



The Revolutionary Stay-in-Place
Concrete Wall Formwork

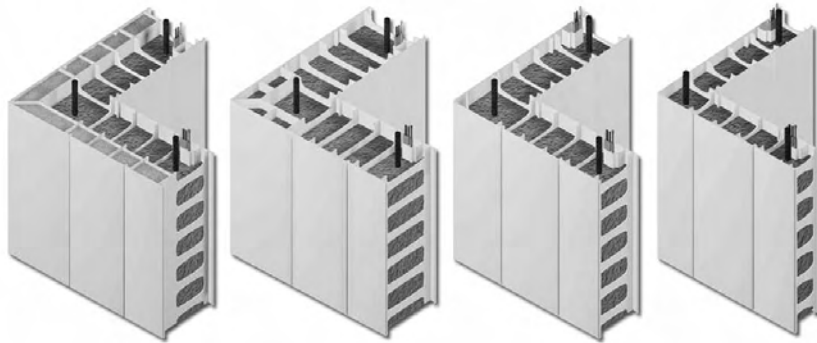
Construction Guide

Non-Bearing Walls



Version 1.0





Building Solutions for a Better World...

Welcome to the world of Nuform Building Technologies Inc., an innovative quality-driven building technologies company. Since the introduction of Conform (formerly Royal Building Systems) in 1992, the product has received global recognition for its approach in providing an innovative solution to the construction industry.

Conform is a patented polymer-based stay-in-place formwork for concrete walls. The extruded components slide and interconnect together to create a concrete formwork. The result is permanent, attractive, and pre-finished concrete walls that can be easily constructed in any climate.

Conform provides flexibility of design, whether you are building a home or a large industrial complex.

The polymer components of Conform will not decay or deteriorate over a lifespan that can be measured in decades. Conform requires no painting, and resists ultraviolet radiation. Furthermore, Conform is highly durable, virtually maintenance free, impervious to weather, and extremely energy efficient.

Conform is also environmentally friendly as the polymer components are recyclable, energy efficient, and non-toxic.

Put it all together, and you can see that Conform offers complete design flexibility and an innovative building product that is easy to maintain, friendly to the environment, and built to last. Whether you are a developer, contractor, architect, engineer, or designer you can find attractive and cost effective solutions for your next project with Conform.

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1. Introduction

This Construction Guide has been prepared by Nuform Building Technologies Inc. (Nuform) to assist contractors, engineers and architects in the understanding of the construction procedures for non-bearing walls using Conform. It is a part of our continuing effort to provide current and practical information to the users of Conform.

The Construction Guide for Non-Bearing Walls provides information on the following aspects of construction using Conform:

- Project Organization
- Wall Materials
- Equipment
- Site Preparation
- Building Preparations
- Safety
- Wall Erection
- Concrete Work
- Clean-Up
- Finishing

In addition to this Construction Guide for Non-Bearing Walls, the following guides are also available to assist in designing and building your projects using Conform:

- Technical Guide
- Design Guide
- Engineering Guide
- Construction Guide
- Finishing, Maintenance and Repair Guide

Although every effort has been made to ensure that all the information provided in the Construction Guide for Non-Bearing Walls is factual and consistent with good construction practice, Nuform does not assume any liability for errors or oversights resulting from the use of information contained in this guide. Anyone making use of the information provided in these guides assumes all liability arising from such use.



1.0 Non-Bearing Wall Project

2. Project Organization

2.1 Planning

The planning and preparation of the site, materials, equipment and related trades greatly affects the erection and economy of walls with Conform. It cannot be overstated how important it is to have all activities prepared and coordinated prior to starting erection of

Conform. Only if all activities are pre-planned and organized can the wall be erected in an efficient and economical manner. The system of sliding panels together is so simple and easy that any difficulties with any other aspect of the work can greatly hamper and delay the wall erection.



2.0 Completed Non-Bearing Wall Project

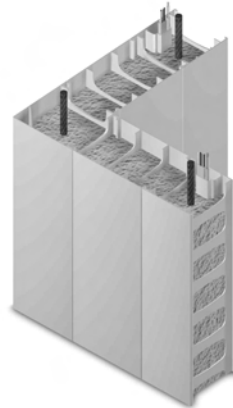
3. Wall Materials

3.1 Conform Polymer Components

1. All of the Conform polymer components are indicated on the Shipping List and on the Erection Drawings.
2. An assortment of components is supplied individually to allow for adjustment of the wall length at the end of long walls, adjacent to corners, adjacent to doors and windows and adjacent to expansion joints. The components are used to suit the site dimensions.
3. Typically for walls that are over 6500 mm (21') high, the boxes and panels are provided in two or more sections. The joints in the boxes and panels are staggered near mid height. The staggered joint is typically 1500 mm (5') long and shall not be less than 1000 mm (3' 4"). The longest lengths of panels and the shortest lengths of boxes are placed at the bottom of the walls. The horizontal joints in the polymer forms do not affect the concrete pour and concrete remains monolithic. The joints are usually concealed with an architectural, "multi-storey" band.
4. To avoid delays during erection, spare individual pieces are ordered to suit the project size, the project schedule, the site proximity to the manufacturing facility, and the potential for damage on site and the potential for site modifications. The spare pieces include box connectors, panels (P232, P182, P093), spacers (S068 and S049) and box joiners. The quantity and type of spare pieces shall be discussed with a Nuform representative to suit each specific project.
5. For large projects, the wall sections are pre-assembled at the manufacturing facility. Typically, the width of pre-assembled sections is 2233 mm (7' 4") to suit shipping and handling. For wall sections with staggered joints, the members are screwed together to allow lifting from one end.

3.2 Concrete Mix

1. The concrete mix design and selection of aggregates shall provide a mix that will easily flow through the coring without vibration and shall minimize the fluid pressure on the face of the wall components. Typically, the following pump mix is used.
 - Minimum 28-day compressive strength of 20 MPa (3000 psi) or 25 MPa (3500 psi) for freeze-thaw conditions
 - Water to cement ratio of 0.55 maximum
 - Maximum aggregate size of 10 mm (3/8") such as pea gravel
 - Slump of 100 mm (4") to 125 mm (5") at the point of discharge
 - Water reducing admixture
 - Air entrainment of 5-7% for freeze-thaw conditions



CF6 (6", 150mm)



CF8i (8", 200mm)

2. Concrete does not segregate in the walls due to the inner webs of the Conform components, which create small cells that act like an “elephant trunk” and therefore prevent the free-fall of heavier aggregates.
3. Mechanical vibrators are not recommended for use in the walls since this may cause bowing and bulging of the wall faces. To ensure that there are no voids in the walls and that the concrete is well consolidated, the faces of the walls are tapped with rubber mallets.
4. Plastizers are not recommended since concrete placement is delayed in some areas and the time constraints of plastizers are not suitable.
5. The quantity of concrete is calculated based on the wall area and shall be adjusted for wall openings, wastage and specific project conditions. The theoretical quantities of concrete for various Conform components are shown in Table 3.2 (Imperial units) and Table 3.1 (Metric units).

Table 3.1: Concrete Take-off (Metric Units)

	CF6	CF8i
	Square Metre of Wall Area	
Per Cubic Metre of Concrete	7.2 m ²	7.5 m ²
	Cubic Metre of Concrete	
	Per Square Metre of Wall Area	0.1385 m ³

Table 3.2: Concrete Take-off (Imperial Units)

	CF6	CF8i
	Square Foot of Wall Area	
Per Cubic Foot of Concrete	59 ft ²	61 ft ²
	Cubic Yard of Concrete	
	Per Square Yard of Wall Area	0.0169 yd ³

3.3 Reinforcing Steel Bars

1. The size and spacing of steel reinforcing bars are selected to suit the structural design requirements.
2. 15 M (#5) bars are the smallest recommended bar to maintain alignment of the bar within the wall. Typically, the bars are placed in the box connectors since this is the largest cell for placement of concrete around the bar.
3. Wire hoops are tack-welded or tied with tie wire to the vertical bars to align the bars in the cells of the wall components. The wire hoops are located at 3000 mm (10') on center maximum, with a minimum of two hoops per bar.

3.4 Fasteners, Bracing, Caulking

1. The following fasteners are required:
 - 1/4"φ x 3" screws with flanged hex head
 - 1/4"φ x 1 1/2" screws with flanged hex head
 - 1/4"φ x 1 1/4" concrete screws (Tapcon)
 - 3 1/2" common nails
2. The bracing materials are:
 - Nominal 50 mm (2") lumber members in lengths to suit
 - Aluminum beams
 - Adjustable jacks
 - Formwork C-Clamps
3. Oxime Neutral Cure Silicone sealant (Refer to Finishing, Maintenance and Repair Guide).

4. Equipment

4.1 Hand Tools

The hand tools used on most projects:

- Measuring Tapes (7.5m/25') and (30m/100')
- 100' Chalk Reel & Chalk
- 48" Aluminum Hand Level
- 20 oz Claw Hammers
- 28 oz White Rubber Mallets
- 20 lb Sledge Hammer
- Utility Knife and Blades
- 24" Carpenter's Hand Saw (Crosscut, 10 TPI)
- Screwdriver Sets (Slot, Phillips, Robertson)
- 3/4" x 8" Concrete Chisel
- 7" Wire Cutters
- 8" Linesman Pliers
- 8" Aluminum Hand Trowel
- Caulking gun
- Pry bar
- 2" Putty Knives
- First Aid Kit
- Surveyor's Level
- Surveyor's Laser Transit
- 20" x 14" Carpenter's Clamps

4.2 Power Tools

The power tools required on most projects:

- 3/8" Cordless Drill Kits and Spare Batteries (14.4V min.)
- Extension Cords and Power Bars
- Magnetic, 6" Round Shaft, Driver Bits (Phillips, Robertson #1 & #2, Socket)
- 1-1/2" Rotary Hammer Drill (for dowels)
- Concrete Drill Bits (3/16", 3/4", 1")
- 7-1/4" or 8" Circular Saw (60 Teeth Blades)
- Reciprocating Saw (14 TPI x 8" Blades)
- 12" or 14" Gas Powered Quick Cut Saw (Metal & Concrete Blades)
- 3000 psi Power Washer (with heater for hot water in winter)
- Gas Powered Generator (2500 watt)
- 10" or 12" Sliding Compound Mitre Saw (with 72 Teeth blades)

4.3 Erection Equipment

The erection equipment used on most projects:

- Aluminum Step Ladders (10' or 12')
- Concrete Funnel (CF6, CF8/8i)
- Push Brooms and Corn Brooms
- 6' Scraper
- Square Shovel
- Wheelbarrow
- Soft Bristle Brushes for Washing
- 100' Garden Hose with Spray Nozzle
- Extension Ladder (20' or 30')
- 3/8" x 250' Rope
- Strapping Equipment and Strapping Refills
- Lifting Bar (15/16"Ø x 9' smooth bar)
- Lifting Chains (2 hooks and 8' chains)

4.4 Construction Equipment

The construction equipment used on most projects:

- 34 m Concrete Pump with 3" or 4" reducer and S-bend
- Scissors Lift (40' platform)
- Telescopic-Boom Lift (60' arm) or a second Scissors Lift
- Telescopic Fork Lift (40' arm)
- Boom Truck (1200 lb capacity at 70')
- MIG Welder with electrodes, mask and gloves

5. Site Preparations

5.1 Site Grading and Access

1. The ground at the exterior and interior of the building shall be graded to a level surface for equipment access during erection of the walls. Typically, the ground is graded to the finished sub-base elevation specified for the exterior paving and the interior floor slab, but not higher than 150 mm (6") below the top of the foundation wall.

2. The ground is graded level for at least 6 m (20') wide at the exterior and interior side of the foundation wall. In the case of panelized walls, the width at the exterior side of the foundation wall is increased to 15 m (50'). This is to allow access for a scissor lift or telescopic boom 4.5 m (15'), a crane to lift the panels 6 m (20') and trucks to deliver the panels 4.5 m (15').

5.2 Material Storage

1. A secure area is required on site for storage of all material and equipment. The size of the area depends on the size of the project, the delivery schedule for material and the equipment being used for erection.

2. The individual components are stacked on sleepers, or skids and are covered as required to keep them clean. The components are organized by location on the building, by component type and by component length. All similar components shall be stacked in neat piles.

When practical, a separate pile shall be created for each different length of each component.

3. The panelized walls are left on the trailers until erected and the trailers are organized in sequence of wall erection.

4. A storage and work area at least 3 m (10') wide is required around the perimeter of the roof. Skids of individual components are placed and stored on the roof as required for erection of the upper section of the wall or the gaps between the panelized walls. The skids may contain up to 45 boxes or 30 panels and can weigh up to 450 kg/skid (1000 lbs/skid).

5.3 Electrical Power

Portable generators are required for site power in order to provide accessibility at all walls and to minimize the extension cords.

5.4 Water Supply

Water truck with hoses and washing nozzles are required for cleaning the walls during concrete placement. For small projects, a portable power washer is sufficient. Power washers are 3000 psi and hot water is used in cold weather.

6. Building Preparations

6.1 Foundation Walls

1. All foundation walls are constructed prior to start of the Conform erection.

2. The foundation walls shall be straight and within 6 mm (1/4") of the specified plan location with respect to the structural steel framing.

3. The top of the foundation walls are finished with a wood float and shall be level ± 3 mm in 3000 mm (1/8"

in 10' and within 6 mm (1/4") of the specified elevation. The top of the foundation walls shall be clean of debris and loose concrete. All ice or snow shall be removed.

4. It is highly recommended that the top of the foundation wall be 100 mm (4") lower than the finished surface of the floor slab. This will effectively eliminate any potential for water penetration at the wall/slab interface.

6.2 Wall Dowels

1. Dowels are installed during the construction of the foundations, as noted on the Conform shop drawings. The dowels are either tied in place prior to pouring the concrete for the foundation walls or placed in the concrete as it is poured.
2. The dowels shall be located within 25 mm (1") of the center of box connectors and panels.
3. The dowels at each side of door openings are critical and shall be accurately located.
4. Dowels that are missing or incorrectly located are site drilled and epoxy grouted into the foundation wall, with a minimum embedment depth of 200 mm (8").



6.2 Footings with Dowels

6.3 Structural Steel Framing

1. The layout for the inside face of Conform is indicated on the foundation wall, prior to erection of the girts and the perimeter roof angle. If desired, the temporary angle at the base of the wall can be installed during the structural steel erection.
2. All girts are shipped loose and erected on site to be plumb and aligned with the inside face of Conform. Girts with bolted connections require slotted holes for adjustment of girt.
3. All perimeter roof angles are shipped loose and erected on site to be plumb and aligned with the layout for the back of Conform and the girts.
4. All overhead door frames are erected, prior to start of the wall erection and are braced with temporary angles connected to the girts, roof beams or columns.



6.3a Structural Steel Framing

5. The steel roof deck is erected and fastened to the structural steel framing, prior to starting erection of Conform.

6. When painting or spray fireproofing of the structural steel is required, it is suggested that this work be completed for the exterior members, prior to starting the erection of Conform.



6.3b Structural Steel Framing

6.4 Roofing

If required, the roofing or roof membrane can be installed prior to the wall erection, but shall stop at least 400 mm (16") from the back of the wall so that the connections for Conform can be installed. The perimeter roofing and cants are installed after the wall erection is completed.



6.4 Roofing

7. Safety

7.1 Workmen

1. All workmen shall follow standard construction safety procedures to operate all equipment and tools and to perform all work.
2. Workmen shall not travel or work below any wall sections or components that are lifted overhead by a crane or workmen.
3. Workmen wear construction gloves to handle the Conform material. The edges of the coring and the ends of the components are hazardous.

4. **The components must not be held through the coring when slid together.** The coring in the webs creates a sharp shear as the components are slid together and can cause serious injury.
5. Workmen working off the ground or on elevated platforms must wear the appropriate safety harnesses.

7.2 Safety Cables

1. Steel anchor posts are supplied and installed to the structural steel of the roof in order to connect a safety cable. Alternatively, provide sleeves in roof for connection of cable directly to structural steel framing. Holes cut in the roof deck and roofing to install the anchor posts are patched by others.
2. A safety cable is required continuously around the perimeter of the roof at 3 m (10') from the back of the wall. This is for connection of the safety harness of the workmen on the roof.

7.3 Weather Conditions

1. Conform is not affected by weather conditions. However, long components or pre-assembled panels are not erected in adverse weather conditions for safety reasons. Short walls or sill walls can be erected in any weather condition.

2. Conform must not be erected in high winds since the components and wall sections cannot be handled safely by the workmen.

3. The walls are not erected in icy or snowy conditions where the workmen have poor footing conditions.

4. The appropriate lateral bracing for stability and wind conditions must be installed as the Conform components are erected. The lateral bracing must remain in place until the concrete is cured and the permanent bracing or structural framing is attached.



7.2 Safety Cables

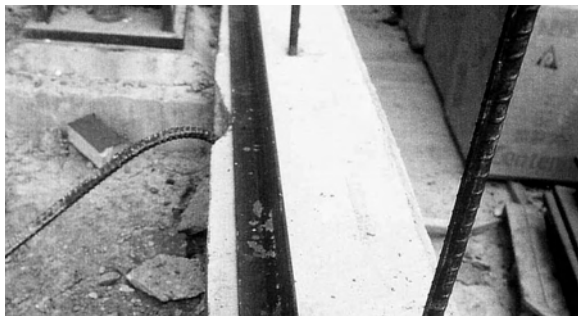
8. Wall Erection

8.1 Layout

1. The location of the foundation wall is verified with respect to the structural steel framing. The elevation and levelness of the top of the foundation wall is verified to ensure that the wall height is correct.
2. The back face of Conform is measured and marked on the top of the foundation wall. The location of the back face of wall is verified to ensure that it is plumb with face of girts and the face of the edge angle at the roof.
3. Each side of all openings is measured and marked on the top of the foundation wall
4. Vertical alignment is determined and plumb lines are marked on the foundation walls, girts and roof at approximately 5 m (15') on center and at each side of each door or window.

8.2 Foundation Angle

The temporary foundation angle is installed on top of the foundation wall to suit the layout for the back face of Conform and the angle is anchored to the foundation wall with concrete screws (Tapcon). The angle location is verified to ensure that it aligns with the face of the girt and the roof. The top of the foundation wall is brushed clean prior to installing the angle.



8.2 Foundation Angle

8.3 Erection Procedures – General

1. Conform shall be erected by trained and experienced concrete installers. A Nuform representative shall be on site to review procedures during initial projects.
2. Typically, the erection crew is composed of 6 workmen and a foreman. In addition, truck drivers, crane operator and concrete pump operator are required.
3. Any dirt, loose concrete, ice or snow on top of the foundation walls is removed prior to erecting the walls, using brooms and propane heaters
4. Erection of wall components typically starts at a corner. The corner is checked to ensure that it is plumb prior to the start of erection.
5. Erection proceeds along the wall to the next corner by sliding adjacent pre-assembled sections together. The wall sections are anchored to the foundation angle, girts and roof angle as they are erected.
6. The plumb of the joints between components is monitored as the wall is erected. Temperature changes can affect the established plumb lines due to thermal expansion or contraction of the steel framing. The plumb lines previously marked on the foundation wall, girt and roof shall be verified at the start of each day. The plumb of previously erected walls shall be verified at the start of each day prior to continuing with the erection since the wall or the structural steel framing can move due to temperature changes.
7. If a panel is not plumb it is necessary to push or pull the panel as it is erected to maintain plumb wall joints at all times. Each and every panel shall be checked for plumb as it is erected.
8. If a wall panel is not plumb after erection it shall be corrected immediately. With the lifting slings in place, it is possible to adjust the wall by removing the screws at the roof and girt and reinstalling the screws at an angle in the direction that will pull the wall plumb.
9. High temperatures or low temperatures will affect the horizontal length of the walls. The wall length will vary 5.8 mm in 10 m for each 10°C (0.384" in 50' for each 20°F) variation in temperature. The drawing dimensions are calculated at 20°C (68°F) (Refer to Construction Bulletin #1).
10. The cleanliness of the components and specifically the box connector leg and panel groove will affect the sliding of the panels. The components shall be kept clean and any obvious dirt wiped away.
11. If difficulty is encountered in sliding the components, the joints shall be lubricated by spraying the leg or groove with a vinyl protectant (Armor-All). If the components are difficult to slide they are hit at the top with a sledge hammer, but using a wood block to protect the end of the component. Excessive force shall not be used with the hammer or the components will break or chip. Use sufficient force to achieve a 25 mm to 50 mm (1" to 2") drop per blow (Refer to Construction Bulletin #2).

8.4 Individual Components

Individual pieces, that connect the pre-assembled wall sections together, are handled by a workman at the top and midway of each component. The components are lifted by the top workman and guided together by the lower workman. Both workmen slide the components down as required.



8.4 Individual Components

8.5 Pre-assembled Walls

1. Pre-assembled wall sections must be inspected prior to lifting to ensure that all components are fastened with screws to each other and especially that the lower components below a staggered joint are connected to the upper components that will contain the hoisting bar. Unconnected pieces will slide apart during lifting.



8.5a Pre-assembled Walls

2. Prior to lifting, all dirt or ice is removed from the side joints of the wall section and the joint is lubricated if required.
3. A 25 mm (1") diameter hoisting bar is placed in the second or third core from the top of the wall section.
4. Slings are connected to the hoisting bar at approximately 375 mm (15") from each side of the wall section.
5. Two 7.5 m (25') long ropes are connected to the bottom corners of the wall section prior to lifting and are held by workmen at all times.
6. Workmen shall never walk under a wall section lifted by the crane.

7. The wall sections are shipped with wood strapping or strips of padding between the sections and the panels are lifted from the truck to prevent scrapping of the panel faces.



8.5b Pre-assembled Wall Sections

8. A 104 mm (4 1/8") wood spacer is placed adjacent to the previously erected wall to provide the appropriate space for a box connector between the panels at each side of the pre-assembled wall sections.

9. The wall sections are lifted adjacent to the dowels in the foundation. If the dowels will interfere with the webs of the components, the dowels are bent a minimum of 12 mm (1/2") away from the webs to allow for final adjustment of the wall section. The wall section shall be lifted away from the foundation prior to workers bending the dowels.

10. Workmen shall never place their hands between a wall section and a dowel or between two wall sections. A sudden gust of wind will move the wall sections in an unexpected manner.

11. The wall section is lifted above the dowels and lowered into the correct position adjacent to the foundation angle on the foundation wall.

12. The box connector and/or panel components are installed between the erected wall section and the adjacent wall. For a wall section without a lap joint, a full height box connector is installed. For a wall section with a finger joint, the lower part of the wall is joined with a box connector and the upper part of the wall is joined with a panel, a box connector and another panel. The connecting components are installed using a scissors lift and/or from the steel roof deck.

13. For ease of erection, the wall shall be temporarily connected to the structural steel angles and foundation angle with 25 mm (1") diameter washers and 6 mm (1/4") screws at 1333 mm (4' - 4") on center. The washer is clipped over the top of the leg of the angles and the screws are used to pull the wall tight to the angle prior to installation of the permanent anchor screws.

14. After the erection of a large portion of wall is completed and permanently anchored to the structural steel, the exposed screws on the faces of the wall, that were used to secure the components to each other at a staggered joint, are removed. In special cases it will be necessary to remove these screws to plumb the wall components, during erection.

8.6 Erection Sequence

1. The first wall sections or components are erected adjacent to a corner and are connected with the corner box connector.

2. The first wall sections or components are connected to the structural steel framing and the foundation angle.



8.5c Pre-assembled Walls

3. The following wall sections or components are erected and anchored consecutively around the building to enclose the required space, completely.

4. The slings and hoisting bar are removed from a pre-assembled wall section, only after the permanent anchors are installed or sufficient temporary anchors are installed.



8.5d Pre-assembled Walls

8.7 Wall Length

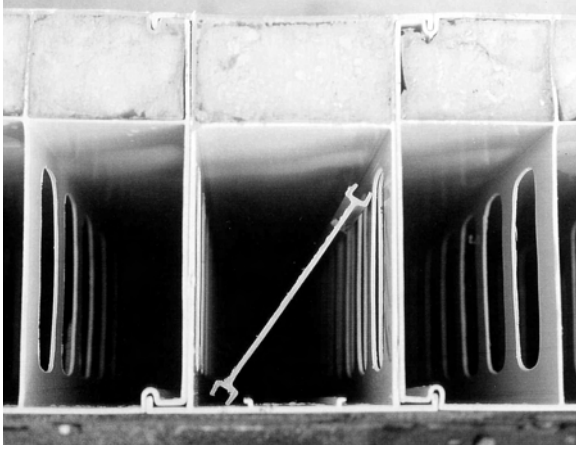
1. As the wall sections and components are erected, they are pushed or pulled as required to keep the joints plumb and the wall length as accurate as possible to the component design length.

2. When the erection is within approximately 2.5 m (8') of a corner or large opening, the wall length remaining shall be measured and verified with the supplied components or wall sections.

3. The components or wall sections are adjusted adjacent to corners or large openings using spacers and small panels to suit the required dimensions (Refer to Construction Bulletin #3).

8.8 Control Joints

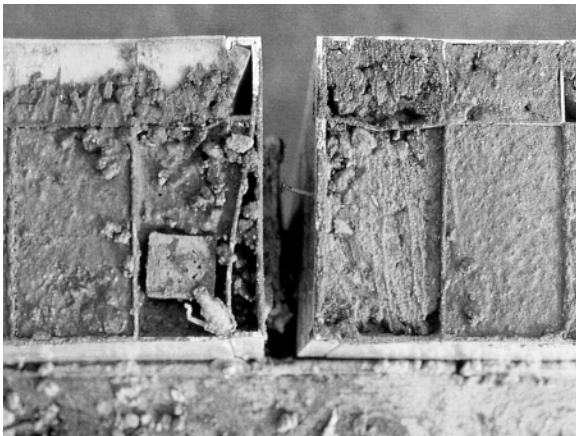
As the walls are erected, provide crack control joints at approximately 9 m (30') on center. The control joints shall be constructed by installing an uncored box joiner in a cored box connector or panel or by installing an uncored box connector.



8.8 Control Joints

8.9 Expansion Joints

Expansion joints are provided to match the expansion joints in the structural framing. A rigid board is placed between the components at an expansion joint. If the wall construction stops an expansion joint, the wall is rigidly braced to prevent bowing.



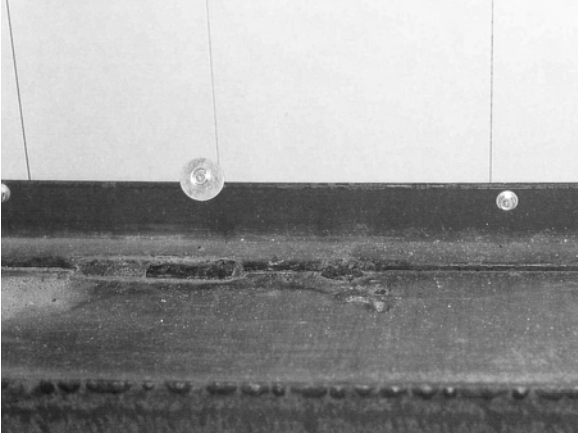
8.9a Expansion Joints

8.10 Anchors

1. The wall sections or components are connected to foundation angle as the wall is erected.
2. The wall sections and components are connected to the structural steel framing at the roof, girts and floor framing.
3. The connection is with 6 mm ϕ x 76 mm (1/4" ϕ x 3") flanged, hexhead screws at 400 mm (16") on center maximum. The connection to roof framing and floor framing is at slotted holes to accommodate the deflection of the steel members.



8.10a Anchors



8.10b Anchors



8.10c Anchors

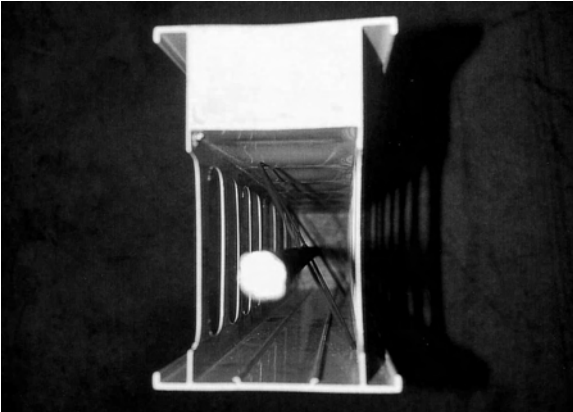
9. Concrete Work

9.1 Reinforcing Steel Bars

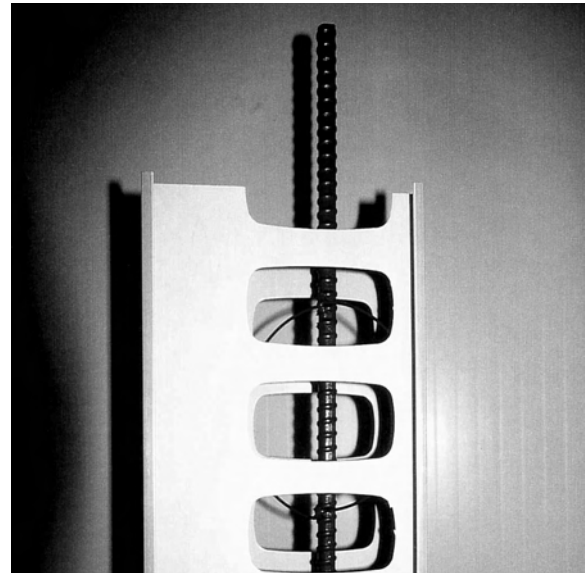
1. Vertical and horizontal reinforcing steel bars are installed in the components as the wall erection progresses and prior to placement of any concrete.

2. Wire hoops are welded to the vertical bars to provide the correct location for the reinforcement, typically at the centerline of the wall. The bars are placed in the box connectors or in the center cell of the panels.

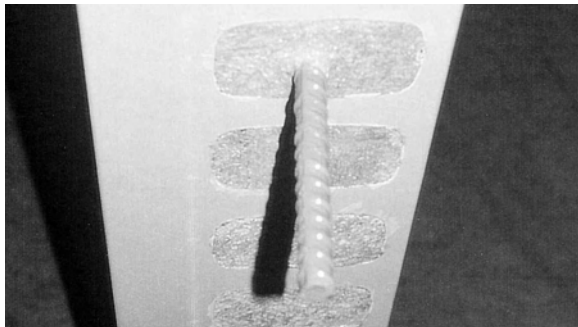
3. Horizontal bars up to 4 m (13') long are placed in the web coring of the Conform components. The horizontal steel is placed as a multiple of the web coring, which is at 83.33 mm (3 1/4") on center. The horizontal bars are lapped as required.



9.1a Reinforcing Steel Bars



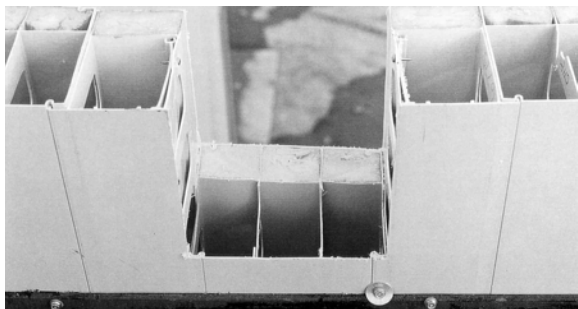
9.1b Reinforcing Steel Bars



9.1b Reinforcing Steel Bars

9.2 Openings

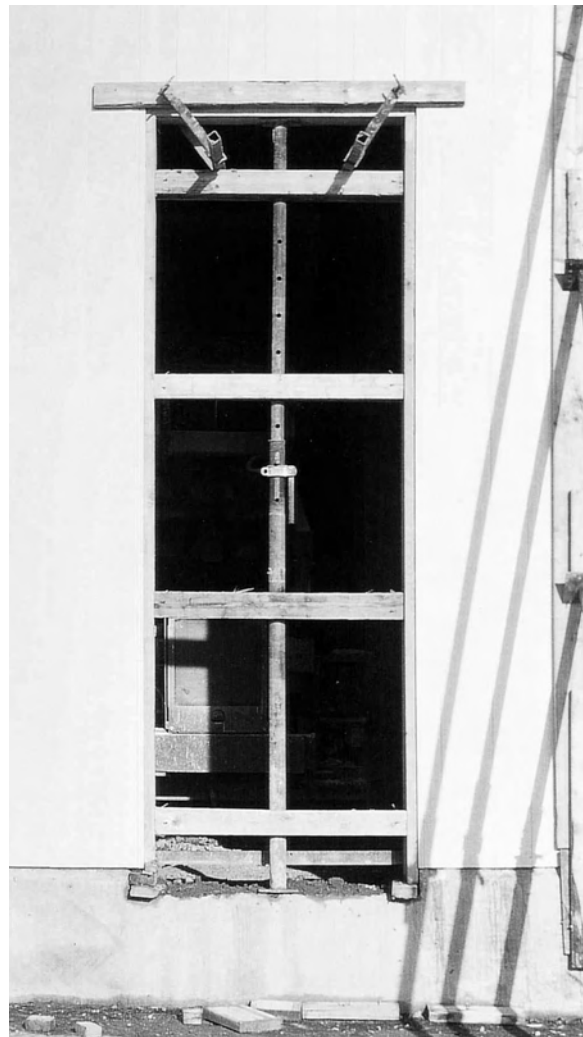
1. The components or wall sections are pre-fabricated to the dimensions of openings at man doors with hollow metal frames.
2. Openings for overhead doors are provided using a bent steel plate supplied with the structural steel. The bent steel plate is erected and temporarily braced to the structural steel. The wall components or sections at each side of the opening are pushed horizontally into the steel plate at each side and the header members are lifted and slide into the side components.
3. The components or wall sections are pre-fabricated to the dimensions of windows. The jambs and header of the opening are formed with wood or the basic frame component.
4. Small openings and sleeves for mechanical, plumbing services and roof scuppers are pre-cut or site cut as required.



9.2 Openings

9.3 Wall Bracing & Formwork

1. All openings shall be braced at the jambs and the header to prevent bowing. All door headers shall be clamped to the bent steel plate frame at overhead doors to secure wall in place. Wood or steel framing is required to brace the openings.



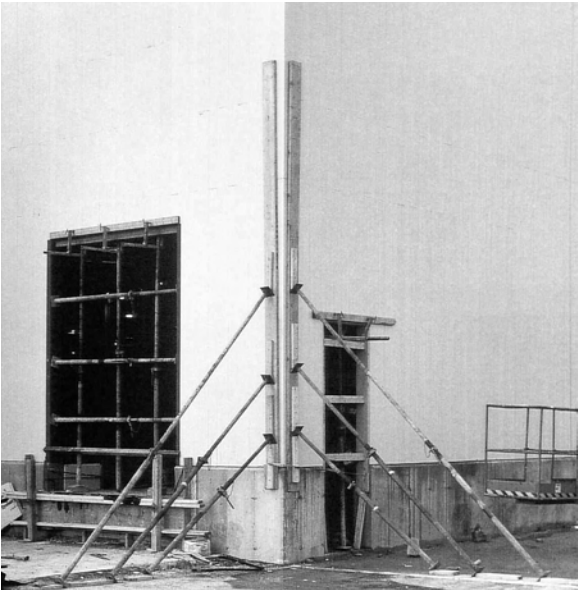
9.3a Wall Bracing & Formwork

2. Inside corners require forming and bracing to prevent the end from curving. The face of the wall shall be formed on the exterior or reinforced with a metal sheet placed inside, adjacent to the inside face of the exposed corners.



9.3b Wall Bracing & Formwork

3. The ends of walls or the two sides of corners require rakers for 5 m (16') minimum height.



9.3c Wall Bracing & Formwork

4. Openings within 2.5 m (8') of a corner or end of a wall shall have the opening and the corner or end tied together or braced to maintain the dimension of the wall and to prevent bowing.

5. Openings within 2.5 m (8') of each other shall be tied together to maintain the dimension of the wall between the openings.

9.4 Concrete Placement

1. Typically, concrete is placed by hose from a concrete pump truck. The hose shall have a reducer to 75 mm – 100 mm (3" – 4") maximum at discharge and an S-bend at the end. A quick shut-off valve at the point of discharge is also recommended. Use an elephant trunk to reduce the pressure if an S-bend is not available.



9.4a Concrete Placement

2. The Conform wall chute is recommended to minimize spillage on the face of the wall.



9.4b Concrete Placement

3. Direct visual contact is required between the concrete placers and the pump operator to control the flow and placement of concrete.

4. Vibration of the concrete is usually not required but if voids are suspected, use a rubber mallet to tap the face of the wall and remove any air pockets.

5. Mechanical vibrators are not recommended and will cause deformation of the face of the wall.

6. There shall be no ice or snow within the components when placing concrete into the walls. Remove any ice or snow by using hot water immediately prior to placing the concrete.

7. The placement of concrete will cause the wall to move laterally if large variations in concrete height are created. Use small lifts of 1.5 m to 1.8 m (5' to 6') at one time until the concrete achieves some initial set.

8. Concrete is placed using the pump at slowest speed at all piers, corners and ends of walls that are tied or braced to prevent lateral bowing.

9. Prior to filling the lower half of the wall in a uniform manner the following areas shall be completed first using the pump at slowest speed and allowing the concrete to achieve an initial set.

- First, fill all headers that will place weight on jambs to prevent movement of jambs, 2 m (7') maximum.
- Window sills (pour up to full height, 2 m (7') maximum)
- Corners (pour up to 1/4 height, 2 m (7') maximum)
- Door jambs (pour up to 1/2 height, 2 m (7') maximum)

10. Prior to filling the upper half of the wall in a uniform manner the following areas shall be poured first using the pump at slowest speed and allowing the concrete to achieve an initial set.

- Corners (pour up to 3/4 height)
- Door jambs (pour up to header)

11. Continuous visual inspection for vertical alignment and plumb is required at both the inside and outside of the walls during any concrete placement. The pour shall be stopped in any areas that start to move and continued only after the concrete has an initial set.

12. Continuous visual inspection for blow-outs is required at both the inside and outside of the walls during any concrete placement. Wood formwork and rakers shall be ready to provide temporary bracing for any problem areas that develop.

13. The top of the concrete is screeded level with the top of the components and provided with a wood float finish.

9.5 Inserts

1. Plastic fixing blocks are installed for wall caps while the concrete is wet.

2. Cast-in-anchors, if required, are installed in the top of the wall, while the concrete is wet.



9.4c Concrete Placement

10. Clean-Up

10.1 Washing

1. The walls shall be cleaned on the interior and exterior face of the walls, using a power washer, as the concrete is poured. The power washer shall be operated from a scissors lift or zoom-boom. The workmen will perform the visual inspections of the wall as the washing is done.

2. It is recommended that the slurry shall not be left on the wall for more than 30 minutes after concrete placement, since it will be more difficult to remove. Difficult to clean areas and small areas shall be cleaned using a hose and broom.

10.2 Temporary Angle

1. It is recommended that the screws for the temporary angle be removed as soon as possible.

2. The temporary angle on the foundation wall shall be removed and stored off-site for future projects.

10.3 Patching

1. Any surface damage during construction or any small holes are patched with a Bondo Patch Kit and are painted to match the wall colour. Contact your Nuform representative for specific instructions (Refer to Construction Bulletin #7 & #20).

2. Any large holes or blow-outs are patched by cutting out the face of the wall, repairing the concrete and installing a new facing. The new facing is cut from spare components and secured to the original facing with a PVC glue. The Bondo Patch Kit and paint are used to repair the joint as required.

3. The faces of the walls are wiped with a damp clean cloth to remove any surface dirt. An approved cleaner is used to remove any difficult to remove marks or stains.

10.4 Clean-Up

1. The spare or extra components are cleaned and stored off-site for future projects.

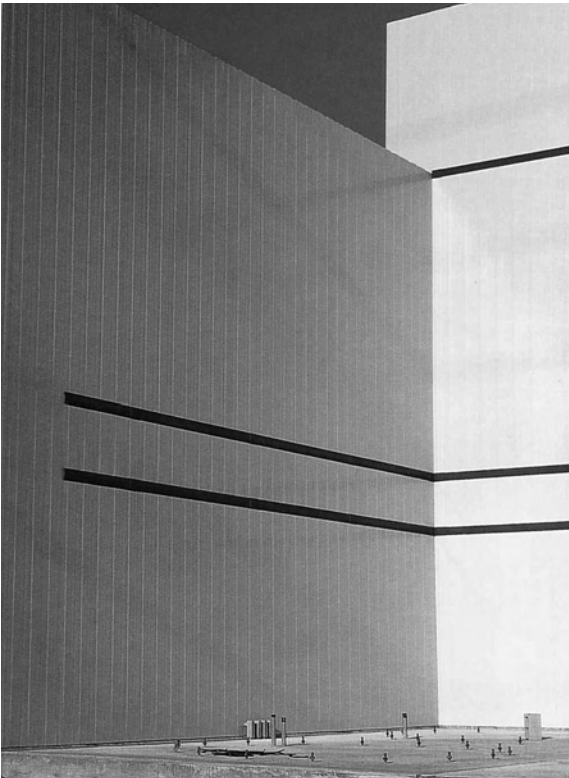


10.4 Clean-Up

11. Finishing

11.1 Multi-storey Band

1. A multi-storey band is installed to cover the staggered joints or as an architectural feature. The band is installed in lengths of approximately 2 m to 3 m (6'-8" to 10') long with a 25 mm (1") gap between the pieces.



11.1 Multi-storey Band

2. The band is fastened to the wall with #6 x 5/8" flat top, shoulder, stainless steel screws in 38 mm (1 1/2") slotted holes at 400 mm (16") on center maximum. The screws should be slightly loose to allow the band to move with thermal expansion.

3. A multi-storey band channel cap is snapped into the center of the band to cover the screws.

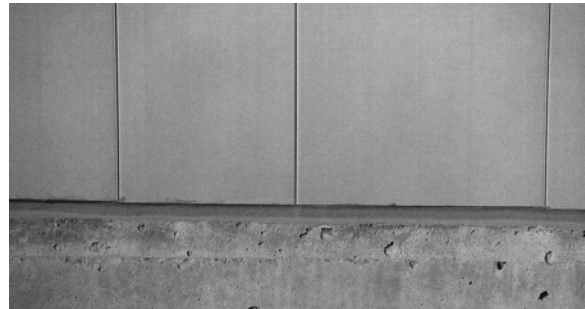
4. A multi-storey band joint cover that is 200 mm (8") long is snapped over the band to cover the joints and secured to one side with silicone sealant. The multi-storey band is scored with a knife or heated with a heat gun and bent around the corners to cover the joints at the corners.

11.2 Caulking

1. When the base of the wall is below the finish floor, caulking is applied at the base of the wall, around the exterior perimeter, between the underside of the wall insulation and the top of the foundation wall. The caulking shall not prevent the joints between the box connectors and panels from draining to the exterior.

2. When the base of the wall is at the finish floor, caulking is applied at the base of the wall around the interior, between the inside face of the wall and finished floor. No caulking shall be applied on the exterior side of the wall.

3. Caulking is applied between the exterior face of the wall and the bent steel plate around the overhead doors.



11.2 Caulking

4. Caulking with backing rod is applied at expansion joints and at all control joints with other walls.

11.3 Parapet

At this stage, the perimeter roofing and cants are installed after the wall erection is completed. The roof is connected to the wall at the parapet such that thermal, air and vapour barrier continuity is maintained at the wall/roof junction.

11.4 Electrical

For non-bearing industrial application of Conform, the electrical wiring is surface-mounted, in the same manner as on conventional concrete or masonry walls.

Notes

We hope you found this guide informative while designing your project using Conform.

As always, our main goal at Nuform Building Technologies Inc. is to ensure that our valued customers are 100% satisfied with our service and with Conform. Should you have any questions or comments, we would like to hear from you. You may contact us at the following:

Please visit the Technical Resource Center section of our Web site at www.nuformdirect.com for the latest version of this guide. Please forward us any suggestions or comments for improving this guide. All suggestions for improvements will be given full consideration for future revisions.

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