Product Information Guide

Why your next building should be a *Total Precast Structure*

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Introduction

Stubbe's started in 1982 as a small precast company servicing the agricultural market. In 2001, Stubbe's entered the commercial and residential markets beginning with the precast hollow core floor system. This was followed by the introduction of structural wall panels in 2006, and in 2010 Stubbe's added structural columns, beams and double tees to its product line. All these products now make up our Total Precast Structures.

Thank you for taking the time to explore a total precast option for your next build.

Stubbe's is a family owned and operated company that has been in business for over 30 years. At Stubbe's, our continual focus is to provide unique, cost effective and long lasting solutions.

Introduction

Total Precast Structures offer high durability, low maintenance, excellent fire resistance and energy efficiency. Accelerated construction schedules, increased interior flexibility and reduced cost make Total Precast Structures one of the leading choices for multi-level structures across Ontario.

Stubbe's is known for its forward thinking solutions, quality products and customer service. We offer significant experience and expertise in providing optimal solutions for total precast structures.

We look forward to working together on your next project.

Stubbe's Precast

Quick Facts:

Many of our repeat customers are Owners and Developers who value Stubbe's innovative and forward thinking solutions, in providing a quality and economical precast structure.

Stubbe's Precast employs qualified erection crews and uses its own cranes where possible, to ensure proper and timely installation of all precast products.

Notes

Advantages of Total Precast Structures

Fast Construction

High Quality, Low Maintenance, Interior Design Flexibility

All-Weather Construction

All-In-One Components

Safety

Single Source Provider

Advantages of Total Precast Structures

Total Precast concrete building systems are becoming a popular choice for many construction projects. Architectural and structural precast, concrete components can be combined to create the entire building structure.

This design approach can take several forms, including precast columns and beams with panelized cladding or load-bearing precast walls with double tee or hollow core flooring. These advantages benefit every member of the construction team – especially the owner, whose goals are always paramount.

Architect – In addition to helping to meet all of the building Owner's needs, total precast concrete systems provide specific advantages to Architects that can make the design process smoother.

Contractor – General Contractors find the use of precast concrete components make their job easier on site, ensuring a smooth process for the Owner and Designer in both the short and long terms. There are fewer trades to coordinate with precast construction.

Engineer – Structural Engineers report no difficulty in learning to design with total precast concrete systems. They also benefit from the material's ease of use and efficiency.

Fast Construction

Developers who use total precast systems say precast can shorten the project timetable when compared with steel and even more when compared with cast-in-place concrete construction. That savings can be critical in bringing a new building into a competitive marketplace or in meeting a tenant's need for occupancy on a specific date. The total precast system's speed helps keep projects on track.

Scheduling advantages:

Single source for the building's shell eliminates issues with multi-trade coordination and eliminates the extra contingencies built into schedules.

Fabrication of precast elements during permit stage and site preparation saves time resulting in fast efficient construction regardless of weather conditions.

Designing precast systems is easier, thanks to the assistance from Precaster's engineering department.

Precast components can be erected over the winter months, maintaining tight schedules and allowing year round installation.

With a Total Precast System the speed of erection allows the contractor to enclose the building quickly, giving interior trades faster access.

Precast components are assembled with a fire rated design. Precast's inherent fire resistance eliminates the messy and time consuming fire proofing required for a steel structure and subsequent repairs caused by other trades.

High Quality:

Precast concrete components are certified in accordance with standard practices Precast Concrete – Materials and Construction Standards. Tight control ensures that components are produced with uniform consistency.

Low Maintenance:

Precast structures require less maintenance than buildings constructed using other materials. Incorporating the architecture into the structure using large panel sizes minimizes the number of joints.

Effective Pricing:

Because of precast concrete's tightly controlled and shorter production process, costs can be more accurately estimated earlier in the process.

Interior Design Flexibility:

Long-span precast concrete systems help owners adapt to changing client needs in future years. Hollow core slabs can span 30 to 40 feet, minimizing the need for interior columns.

Green Design

Precast concrete offers a number of benefits that make it environmentally friendly as growing needs in the Leadership in Energy & Environmental Design (LEED Canada) criteria become more popular. Precast's energy efficiency, recyclability, reusability along with minimal waste in the precast plant and on the jobsite are keys to meeting environmental standards that are gaining client interest and acceptance as green construction gains popularity.

Precast offers high thermal mass that has become a feasible element of building design. With precast's ability to aid in meeting LEED standards, the benefits of thermal mass will become more apparent to designers in the future. The use of fly ash, slag and other waste materials aid in environmental friendliness. Precast's high durability produces buildings with a total service life that far outpaces other designs.

Advantages of Total Precast Structures

Construction Speed

Time is money on any construction project. The efficient speed through design, fabrication and erection help meet tight deadlines. This particularly aids contractors when the permit process slows down or unforeseen delays on site arise due to soil conditions or other factors. Precast structural systems are ready to be assembled when the foundations are prepared.

The continuous, uninterrupted installation of precast structural components lends itself perfectly to fast track construction schedules. Savings on financing costs (faster return on investments since substantial completion is reached sooner) is just one of the benefits provided by a complete precast building system.

Precast concrete pieces are fabricated in controlled conditions using high-quality materials, so designs are able to precisely meet specifications. Field adjustments are reduced, creating a smooth erection process with minimal surprises.

Site construction moves smoothly because no special equipment or techniques are required to transport or lift a combination of structural and architectural components. These types of activities can often require additional structural review and exposure to risk.

All-Weather Construction

Contractors can minimize the added "cushion" created in schedules to accommodate bad weather conditions, since precast components can be produced and erected all year round.

All-In-One Components

Total precast concrete systems allow the architectural panels to serve structural functions, limiting the need to incorporate multiple materials and trades. Combining architectural and structural elements provides efficiencies in a building's lateral support systems. Spandrel panels can support floor systems and windows while providing architectural exterior finishes. Precast elevators and stair wells can support floor systems while providing rigid structure and fire rated enclosures.

Safety

Precast construction keeps the site cleaner and eliminates multiple trades from the construction zone, improving logistics and enhancing worker safety. Site storage is minimized – precast components are lifted by crane directly from the truck into position on a building. A clean site is particularly vital on building additions, existing facilities, and in dense urban areas where adjacent businesses can maintain near-normal activities. Precast assembly requires a constant number of people on site versus other types of construction.

Single-Source Provider:

As a single unit, even with stone or brick form liners, precast panels require only one source to create the entire exterior wall system. When a precast structural system of columns, beams and double tees is specified, it allows the complete shell construction with a single producer. This approach ensures all of the responsibility and accuracy for meeting design specifications rests with one supplier. Consistency, tolerances, deadlines, budget and other requirements are assured.

Precast's advantages are maximized when the precaster is brought onto the design team early in the planning stage. This allows the company's full expertise in designing efficient shapes, textures and finishes to be exploited, as well as state-of-the-art knowledge on connection and erection methods.

The Precast Process:

Production To Installation

PRECAST
PROCESS

Panels are produced within a climate controlled manufacturing facility with tight quality control.

Panels are loaded on trucks and shipped to site.

Panels are lifted to the work surface.

Panels are set into place.

Panels are temporarily braced until connections are completed.

Panel to panel connections are completed.

Filling of grout tubes.

Skim coats, caulking & 2nd coat of paint are applied

Caulking and second coat of paint

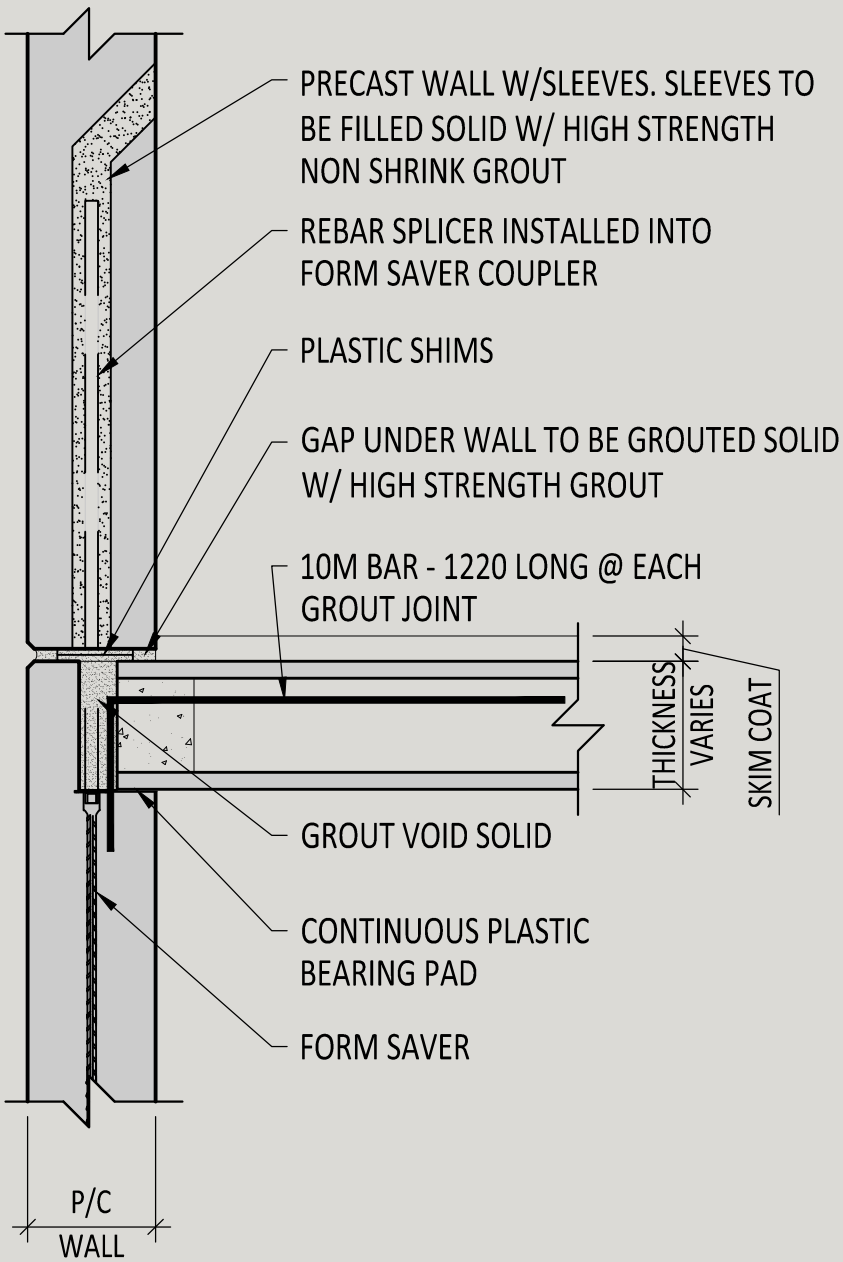
Finished Product!

MAPLE AVE. CONDOMINIUMS
15 Story precast apartment for Auburn Dev.
Location – Maple Ave., Barrie, Ontario

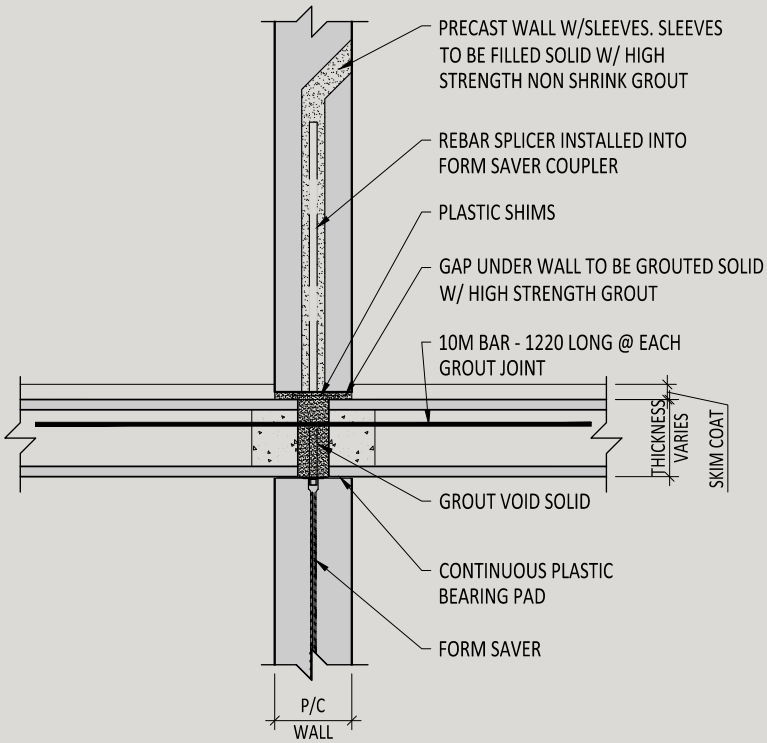
Standard Connections

STANDARD CONNECTIONS

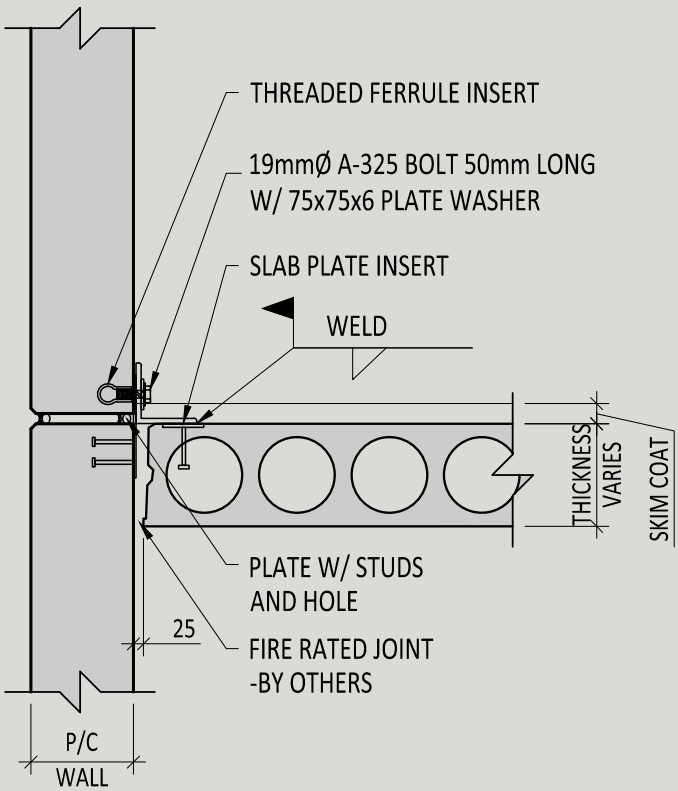
Total precast structures are made up of several components poured in a controlled environment and brought to site where they are connected together. The following details illustrate how the panels are connected together.



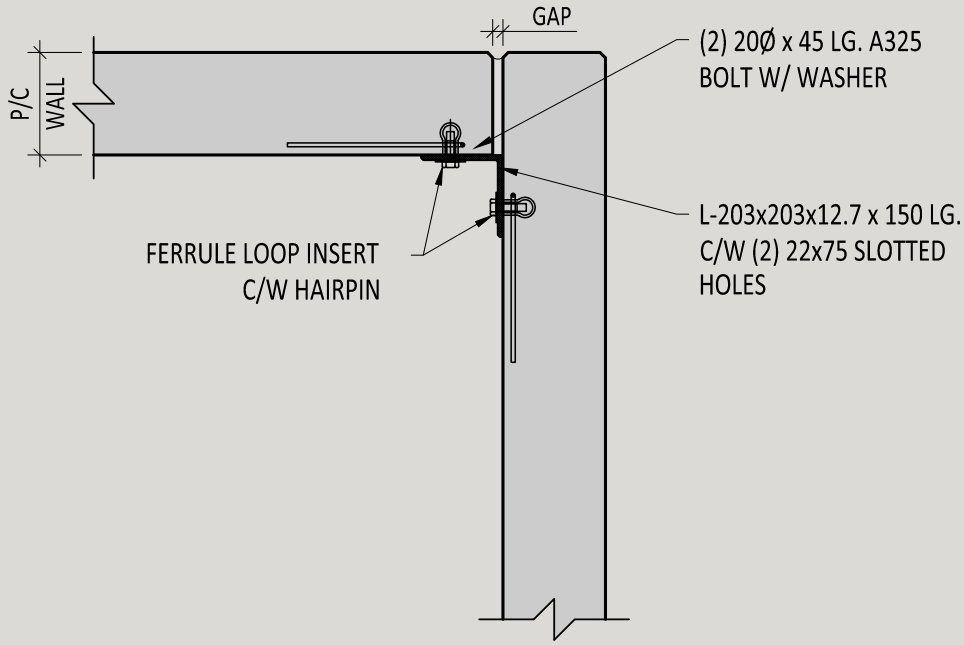
Load Bearing End Walls



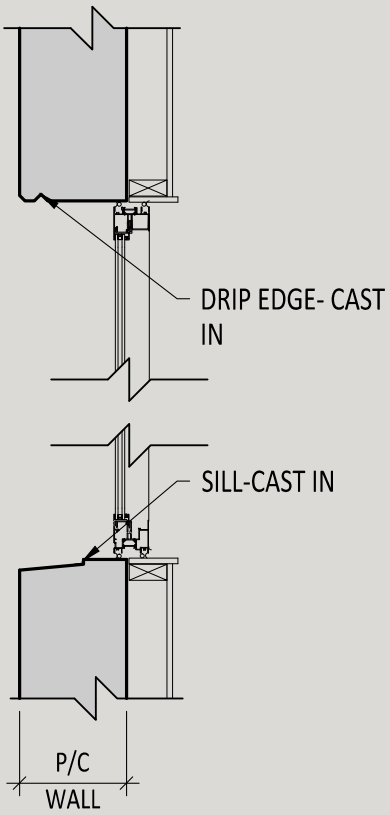
Interior Shear Walls:



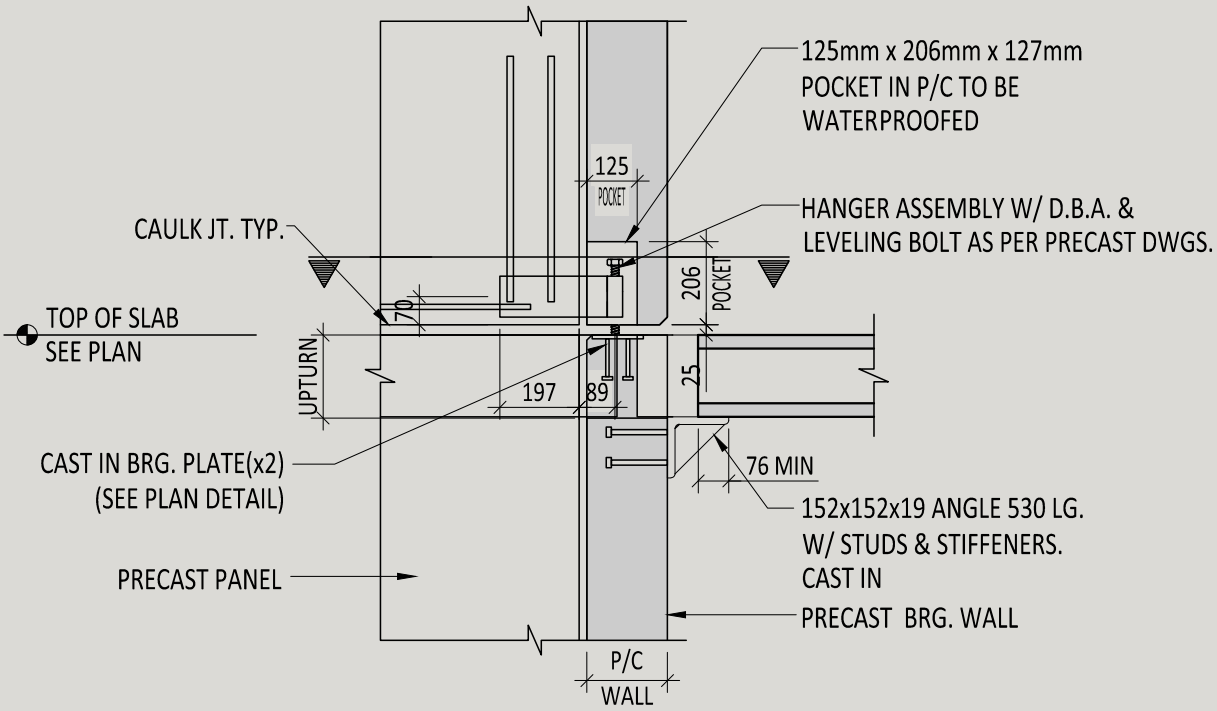
Cladding Walls:



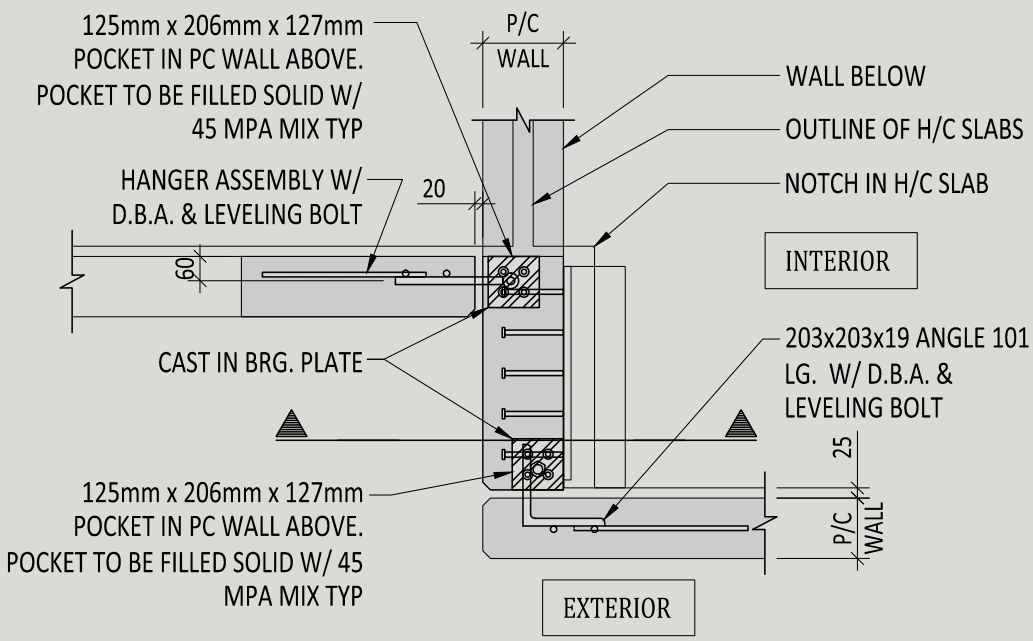
Alignment Connections at Vertical Joints:



Window Sills and Headers:



ELEVATION VIEW

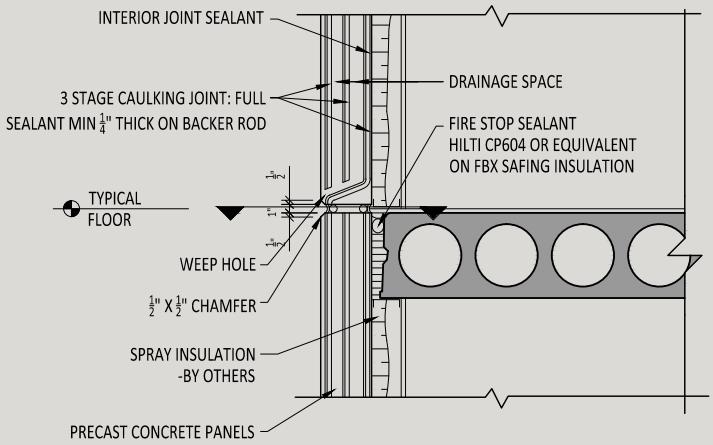


PLAN VIEW

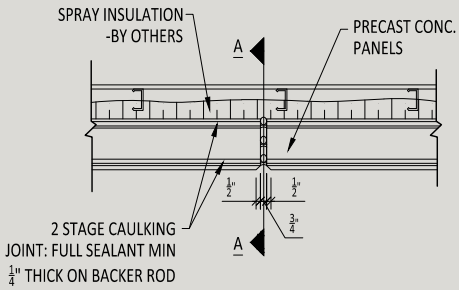
Cladding Panels Hung From Shear Walls:

Caulking/Firestopping Details

CAULKING DETAILS

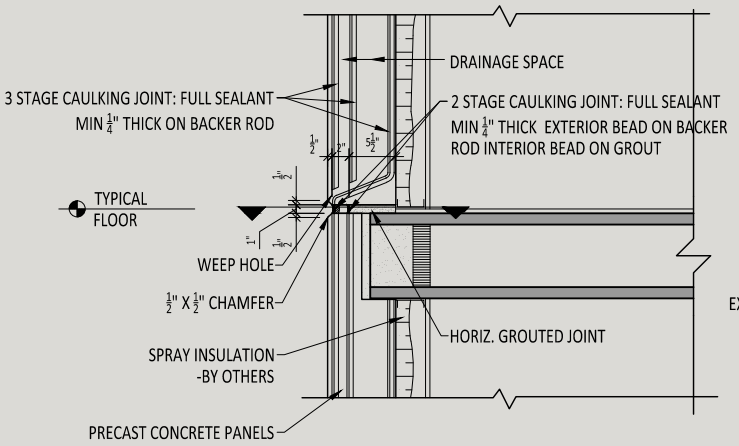


SECTION A-A

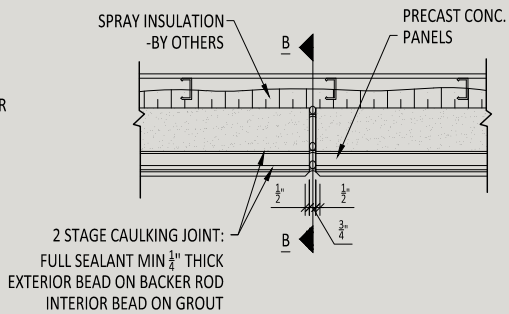


PLAN THRU HORIZ. JOINT

Joint Sealing Details at Cladding Walls

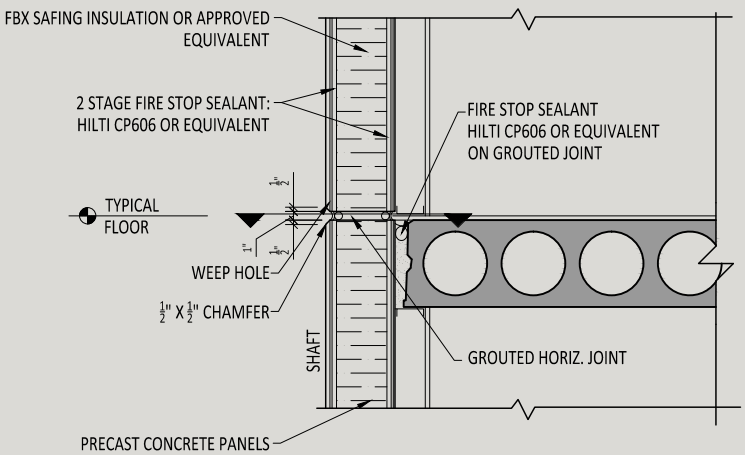


SECTION B-B

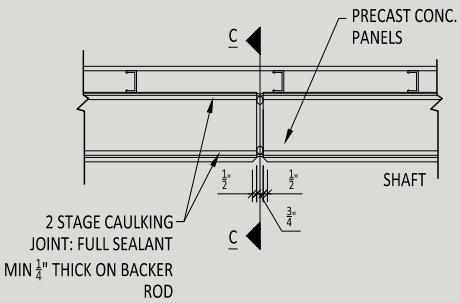


PLAN THRU HORIZ. JOINT

Joint Sealing Details at Shear Walls

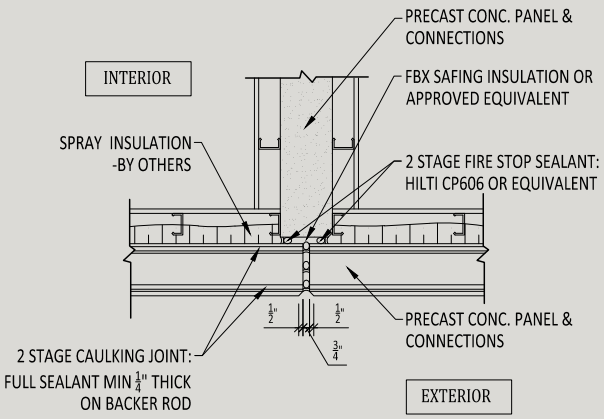


SECTION C-C

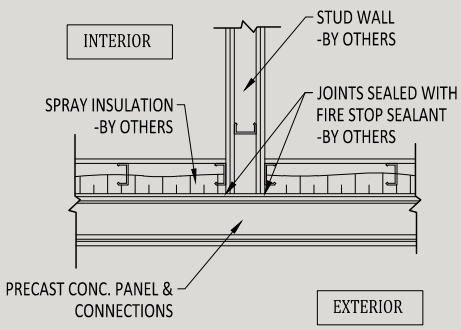


PLAN THRU HORIZ. JOINT

Joint Sealing Details at Shaft Walls

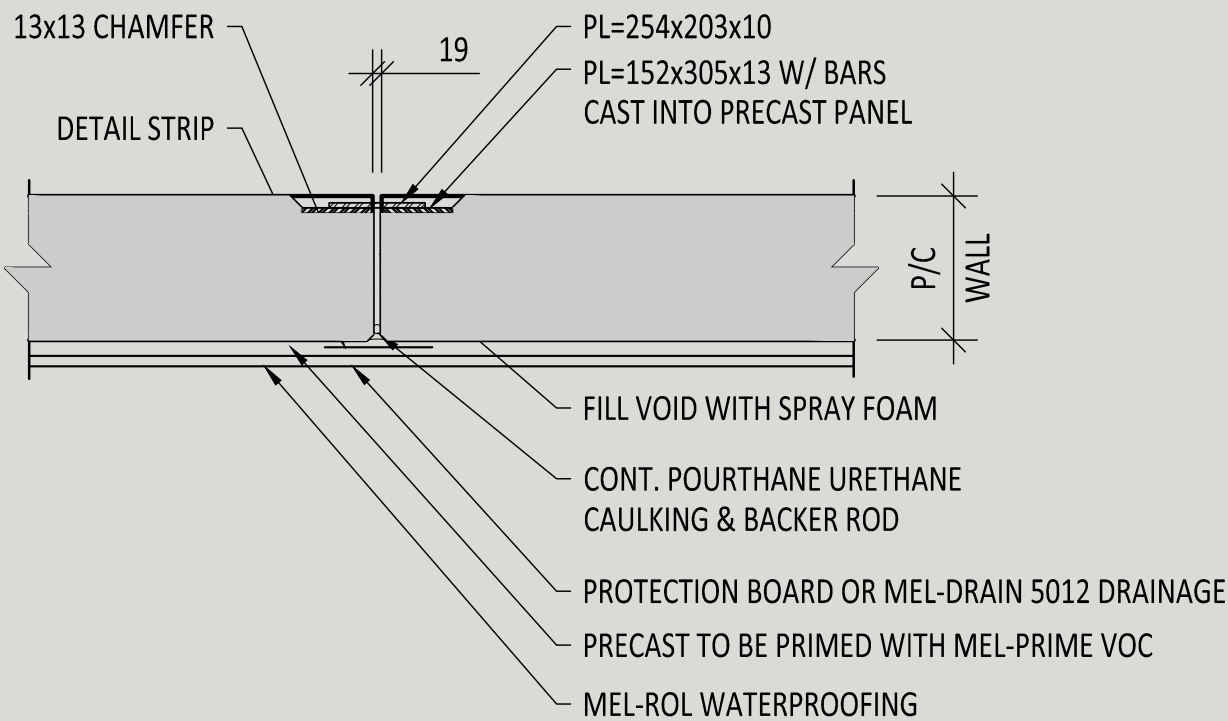


SECTION THRU VERT. JOINT



SECTION THRU VERT. JOINT

Joint Sealing Details at Wall Intersections



PLAN VIEW

Panel to Panel Foundation Vertical Joint

Notes

Past Precast Projects

PAST PROJECTS

RIVER HOUSE CONDOMINIUMS
18 Story precast condominium for Tricar
Location – 150 Macdonell St., Guelph, Ontario

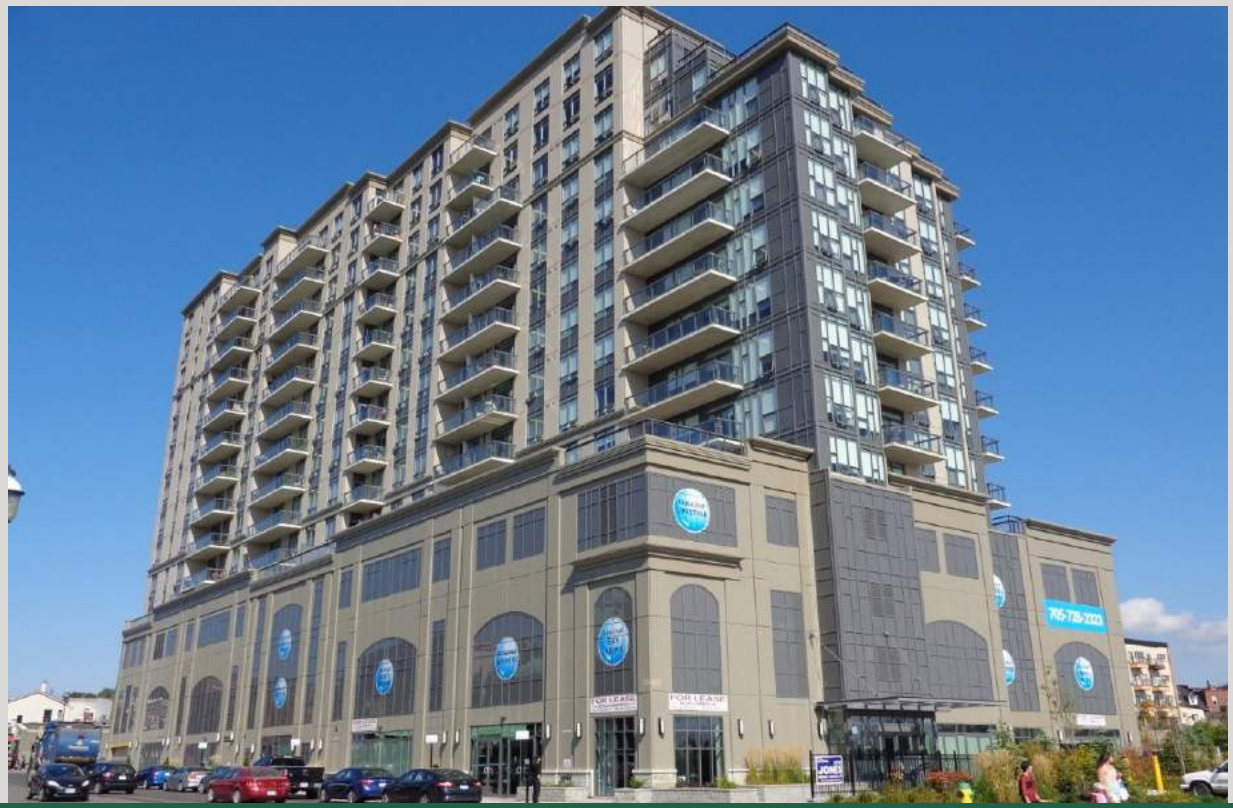
BARREL YARDS TOWER D
26 Story total precast condominium for Auburn Developments
Location – 110 Erb St. West, Waterloo, Ontario

My Rez
18 Story student residence for Off Campus
Location – 181 Lester St., Waterloo, Ontario

1 COLUMBIA

21 Story total precast student residence for Schembri Property Management

Location – 1 Columbia St. West, Waterloo, Ontario



MAPLE AVE CONDOMINIUMS
15 Story precast apartment for Auburn Dev., Barrie Ontario

JACKSON APARTMENTS
7 Story precast apartment for Jackson Hospitality, Hamilton, Ontario

Notes

OAA Rainscreen Requirements

OAA
REQUIREMENTS

Control of rain penetration is key to any building system. Total precast structures do a great job of preventing any rain from penetration thru the panels and draining any penetration that may occur at precast joints. Precast panels are considered to be a perfect barrier face sealed element. Joints between panels are caulked. OAA requires a 2 stage drained joint. Stubbe's provides a 3 stage drained joint. See below for OAA Requirements

OAA Drained Joints

Two-stage drained joints are the time proven method of using sealant to control rain penetration (Figure 23). This approach uses the exterior exposed sealant bead as a rain screen, and hence is expected to fail and allow rain penetration. A second, interior weather protected sealant acts as the drainage plane, with a drainage space between the two joints.

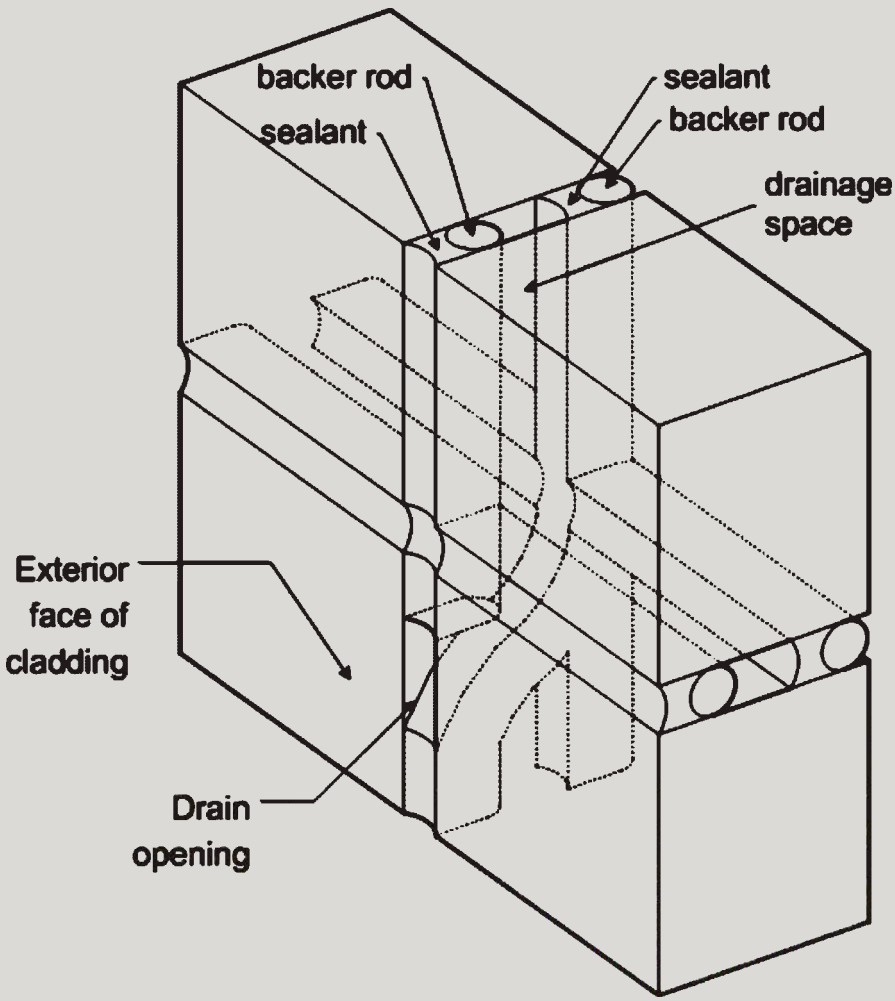


Figure 23: Drained Two-Stage Sealant Joint

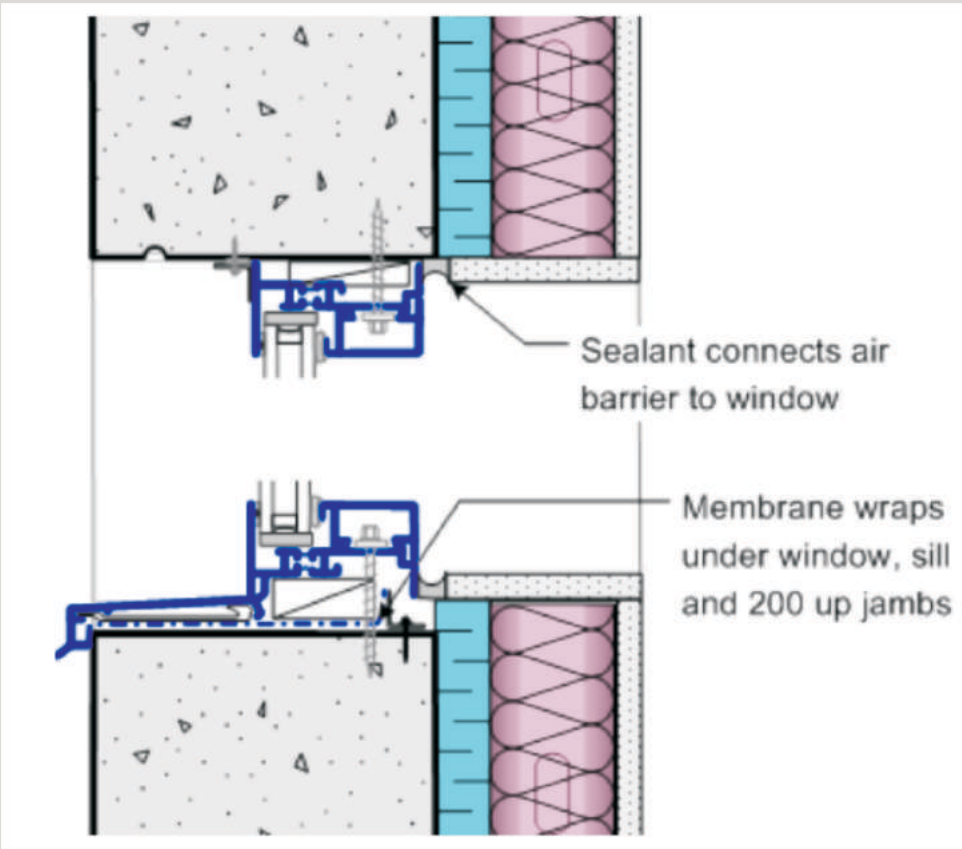
OAA Perfect Barrier Wall Elements

Natural Stone Panels, Metal Panels, and Precast:

Natural stone, metal panels, and architectural precast concrete wall cladding systems are similar in that they are large format panels that are attached at discrete points to their structural backup. Unlike masonry veneers, the panels themselves rarely leak – 40 mm of granite, 1.2 mm of aluminum and 4" of concrete are all essentially perfect barriers. However, the large numbers of joints between panels do.

Solid Masonry and Concrete:

Solid masonry exterior walls were traditionally, and often successfully, used to control rain water penetration. These solid masonry walls were comprised of several wythes and very thick blocks. Modern solid reinforced concrete walls often perform as well or better than walls comprised of masonry (Figure 16). Both systems control rain penetration by storing the small amount of water that is absorbed into their face or penetrates through the inevitable cracks. Since reinforced concrete tends to have many fewer and smaller cracks than a masonry wall, less concrete thickness is required for a specific application.



Reinforced Concrete Shear Wall with Drained Window Penetration

Efficient Precast Structures

EFFICIENT
STRUCTURES

1. Total Height
   Precast has limits in the number of storeys that can be built efficiently. Buildings over 25 storeys may require 2-4 storey's of CIP prior to beginning the precast.

2. Footprint
   A small footprint combined with a high tower is less efficient. A small square foot building will have many more connections than high large square foot building.

3. Shape of the Building
   Rectangular, symmetrical buildings are preferable to L-shaped or asymmetric buildings. Asymmetry results in the center of rigidity of the building being off center. This causes high diaphragm forces from wind and seismic loading due to twisting around the center of rigidity. This is not as big of an issue in cladding walls.

4. Windows and Doors
   Large window/door openings reduce the amount of concrete but also increase the amount of steel reinforcing, particularly in structural walls. This type of wall requires more labour to set up, pour and finish.

5. Number of Repeat Floors
   It takes our production crews a couple of production beds before inefficiencies in design and assembly are ironed out. A greater number of repeat floors allows them to get the maximum amount out of their learning curve. Less repeat floors effects the unit price as the cost of learning is spread over less floors.

6. Estimated Size of a Panel
   Small panels are expensive to manufacture due to increased direct labor per square foot. The forming crews still have to form all 4 sides of a panel whether it is 40 square feet or 200 square feet. Try to maximize panel size to match crane capacity. Decreasing the number of crane lifts allows for a quicker build.

7. Structural Panel versus Cladding
   Cladding panels typically do not have the same amount of reinforcing that structural panels have. In order to achieve cheaper cladding walls, design should allow for structural walls every 20'-40' perpendicular to the cladding walls. This will allow the cladding walls to "hang" off of the structural walls making them self supporting.

8. Walls versus Floor
   A major item that affects cost is the ratio of square footage of walls versus square footage of floor. A small footprint building with lots of walls and short spans result in a much higher price per square foot than a larger footprint building with larger fewer walls and long spans.

9. Precast Preferred Design
   Shear wall designs are much more efficient and cost effective than corridor to exterior wall designs. Shear walls allow us to use the cladding walls on the long exterior sides of the building (parallel to the hollow core) so that the rebar over the large openings (windows and doors) is significantly less.

10. Finishes
    Some panels are not exposed and do not require finishes, where others have a variety of finishes, including painting (smaller cost) and brick liners (significant extra). It also makes a difference if we do a smooth trowel or a power trowel finish on the inside face.

11. Transfer Slabs
    Refer to the building in Barrie (Maple Ave.) as an example. When transfer slabs are not designed at the time of pricing, we provide an allowance for this area of work and track costs against the allowance. In some scenarios it may be more cost effective to do the first couple of floors cast-in-place, top it with a poured transfer slab and then proceed with precast above the transfer slab. This is usually done when line loads do not carry through the podium.

12. Shear Walls
    Efficient designs carry shear walls from the top of the structure down to the footings. This provides building stability and allows the weight of the building to be transferred directly to the footings, without a transfer slab or transfer beams. Transfer slabs and beams are expensive.

13. Hollow core
    Efficient designs maximize hollow core spans minimizing the number of walls required. Please refer to Stubbe's load tables for maximum spans for each thickness of hollow core based on given loads.

14. Precast Beams
    Keep headroom in mind when designing with precast beams. A typical beam will require 12" below the underside of hollow core and a transfer beam will require a minimum of 24" below the underside of hollow core, depending on loads. Try to keep precast beams less than 25'-0" long.

15. Balconies
    Balconies require support at either end (or at least 1.5 of the ends) in order to keep them from "tipping off" the building face.

16. Lintels and Beams

There are 2 options available when designing the steel beams/lintels:

- Delta beams are more expensive but provide a 2 hour fire rating without any additional work.
- Conventional steel (beams, angles, tubes) are cheaper but need to be fire-rated by being encased in drywall or fire sprayed.

Stubbe's has found that conventional steel, fire-rated after the fact is more economical.

17. Weep Holes

Weep holes allow water to drain from the hollow core floor slabs. The weep holes require a plug (installed by Stubbe's) on the top and patching the surface as well as the underside of the slabs. This is typically combined in the drywallers scope of work.

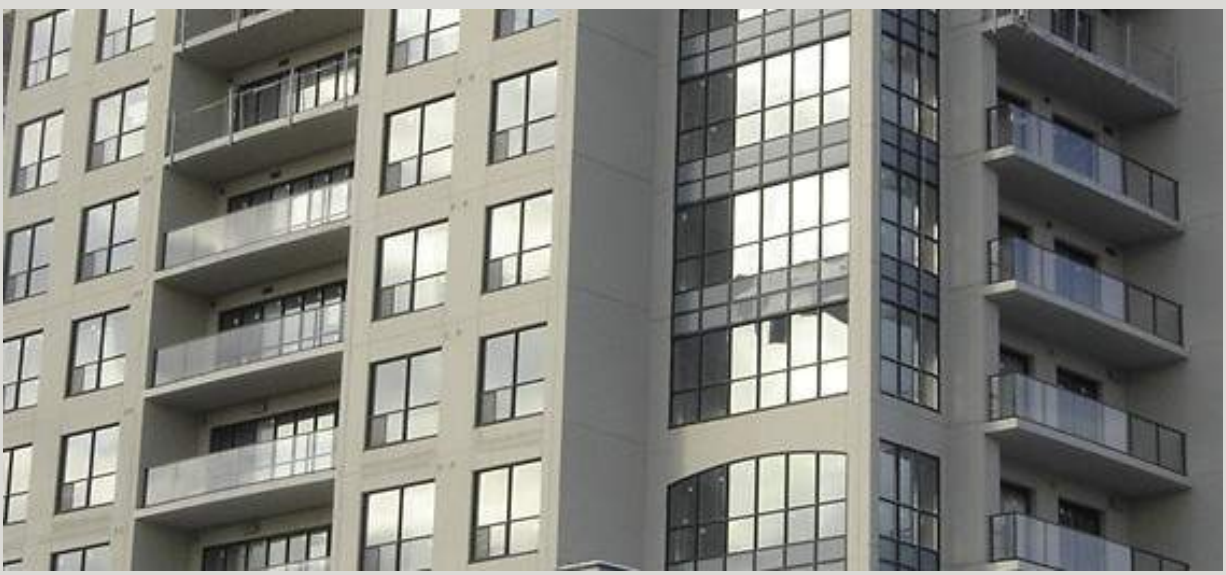
18. Solids vs. Hollow Core

Hollow core requires continuous support at each end of the slab. This means that if a slab is side cantilevered a solid will be required. Solid slabs are approximately triple the cost per square foot so they should be avoided if possible in order to keep the costs of the design more economical.

Notes

Wall Panel Finishes

WALL PANEL FINISHES

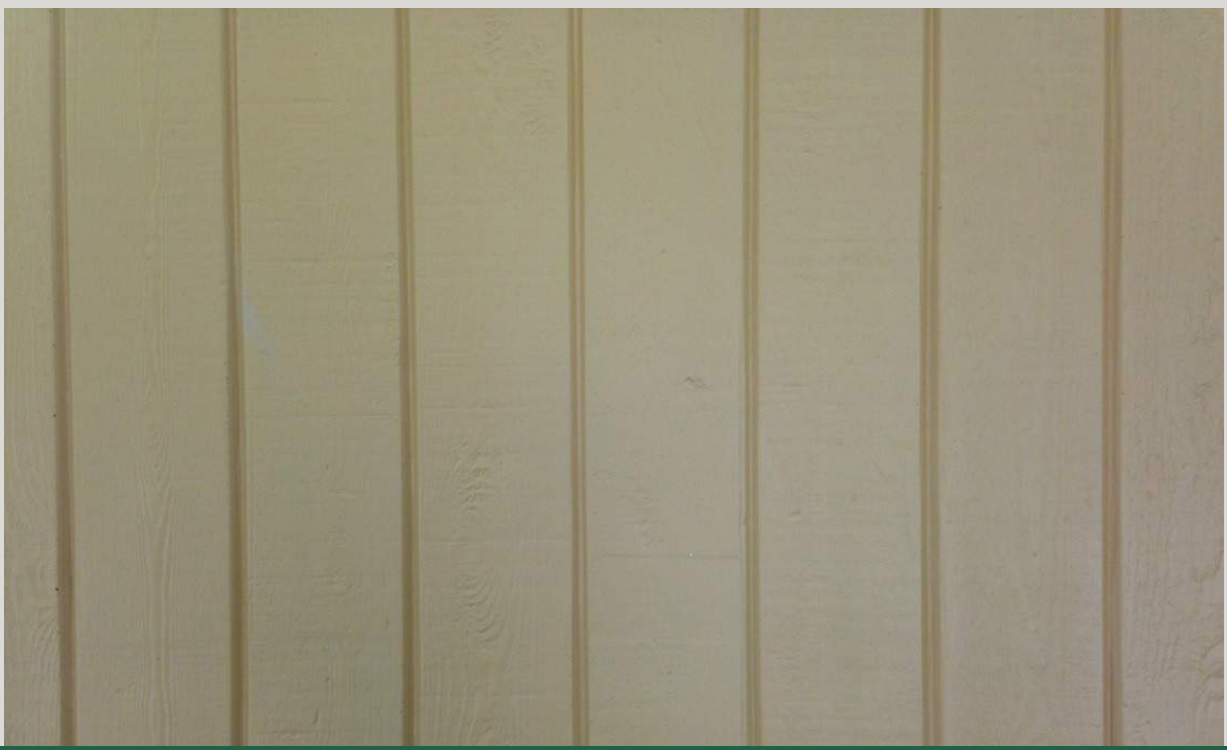


Light Sandblast and Paint

Light Sandblast and Stain

Mold Liner and Paint

Fluted



Wood Grain

Product Information and Specs

Paint/Caulking

STC and Fire Ratings

CSA Certification

Fitzlock

Weep Holes

PRODUCT INFORMATION

BASF
The Chemical Company

Technical Data Guide

09 97 23
Coatings for Concrete and Masonry

MasterProtect® HB 300SB

Waterborne, high-build, modified acrylic waterproof coating

FORMERLY SUPER COLORCOAT™ VOC

PACKAGING
5 gallon (18.9 L) pails

YIELD
See charts on page 2

STORAGE
Store in unopened containers in a clean, dry area. Keep from freezing

SHELF LIFE
18 months when properly stored

VOC CONTENT
Less than 300 g/L
less water and exempt solvents

DESCRIPTION
MasterProtect HB 300SB is a waterborne, high-build, modified acrylic waterproof coating for above-grade concrete, stucco, block and brick surfaces.

PRODUCT HIGHLIGHTS
- Green concrete application expedites project completion
- Suitable for cool weather applications
- Adheres to properly prepared smooth and chalky surfaces
- Primerless adhesion saves time and money
- Resists wind-driven rain, helps prevent water penetration into the substrate
- Breathable to allow water vapor to escape
- Available in smooth and fine sand texture for varied finished appearances

APPLICATIONS
- Exterior
- Vertical
- Above-grade
- Protecting and waterproofing

SUBSTRATES
- Concrete
- Masonry
- Stucco
- Existing Coatings

HOW TO APPLY

SURFACE PREPARATION
1. Surfaces should be clean and sound and free of all bond-inhibiting contaminants.
2. Concrete substrates may be coated after 7 days.
3. Repair any holes, spalled and damaged concrete with appropriate Master Builders Solutions repair materials. Allow appropriate cure time prior to coating.
4. Remove any protruding concrete accessories and smooth out any surface irregularities.
5. High-pressure power wash surface (or abrasive blast on hard, dense surfaces) to create a profile of SP 3, per ICRI Guide 310.2.
6. Some stains may require chemical removal. Neutralize any cleaning compounds used and rinse with clean water.
7. Check adhesion of old coatings according to ASTM D 3359, Measuring Adhesion by Tape Test Method A.
8. Remove any blisters or delaminated areas and sand edges to smooth rough areas and provide transition to old paint areas.
9. Treat cracks greater than 1/32" with MasterProtect FL 746 or MasterProtect FL 748. Treat cracks larger than 1/4" as expansion joints and fill with appropriate Master Builders Solutions sealant.
10. New CMU must have a base coat of MasterProtect FL 749.

Technical Data

Composition

MasterProtect HB 300SB is a high-build, waterborne acrylic coating.

Compliances

- Alberta Transportation - Type 3 sealer

Typical Properties

PROPERTY	VALUE	
	TEXTURED	SMOOTH
Weight, lbs/gal (kg/L)	12.4–12.7 (1.49–1.54)	10.7–11.0 (1.28–1.32)
Solids, %		
By weight	67.7	51.4
By volume	49.5	35.5
Viscosity, KU	122–130	122–130

Test Data

PROPERTY	RESULTS	TEST METHOD
Wind-driven rain test (98 mph)	Passes	TT-C-555B
Room-temperature flexibility, ½" (13 mm) mandrel	Passes	ASTM D 522
Artificial weathering, Xenon Arc, 4,000 hrs	No surface chalking, cracking, or loss of adhesion Color change: ΔE < 5.0	ASTM G 155
Water Vapor Transmission 1653		ASTM E 96 / ASTM D
	Wet Cup / Dry Cup	
Grains/hr/ft²	11.85 / 1.56	
Perms	28.6 / 3.77	
Perm inches	0.23 / 0.04	
CO_2 diffusion resistance, at 10 mils DFT	1,660,000 (μ CO2) 43" (1092 mm) equivalent concrete thickness	PR EN 1062-6
Pull-off adhesion, psi (MPa)	> 100 (0.7)	ASTM D 4541
Dirt pick-up, (2 months)	95%	ASTM D 3719

Test results are typical values obtained under laboratory conditions. Reasonable variations can be expected.

Yield

Approximate Coverage Rates

SUBSTRATE	FT²/GAL (M²/L) PER COAT
Troweled stucco	60–80 (1.5–2.0)
Blown on stucco	60–80 (1.5–2.0)
Block*	50–60 (1.2–1.5)
Brick	60–80 (1.5–2.0)
Concrete	70–90 (1.7–2.2)

*Two coats of MasterProtect HB 300SB are required, or 1 coat MasterProtect FL 749 followed by 1 coat MasterProtect HB 300SB.

Yield

Wet and Dry Film Thickness

FT²/GAL (M²/L) PER COAT	AVERAGE DRY FILM MILS (MM)		AVERAGE WET FILM MILS (MM
	SMOOTH	FINE	
60 (1.47)	9–10 (0.23–0.25)	13–14 (0.33–0.36)	26–27 (0.66–0.68)
80 (1.96)	7–8 (0.18–0.20)	10–11 (0.25–0.28)	20–21 (0.51–0.53)
100 (2.45)	5–6 (0.13–0.15)	8–9 (0.20–0.23)	16–17 (0.41–0.43)

NOTE: Coverage rates are theoretical on smooth-surfaced, properly primed substrates.

IMPORTANT: Warranty applications require a minimum 8 dry-mil (0.25 mm) film thickness. Use the above tables to calculate the required coverage rate and number of coats to achieve 8–10 dry mils (0.25 mm).

Construction

Product Data Sheet
Edition 9.13.2012
Sikaflex-1a

Sikaflex®-1a

One part polyurethane, elastomeric sealant/adhesive

Description	Sikaflex-1a is a premium-grade, high-performance, moisture-cured, 1-component, polyurethane-based, non-sag elastomeric sealant. Meets Federal specification TT-S-00230C, Type II, Class A. Meets ASTM C-920, Type S, Grade NS, Class 35, use T, NT, O, M, G, I; Canadian standard CAN/CGSB 19.13-M87.
Where to Use	▪ Designed for all types of joints where maximum depth of sealant will not exceed 1/2 in. ▪ Excellent for small joints and fillets, windows, door frames, reglets, flashing, common roofing detail applications, and many construction adhesive applications. ▪ Suitable for vertical and horizontal joints; readily placeable at 40°F. ▪ Has many applications as an elastic adhesive between materials with dissimilar coefficients of expansion. ▪ Submerged conditions, such as canal and reservoir joints.
Advantages	▪ Eliminates time, effort, and equipment for mixing, filling cartridges, pre-heating or thawing, and cleaning of equipment. ▪ Fast tack-free and final cure times. ▪ High elasticity - cures to a tough, durable, flexible consistency with exceptional cut and tear-resistance. ▪ Stress relaxation. ▪ Excellent adhesion - bonds to most construction materials without a primer. ▪ Excellent resistance to aging, weathering. ▪ Proven in tough climates around the world. ▪ Odorless, non-staining. ▪ Jet fuel resistant. ▪ Certified to the NSF/ANSI Standard 61 for potable water. ▪ Urethane-based; suggested by EPA for radon reduction. ▪ Paintable with water-, oil- and rubber-based paints. ▪ Capable of ±35% joint movement.
Coverage	10.1 fl. oz. cartridge seals 12.4 lineal ft. of 1/2 x 1/4 in. joint. 20 fl. oz. uni-pac sausage seals 24 lineal ft. of 1/2 x 1/4 in. joint.
Packaging	Disposable 10.1 fl. oz., moisture-proof composite cartridges, 24/case; and uni-pac sausages, 20 fl. oz., 20/carton.

Typical Data *(Material and curing conditions @ 73°F (23°C) and 50% R.H.)*

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Shelf Life

10.1 fl. oz. cartridges	12 months
20 fl. oz. uni-pac sausages	12 months
5 gallon pail	6 months
55 gallon drum	6 months

Storage Conditions Store at 40°-95°F (4°-35°C). Condition material to 65°-75°F before using.

Colors White, colonial white, aluminum gray, limestone, black, dark bronze, capitol tan, stone and medium bronze. Special architectural colors on request.

Application Temperature 40° to 100°F. Sealant should be installed when joint is at mid-range of its anticipated movement.

Service Range -40° to 170°F

Curing Rate

Tack-free time	3 to 6 hours
Tack-free to touch	3 hours
Final cure	4 to 7 days

Tear Strength (ASTM D-624) 55 lb./in.

Shore A Hardness (ASTM C-661) 21 day 40±5

Movement Capability (ASTM C-719) +/- 35%

Tensile Properties (ASTM D-412)

21 day	Tensile Stress		175 psi (1.21 MPa)
	Elongation at Break		550%
	Modulus of Elasticity	25%	35 psi (0.24 MPa)
		50%	60 psi (0.41 MPa)
		100%	85 psi (0.59 MPa)

Adhesion in Peel (TT-S-00230C, ASTM C 794)

Substrate	Peel Strength	Adhesion Loss
Concrete	20 lb.	0%
Aluminum	20 lb.	0%
Glass	20 lb.	0%

Weathering Resistance Excellent

Chemical Resistance Good resistance to water, diluted acids, and diluted alkalines. Consult Technical Service for specific data.

STC for Precast Walls (Minimum 8" Thick):

Fig. 6.2.6 Airborne sound transmission loss (STC) and impact insulation class (IIC) ratings from tests of precast concrete assemblies. [37]

Assembly No.	Description	STC	IIC
	Wall Systems		
1	100 mm flat panel, 240 kg/m^2	49	-
2	150 mm flat panel, 360 kg/m^2	55	-
3	Assembly 2 with "Z" furring channels, 25 mm insulation and 12 mm gypsum board, 390 kg/m^2	62	-
4	Assembly 2 with wood furring, 12 mm insulation and 12 mm gypsum board, 390 kg/m^2	63	-
5	Assembly 2 with 12 mm space, 40 mm metal stud row, 75 mm insulation and 12 mm gypsum board	63[1]	-
6	200 mm flat panel, 480 kg/m^2	58	-
7	355 mm prestressed tees with 100 mm flange, 360 kg/m^2	54	-

STC for 8" hollow core Floors:

STC Rating

The CPCI Metric Design Manual (third edition) indicates the following standards for 200 mm thick hollow core slabs:

A) The Sound Transmission Rating (STC) is 50.
B) Impact Insulation Class (IIC) is 28.

Floor coverings and finishes can increase the ratings (see the CPCI manual for additional information).

Hollow Core Fire Rating

Stubbe's Precast 8" hollow core slabs have the following properties. Cross sectional area of 1216 mm wide slab is 151382mm squared, with 39 mm cover on 12.7 mm diameter strands. The concrete is type N.

Based on Supplementary Standard SB-2 of OBC 2005 the fire rating of the 8" hollow core slabs is 2 hours. See calculations below.

The equivalent thickness of the slab per clause is 1.6

ET = 151,382 / 1216 = 124.5 mm

From Table 2.2.1.A results in a rating of 2 hours.

The steel cover age is 39 mm.

From Table 2.2.1.B results in a rating of 2 hours.

Thus a 2 hour rating is achieved.

These ratings are applicable to Stubbe's Precast 10", 12" and 14" hollow core slabs as well.

Stair and Landing Fire Rating

Stubbe's Precast stair flights have the following properties: minimum thickness of 127 mm, with 39 mm cover on reinforcing bars. The concrete is type N.

Based on Supplementary Standard SB-2 of OBC 2005 the fire rating of the stair flights is 2 hours. See calculations below:

The minimum thickness of the flight is 127 mm.
From Table 2.2.1.A results in a rating of 2 hours.
The cover is 39 mm.
From Table 2.2.1.B results in a rating of 2 hours.
Thus a 2 hour rating is achieved.

This rating is also applicable to Stubbe's Precast stair landings, which have a minimum thickness of 203 mm and 39 mm cover to the bottom reinforcing bars.

Precast Walls Fire Rating

Stubbe's Precast walls have the following properties: minimum thickness of 127 mm, with 39 mm cover on reinforcing bars. The concrete is type N.

Based on Supplementary Standard SB-2 of OBC 2005 the fire rating of the walls is 2 hours. See calculations below.

The minimum thickness of the walls is 127 mm.
From Table 2.2.1.A results in a rating of 2 hours.
The cover is 39 mm.
From Table 2.2.1.B results in a rating of 2 hours.
Thus a 2 hour rating is achieved.

This rating is also applicable to all walls 6" thick or thicker.

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CERTIFICATE OF QUALIFICATION

PRECAST CONCRETE PROGRAM

This is to certify that

STUBBE'S PRECAST
382 Harley Road,
New Durham, ON

has been qualified by CSA to manufacture Precast Concrete to CSA Standard A23.4 in the following program category(ies):

Architectural – Non-prestressed & Prestressed
Structural – Non-prestressed & Prestressed
Specialty – Non-prestressed

Randall W. Luecke
President
CSA International
Date: December 9, 2008

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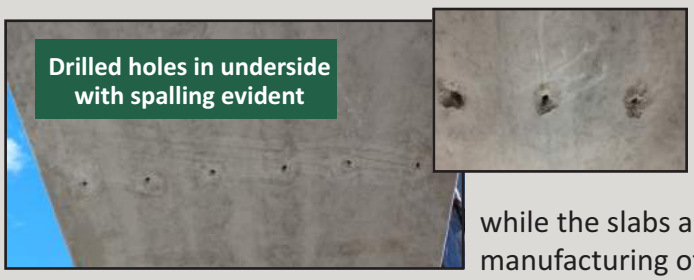
Weep Holes

OBJECTIVE: To avoid any water accumulation in the voids of the hollow core precast slabs and avoid the freezing ice from expanding and contracting within the slab resulting in potential “blow-outs”.

CAUSE: Excessive water collects in cores from a variety of sources. Core drilling holes for the plumbing trades introduces some water but since this a complete hole thru the bottom the water either drains out or evaporates from air flow thru the hole. Rain and melting snow are the main cause and will find its way into the cores from connection details such as tie steel connections and most notably where the anti-rotation connection is used. The grout at these locations is porous and water seeps into the voids. The grout located every few feet also blocks the cores and does not allow the water to escape if the end cores are exposed.



PROCEDURE: During the extrusion of the hollow core the weep holes are drilled from the top surface thru the bottom side of the precast slab using a ½” diameter drill bit. The drilling is done while the slabs are still on the production line during the manufacturing of the precast. There is spalling to the underside of the precast as the slab is penetrated.

BLOCKAGE: Plastic plugs are placed in the top hole to prevent any skim coat or toppings or other construction materials from seeping through the holes and prevent blocking the drain hole in the bottom.

FINISHES: To cover the spalling the underside of the precast slab requires some patch-work. Mud-work not by Stubbes, drywall finishers are more capable to do this work when doing their mud-work. They are on site when the building is enclosed enough to prevent additional water from being introduced into the structure. Furthermore, the 2-hour fire rating needs to be re-established due to the penetrations. Drywall bulkheads cover some holes but exposed holes require a fire caulking infill at these locations. Stubbes cannot estimate these quantities therefore it is not included in any quoted submissions.

ACKNOWLEDGEMENTS

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Acknowledgements

CPCI: Canadian Precast/Prestressed Concrete Institute

OAA: Ontario Association of Architecture

Industrial Suppliers: BASF: The Chemical Company

Fitzgerald Formliners

My Rez
18 Story student residence for Off Campus
Location – 181 Lester St., Waterloo, Ontario

Notes

Family owned. Professionally run.