 1200)

Net Area	193,300 mm^2	Strength of Concrete	40 MPa
Moment of Inertia	1333 x 10^6 mm^4	Strength at Release	25 MPa
Centroid From Slab Bottom	125 mm	Unit Weight of Concrete	2400 kg/m^3
Section Modulus, Top	1330 x 10^3 mm^3	Ultimate Steel Strength	1860 MPa
Section Modulus, Bottom	1660 x 10^3 mm^3	Strand Jacking Stress	1302 MPa
V/S Ratio	57 mm	Strand Type	Low Relaxation
Self Weight (May Vary)	3.69 kN/m^2		

The above properties may vary. Please contact Lafarge for other sections, material properties and structural information.

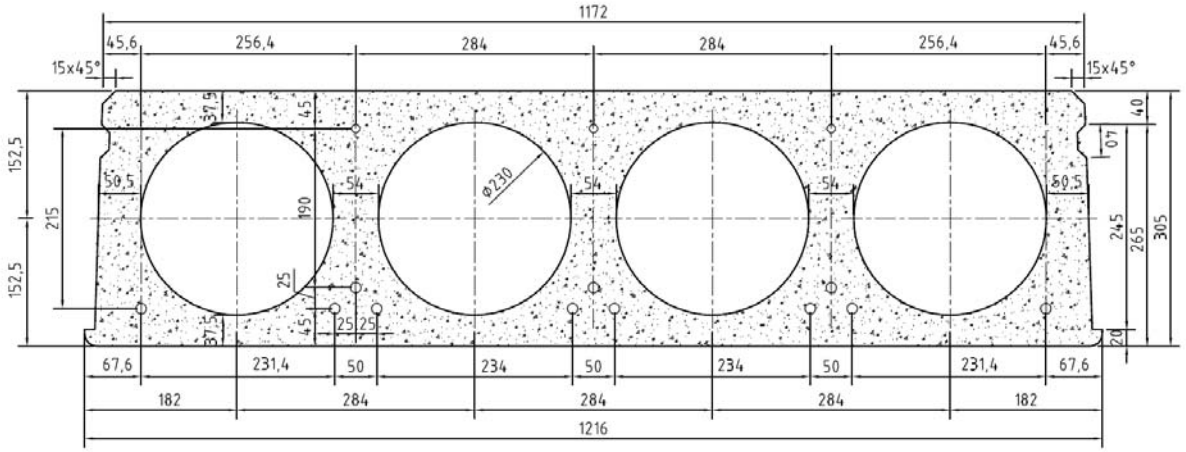


Figure 2 - 305 Deep x 1200 Wide Hollowcore Panel

Slab Section and Material Properties 12" Hollowcore (305 x 1220)

Net Area	206,600 mm^2	Strength of Concrete	40 MPa
Moment of Inertia	2251 x 10^6 mm^4	Strength at Release	25 MPa
Centroid From Slab Bottom	151 mm	Unit Weight of Concrete	2400 kg/m^3
Section Modulus, Top	14620 x 10^3 mm^3	Ultimate Steel Strength	1860 MPa
Section Modulus, Bottom	14910 x 10^3 mm^3	Strand Jacking Stress	1302 MPa
V/S Ratio	65 mm	Strand Type	Low Relaxation
Self Weight (May Vary)	3.88 kN/m^2		

The above properties vary. Please call Lafarge for other sections, material properties and structural capacities.

Tables Of Superimposed Service Load (kN/m2) and Cambers (mm) - No Topping

Hollowcore 1200 x 203 (8"HC)

Strand Code	Span (m)								
	6	6.5	7	7.5	8	8.5	9	9.5	10
1	4.8	3.8	3						
2	6.4	5.2	4.2	3.4					
3	7.9	6.5	5.2	4.4	3.6	3			
4	9.2	7.6	6.4	5.2	4.4	3.6	3.1		
5	10.4	8.5	7.1	6	5	4.2	3.5	3	
6	11.3	9.4	7.9	6.7	5.6	4.8	4.1	3.5	
7	12.5	10.4	8.7	7.3	6.2	5.3	4.5	3	3.3
8	13.5	11.1	9.4	8	6.7	5.8	5	4.3	3.6
9	14.3	11.9	10	8.3	7.2	6.1	5.3	4.5	3.9
10	15	12.5	10.5	8.8	7.3	6.2	5.4	4.8	4
11	15.5	12.9	10.6	8.8	7.3	6.3	5.5	4.9	4.1

Hollowcore 1200 x 254 (10" HC)

Strand Code	Span (m)														
	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13
16	14.6	11.9	10	8.4	7	6	5	4.2	3.5	3					
17		15.2	12.7	10.7	9.1	7.7	6.7	5.7	5	4.2	3.6	3.1			
18			14	12	10.2	8.9	7.6	6.5	5.6	4.9	4.2	3.7	3.2		
19			16	13.5	11.8	10.2	8.7	7.5	6.5	5.7	5	4.4	3.8	3.3	
20					14.2	12.2	10.4	9	7.7	7	6	5.5	5	4.4	3.5
21					14.5	12.2	10.5	9	7.9	7	6	5.5	5	4.5	3.8
22					14.5	12.2	10.5	3	3.3	7	6	5.5	5	4.5	3.7
23					14.5	12.2	10.5	4.3	3.6	7	6	5.5	5	4.5	4.1

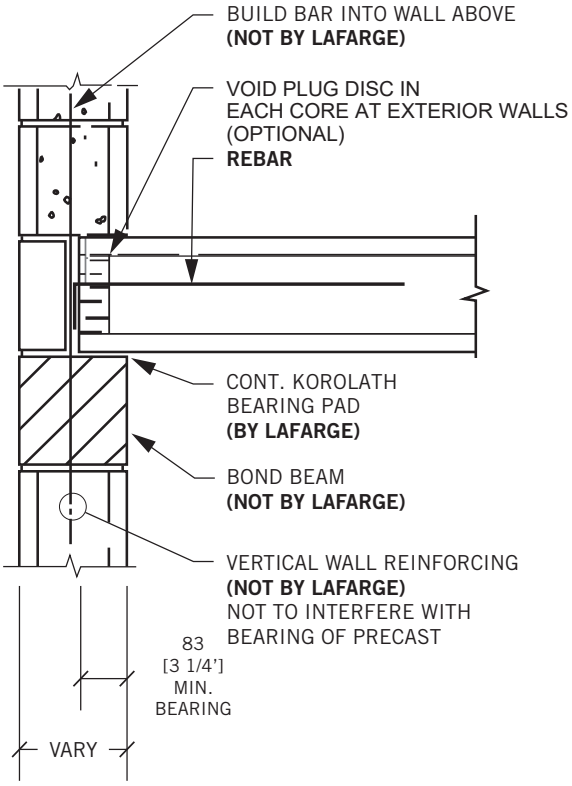
Hollowcore 1200 x 305 (12" HC)

Strand Code	Span (m)														
	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5
12	14.4	12.6	11	9.6	8.4	7.4	6.5	5.7	5	4.4	3.9	3.4			
13	16	13.9	12.3	10.8	9.5	8.3	8.3	6.5	5.8	5	4.5	4	3.5	3	
14		15	13.3	11.5	10.2	9	8	7.1	6.4	5.6	5	4.4	4	3.5	3
15		15.9	14	12.3	11	9.6	8.5	7.6	6.8	6	5.4	4.8	4.3	3.8	3.4

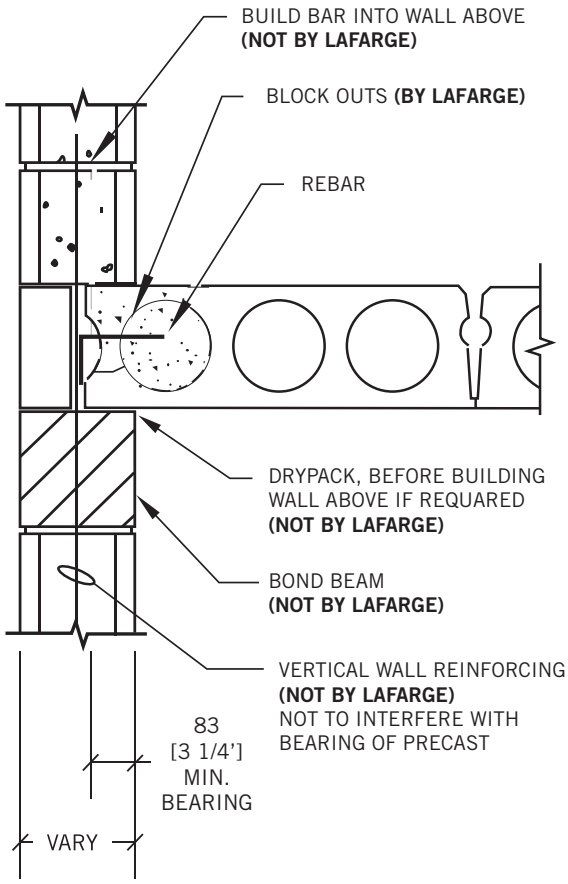
- Loads shown above for uniformly distributed, superimposed not factored.
- Openings, point or line loads, snow drifts, etc. should be considered in design and are not included in the table below.
- CPCI and National Building Code latest revision governs.
- Doesn't include any allowance for strands cut.
- The information below is for guideline purposes - accurate design must be carried out to determine panel's capacity.
- Panel resistance to shear and flexural torsion must be calculated before using the data below.

Connection Details

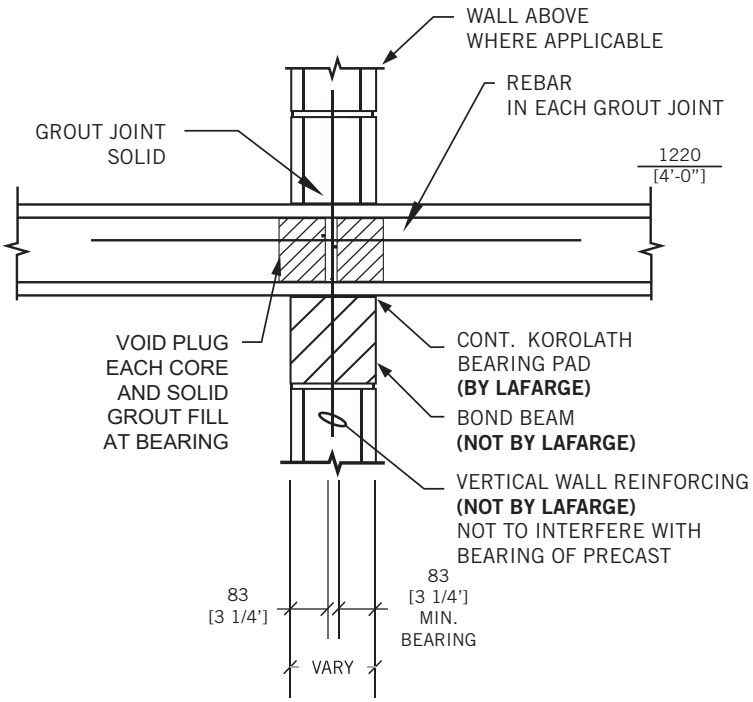
All connection illustrations below are used for conceptual design only.



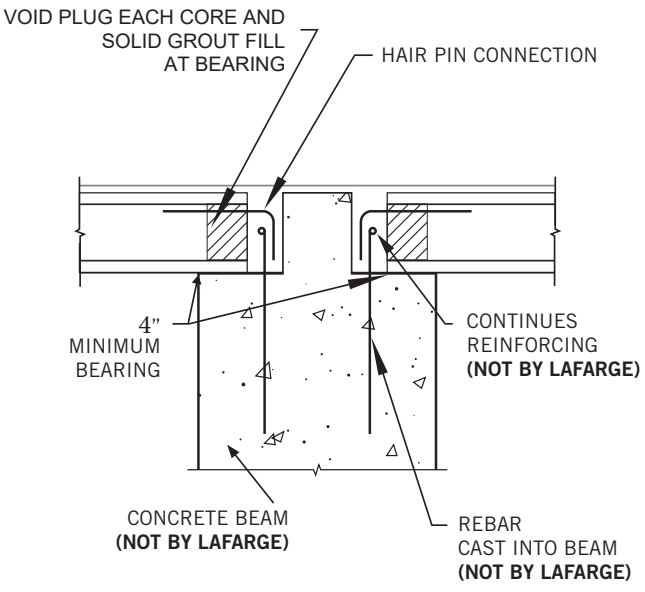
End Bearing On Block - Half Bearing - Tie Up
(Scale - N.T.S.)



Side Bearing On Block - Half Bearing - Tie Up
(Scale - N.T.S.)



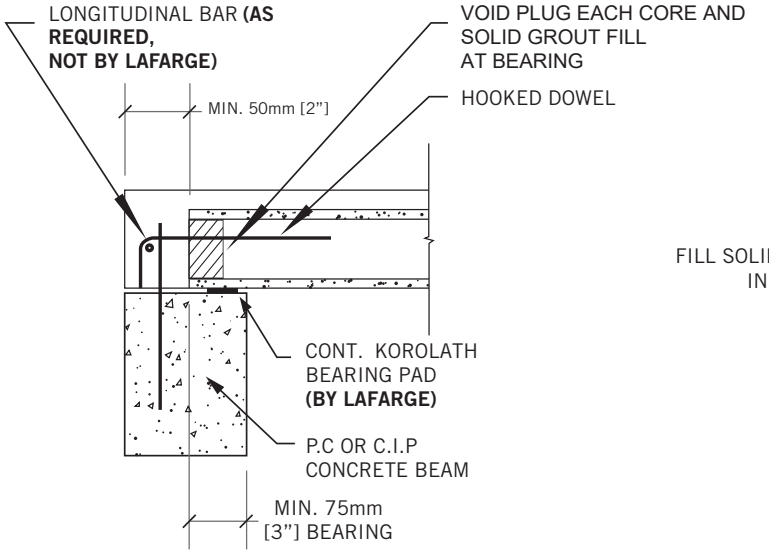
End Bearing On Block - Abutting - Tie Across
(Scale - N.T.S.)



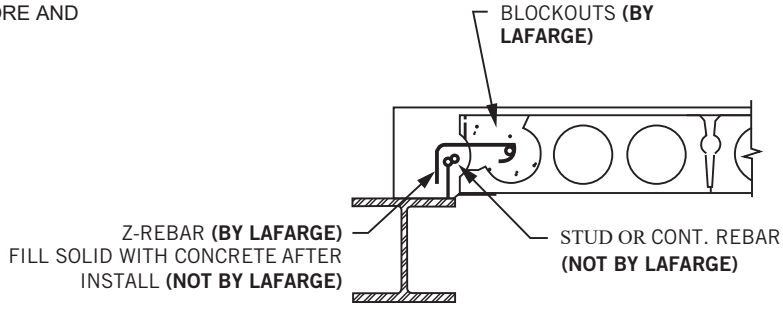
Precast Slab Bearing On Concrete Beam

Connection Details

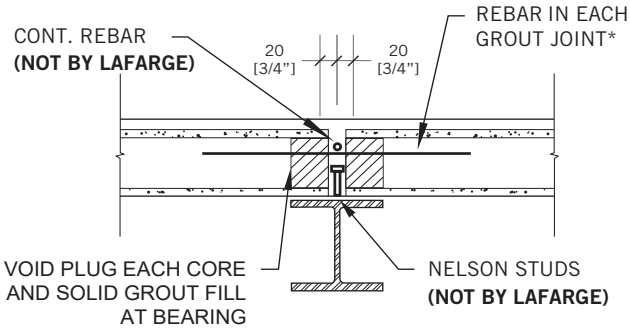
All connection illustrations below are used for conceptual design only.



End Bearing On P.C. OR C.I.P. Concrete Beam (Scale - N.T.S.)

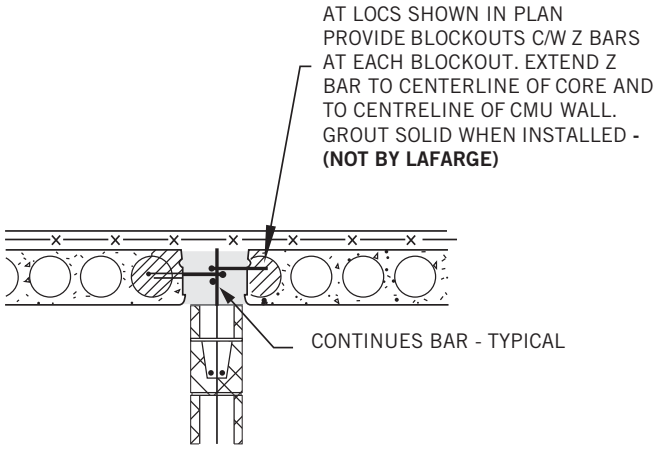


Side Bearing On Beam - Half Bearing (Scale - N.T.S.)

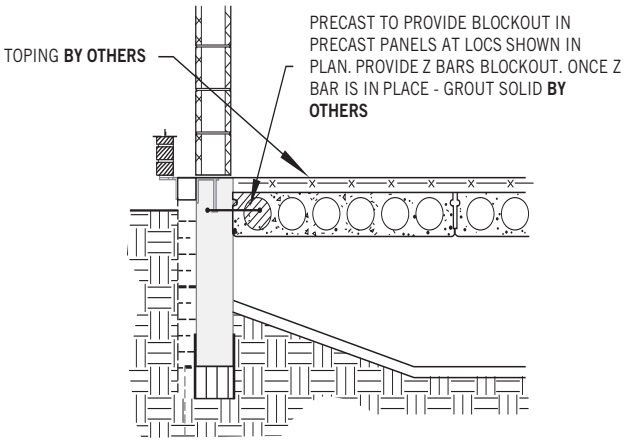


* WHERE JOINTS NOT ALIGNED PROVIDE HOOKED DOWELS

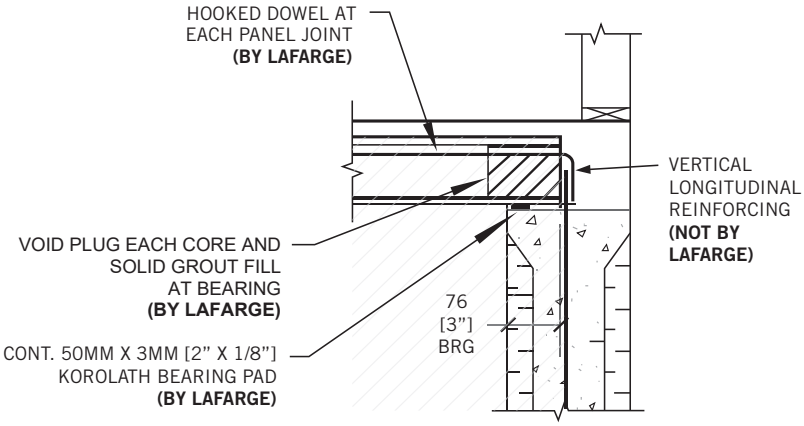
End Bearing On Beam (Scale - N.T.S.)



Interior Hollowcore Parallel to CMU (Scale - N.T.S.)



Grade Beam - Parallel to Hollowcore (Scale - N.T.S.)



Masonry / ICF Foundation (Scale - N.T.S.)

****All connections shown are to be used for conceptual design only.**

Hollowcore Installation Guidelines

Please follow the following procedures for hollowcore installation process:

Organization
- Be sure to inform Lafarge of the sequence of installation prior to hollowcore production in order to ensure that slabs are produced and stockpiled in the appropriate order.

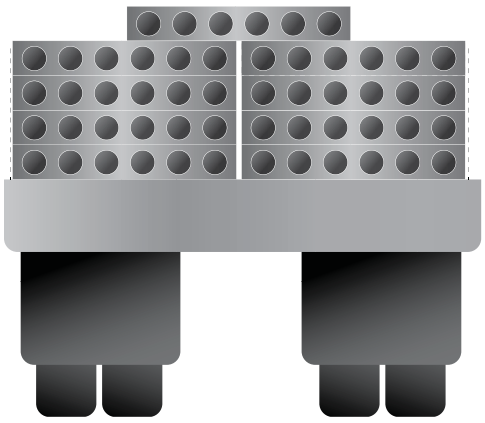
Before Requesting Site Delivery
- Clarify that the site dimensions and details are in accordance with Lafarge drawings. Always read Lafarge drawings in conjunction with architectural and structural drawings.
- Ensure that bearing surfaces are smooth, flat and level and that they are within ± 6mm over 6m.
- Be sure that all the other materials that are required for the installation process of the hollowcore are available.
- Obtain a record of approval of the stability of the supporting structure from the engineer.

Delivery Notice
- Always provide seven (7) working days delivery notice to the shipper.

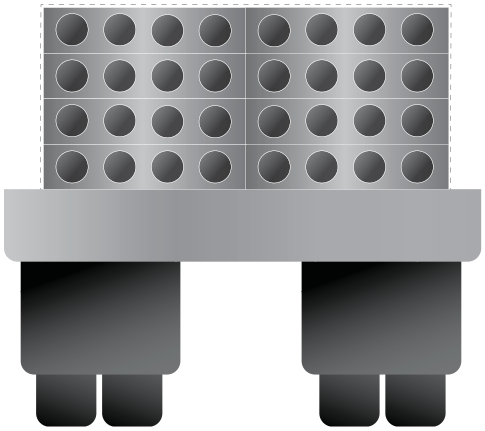
Transportation
- The diagram below illustrates the maximum loading pattern on high-bed trailers.
- Loads may also be governed by legal trailer capacity and slab geometry.
- Offloading sequence may differ slightly from the shipping list due to the slab geometry.
- Irregular slabs are placed on top of the load.
- Prior to unloading, the installer should inspect each shipment.
- Any damage not specifically reported on delivery slips and/or not reported to the project engineer becomes the responsibility of the installer.
- Stockpiling at the site may be necessary - use full width 4"x4" dunnage placed on stable level ground. Separate the slab with full width 2"x4" dunnage.

Load Illustrations

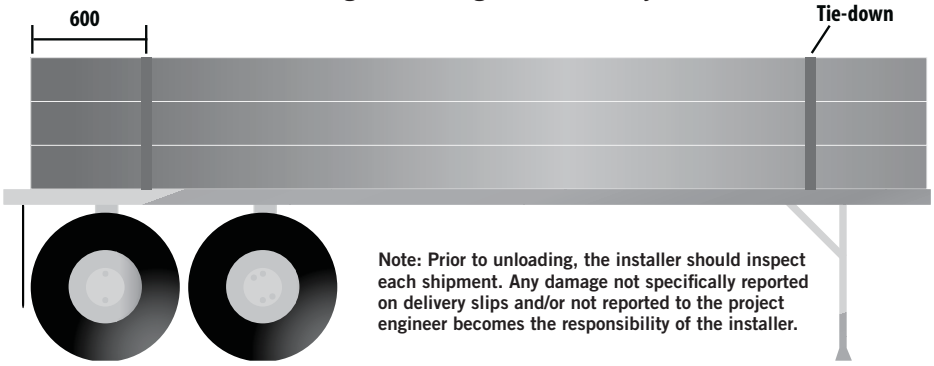
203mm Hollowcore



254 / 305mm Hollowcore



Dunnage to be aligned accurately



Note: Prior to unloading, the installer should inspect each shipment. Any damage not specifically reported on delivery slips and/or not reported to the project engineer becomes the responsibility of the installer.

- Keep the dunnage accurately aligned from slab to slab.

Installation

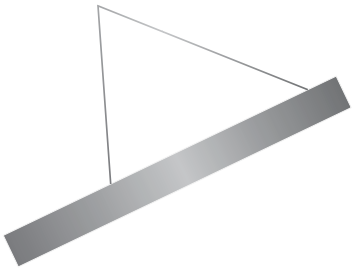
- Hollowcore slabs are to be located and installed in accordance with Lafarge drawings.
- Minimum end bearing is 75mm unless specified otherwise on drawings.
- Keep slab joint widths uniform.

Hoisting

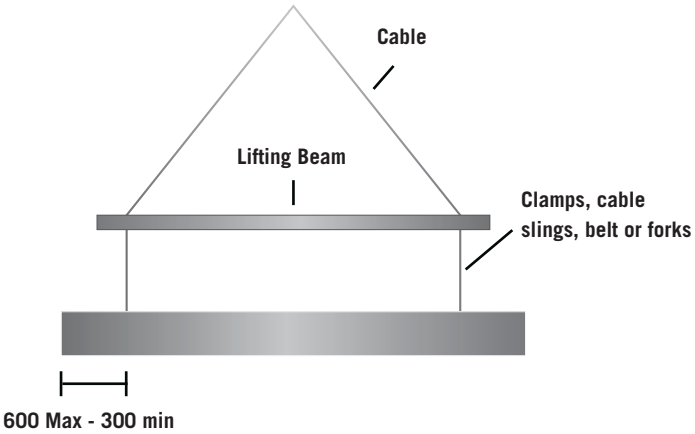
- Use lifting devices (clamps, belts, chokers, forks) of adequate capacity with a minimum safety factor of 5:1.
- Clamps should be used only with a spreader bar. The slab shall be lifted with lines vertical. If this cannot be accomplished, then belts or chokers should be used instead of clamps.
- On slabs less than 4 feet wide, use belts or chokers; do not use clamps.
- Balance load to avoid slipping and to eliminate twist on clamps or belts.
- When using clamps, ensure that the clamp edges fit properly against the sound concrete grooves inside the slab, after the crane has taken the load but before hoisting.
- Blocking for stockpile is in the same locations as lifting.
- Refer to shop tickets for slab weight.
- Hoist only one slab at a time.
- Always use safety slings when hoisting with clamps or forks.
- Never use hollowcore as a platform for hoisting people or materials.
- Never hoist slabs by hooking into cores.
- Never turn slabs on edge or upside-down.
- Never put hands in cores or between slabs.
- Handle only from top surface or with lifting gear.
- For special conditions or safety concerns, contact Lafarge before hoisting.

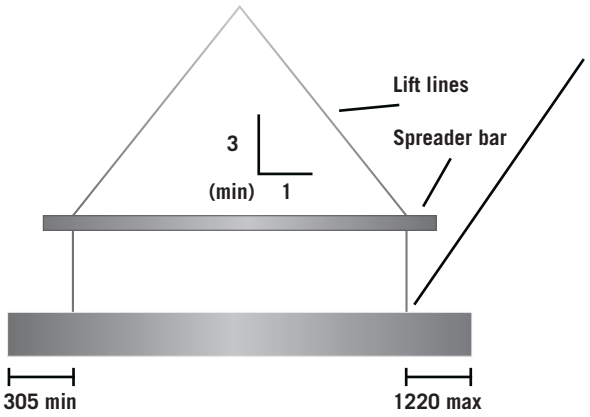
Proper Installation

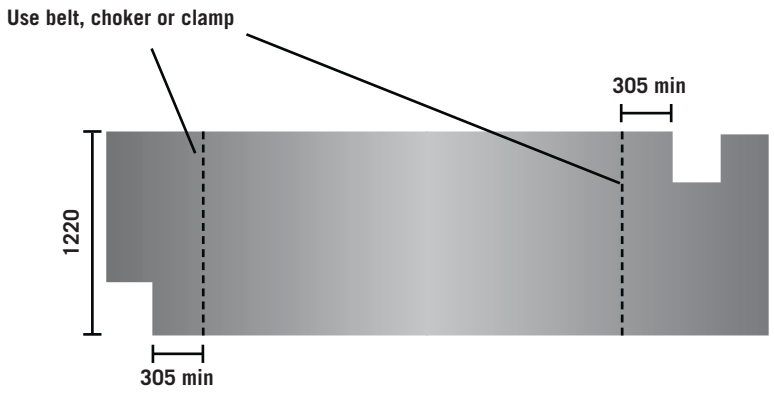
Incorrect Hoisting



Correct Hoisting







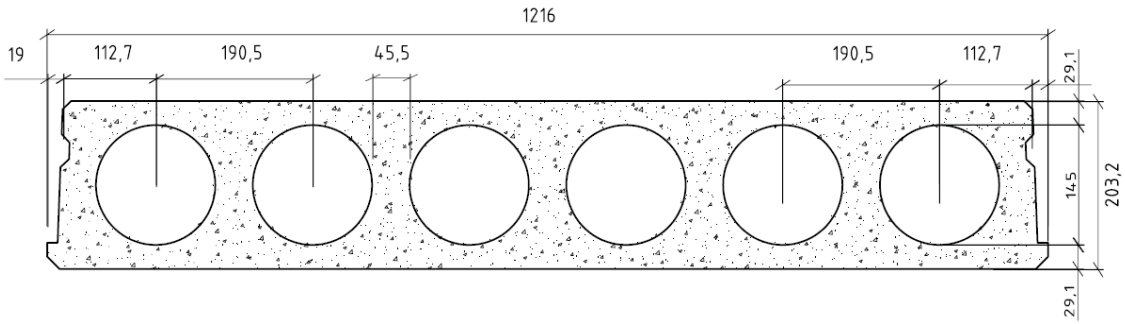
Grouting

- Remove all debris from joints.
- Grouting materials - unless specified otherwise, they consist of a sand/ cement mix. Minimum 28 days strength is 25MPa with an air content of 3% to 6%.
- Camber may occur in hollowcore slabs and will vary with slab age, span, reinforcing and loading conditions.
- Differential camber can be minimized by shoring slabs prior to grouting.
- Cold weather grouting procedures are to be in accordance with CSA A23.1. Until the grout has reached adequate strength, full load capacity may not be assumed.

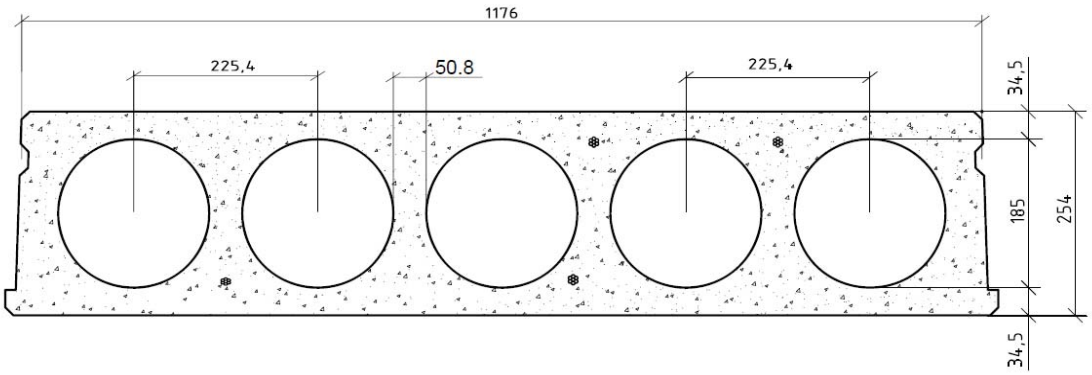
Field Cut Openings

- Round holes are cut in the locations specified and the maximum sizes are shown on the diagrams below that may be cut in the field.
- Approval must be obtained from Lafarge if:
    1. More than 3 holes are to be placed across the slab in one location through the core space.
    2. The holes are larger than shown in the diagrams.
    3. The holes are within 1/5 of the slab length measured from the bearing point.
    4. Webs must be cut to accommodate openings.
- Core-drilling is recommended for all the holes.

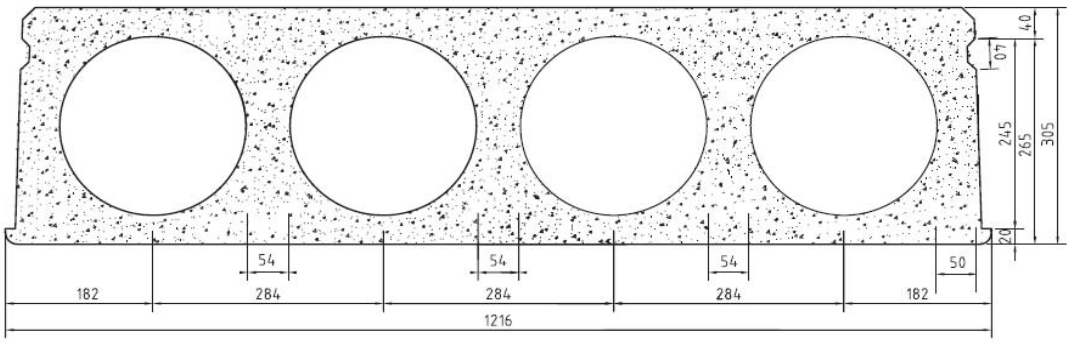
203mm (8") Hollowcore



254mm (10") Hollowcore



305mm (12") Hollowcore



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We pride ourselves in building better cities and better communities, from the buildings in which we live and work, to the roads and bridges that connect our cities and towns. We provide construction solutions that respond to the needs of our customers and the people living in the communities we help create.

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