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DC FORM INSTALLATION MANUAL

INTRODUCTION

DC INTERNATIONAL formworks are simple to construct. With this guide provides installation instructions and explains the numerous advantages of the DC FORM construction system. A separate section has been devoted to each step in order to help you plan your project and use DC FORM to construct homes or buildings in accordance with good building practice.

SAFETY AND LEGAL RESPONSABILITY

It is essential to understand clearly and to follow precisely the procedures and specifications described in this guide in order to avoid any possible accident and/or damage of the structure. The safety of all personnel involved in the construction project is dependant upon this understanding and the use of appropriate tools, equipment and the formwork system.

DC International Inc. is not responsible for any problem that may arise during or after the construction for not respecting the procedures and specifications of this guide, the substitution of materials, or the lack of safety standards.

It is mandatory to obtain the building permits from the local authorities prior to the construction of your project and to hire an architect and/or engineer to manage the whole construction process.

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1. TOOLS

1.1 Description of the basic tools required for the installation

- General-purpose knife
- Carpenter's hammer
- Various screwdrivers
- Wood chisel 20 mm (0.75 in.)
- Nivea level 60 mm (2 ft.)
- Chalk line
- Adjustable wrench
- Panel junction extractor
- Handsaw
- Hole saw
- Measuring tape

1.2 Description of the electric tools required for the installation

- Small grinder to cut light steel structure
- Cordless drill with assorted drills and bits
- Electric mitre saw, 30 cm (12 in.) to cut adjustment extrusions
- Percussion drill
- Jig saw
- Circle saw

1.3 Description of other equipment required for the installation

- Concrete pump
- Tooling for bracing doors and windows
- Level on tripod

2. COMPONENTS

2.1 Panels

	Code
▪ Flat panel 30x60 cm (12x24 in.)	FP-3060
▪ Flat panel 60x60 cm (24x24 in.)	FP-6060
▪ Embossed panel 60x60 cm (24x24 in.)	MP-6060
▪ Panel with pattern 60x60 cm (24x24 in.)	PP-6060
▪ Utility open panel 60x60 cm (24x24 in.)	OP-6060
▪ Interior corner 10x10 cm (4x4 in.)	CI-1010
▪ Exterior corner 20x20 cm (8x8 in.)	CE-2020
▪ Corner for adjustment panel (by 4)	CP-1010

2.2 Components

	Code
▪ Panel junction (shamrock)	J-100A
▪ Half panel junction (half-shamrock)	J-100B
▪ Spacer 10 cm (4 in.)	I-210A
▪ Half-spacer 10 cm (4 in.)	I-210B
▪ Adjustable spacer	I-210C
▪ Half-adjustable spacer	I-210D
▪ Spacer cap for I-210C for slab	MS-11
▪ Slab spacer	I-230
▪ Extension for 20 cm wall, (8 in.)	T-050
▪ Extension for 25 cm wall, (10 in.)	T-100
▪ Extension for 30 cm wall (12 in.)	T-150
▪ Waterproof plug	WP-100
▪ Fixing handle	H-100
▪ Adjustment profile for CP-1010, 5 m (16 ft.)	E-50100

2.3 Anchor system

	Code
▪ Threaded rod 25 cm (10 in.)	B-1225
▪ Threaded rod 30 cm (12 in.)	B-1230
▪ Threaded rod 40 cm (16 in.)	B-1240
▪ Plate 10 x 10 cm (4 x 4 in.)	B-1110
▪ Plate 7 x 10 cm (2½ x 4 in.)	B-1107
▪ Nut	B-1300
▪ Handle nut	B-3200
▪ Screwing flange	B-2700
▪ Wing nut	B-3900

2.4 Light steel structure

The light steel structure system retains the formwork panels at the good level and also supports the workers during the pouring of the concrete.

It has four main components: The horizontal channel, the vertical channel, the adjustable brace, and the platform bracket. Also joist anchors are used to support the temporary floor beams that hold the floor panels.

	Code
▪ Horizontal channel 3 m. (10 ft.)	A1200SW10PGC
▪ Vertical channel 3 m. (10 ft.)	A1200SW10PGC
▪ Brace and platform bracket 2.6 m. (8.6 ft.)	PB-2600
▪ Brace and platform bracket 3.0 m. (10 ft.)	PB-3000
▪ Joist anchor 10 x 20 x 70 m.	PB-1020

3. PREPARING THE SLAB

3.1 General specifications

The slab shall be built square, level, straight, smooth and with good quality concrete. Since soils vary considerably, the foundation plan should be approved by an architectural engineer who is authorized to practice where the building is being constructed.

3.2 Cleaning the slab

Before beginning construction, it is important to organize the site properly. The piles of excavation soil and the trenches resulting from the excavation must be levelled in order to permit easy circulation around the perimeter of the work area. The slab must be clean, dry and free of all debris and dust.

3.3 Laying out the walls

Trace the outline of the exterior walls so that they are square and centred on the slab. In order to ensure that the traced lines are square, the measurements must be checked once using the hypotenuse method.

Trace the position of the interior walls using the exterior walls as a measuring guide.

The reinforcing steel bars of the interior walls must be laid once the tracing of the walls is done and have to be anchored in the slab with a non-shrinkage compensating mortar or an epoxy mortar.

4. INSTALLING THE DC FORM FOR THE WALLS

4.1 First side of the wall

Install a few panels and attached them together. Attach the spacer I-210A with the threaded rod to the panel junction J-100A and then bolt the spacer on the external side of the wall.

Install the light steel channel at the top and the middle level of the wall.

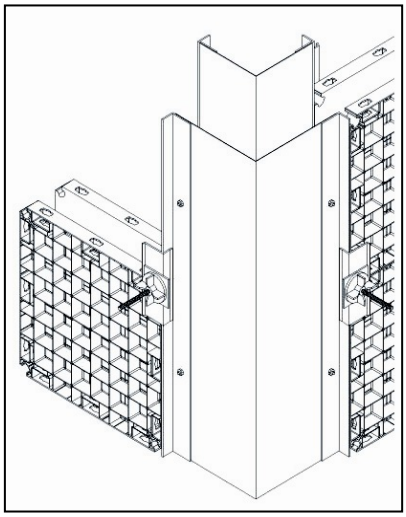
Attach the threaded rod to the horizontal channels. Install a vertical channel with adjustment brace at every 2 m (6 ft). Install the platform brackets on every vertical channel.

Note: The light steel structure can be replaced by regular 2'x4' wood studs. The wood supports have to be double with an opening between them to allow the installation of the threaded rods.

4.2 Corners

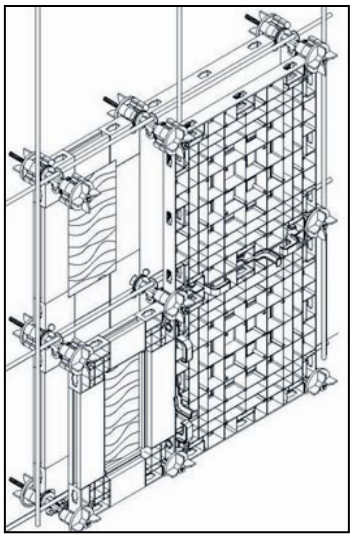
For corners and intersections of walls, it is possible to use either the moulded plastic panels or the steel corners. It is easier to use the plastic corners. However, the steel ones present an adjustment moving part that simplifies the installation, especially when the measurements are not exact.

Plastic corners: They are available in pre-established dimensions and are related to the thickness of the walls. Use interior corner CI-1010 and exterior corner CE-2020 to do a 90 degrees wall corner. Use also two panels CI-1010 in order to realize a wall intersection.



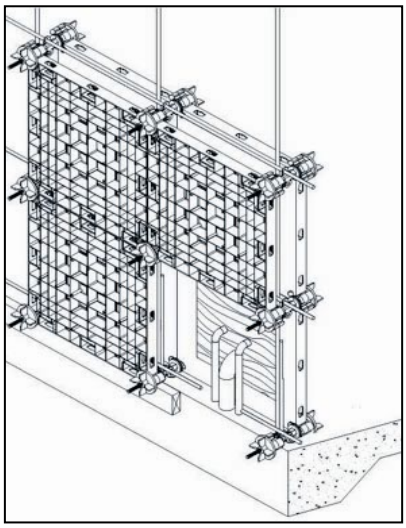
Steel corners: The corners are made of steel of gauge 14 with an adjustable angle prepared to receive the anchor bracket.

The brackets are attached to the panels with the threaded rod B-12 installed from one face of the wall to the other one and tightened in place with handle nuts B-3200.



4.3 Adjustment panels

To adapt the panels to the specific length of the walls it may be necessary to use the four separate panel corners (CP-1010) and the adjustment profiles E-50100.



Cut the profile to the proper length and insert the corners in their extremities.

The center of the panel has to be filled with a 20 mm (¾ in.) plywood sheet.

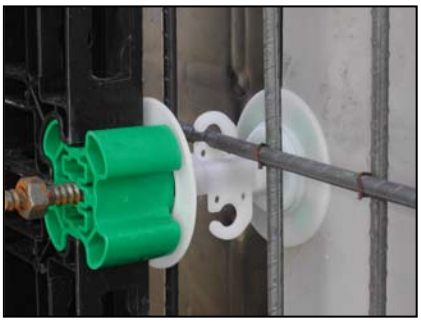
4.4 Utility panels

For electrical fixtures or plumbing fixtures or pipes use the utility panel. This panel (OP-6060) has an opening on its center ready to receive a 20 mm (¾ in.) plywood sheet.

Make all openings needed in this plywood sheet and replace afterwards.

4.5 Frames for doors and windows

Before putting in place the second side of the walls, install the window and door frames or templates. These frames can be attached at their final position by fixing them to the plastic spacer I-210 with screws.



4.6 Reinforcing bars

Install the vertical reinforcing bars and attach them to the reinforcing bars coming from the slab, according to the structural specifications.

Install the horizontal reinforcing bars on the spacer and attach them to the vertical bars.

4.7 Plumbing system

The plumbing equipment, faucets, washbasins, water closets and piping, used to build houses with the DC FORM system, are standard products which are available on the market and must conform to the applicable standards and codes. The piping for the potable water supply and for the drainage system should be installed in the floor slab before the concrete is poured.

It is strongly recommended to foresee openings in the slabs to be used as a mechanical shaft to install all plumbing pipes. Pipes can also be incorporated in the concrete walls before putting in place the second side of the concrete form.

4.8 Electrical system

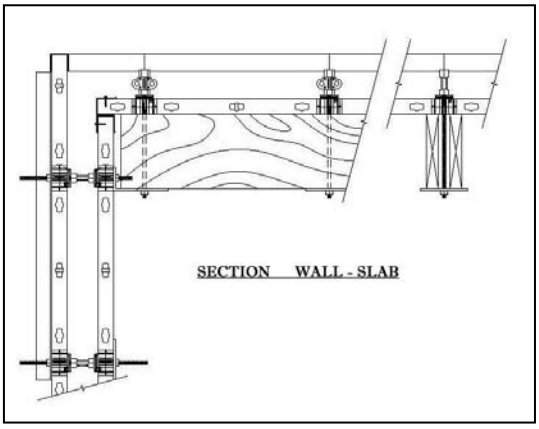
All the electric system can also be installed by placing the empty piping in the walls before closing them. Thereafter, the electric conduits could be installed and connected.

4.9 Second side of the wall

When all bars and piping are installed, close the walls by installing the other side of the form.

The panel junctions are installed on the threaded rods and the panels are slide to their final destination. Install the washer plates (B-1110) and screw the handle nuts. Install the corner panels.

5. INSTALLING THE FLOOR FORMING



5.1 Temporary floor structure

On the last threaded rod of the top of the wall, install tightly a beam bracket or a continuous steel angle ready to receive the temporary beams. These beams have to be designed by the engineer according to the dimensions of the slab.

The beams may be reduced by adding temporary intermediary posts. The beams have to be double with an opening between them to allow the installation of the threaded rods retaining the panels.

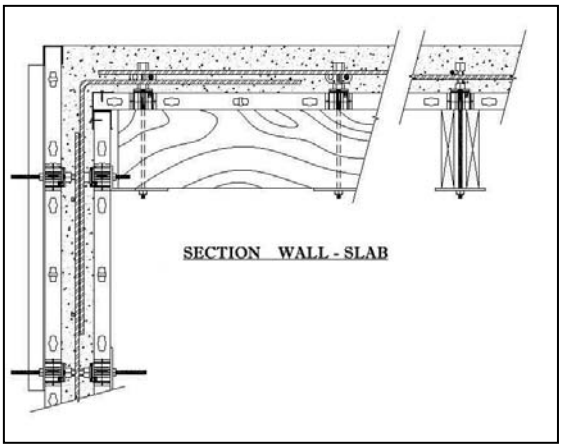
5.2 Panels and panel junctions

Place the panels and the panel junction on the double beams and insert the threaded rods with their slab spacer (I-230 or I-210C) through the beams. Plates (B-1110) and nuts have to be installed underneath the slab to attach all the forms together.

The slab spacer (1-210C) has to be covered with the spacer cap (MS-11) to prevent the concrete to be in contact with the threaded rods. After the pouring the threaded rod will be removed by underneath but the nut on top will stay in the concrete.

5.3 Adjustment panels

To adapt the panels to the required length of the walls it may be necessary to use the four separate panel corners (CP-1010) and the adjustment profiles (E-50100). Cut the profile to the proper length and insert the corners in their extremities. The center of the panel has to be filled with a 20 mm (¾ in.) plywood sheet.



5.4 Utility panels

For electrical fixtures or plumbing fixtures or pipes use the utility panel. This panel (OP-6060) has an opening on its center ready to receive a 20 mm (¾ in.) plywood sheet. Make all openings needed in this plywood sheet and replace afterwards.

5.5 Reinforcing bars

According to the structural specifications, place the reinforcing bars on the slab and support them by the slab spacer. Attach bars together as required by state of art.

5.6 Plumbing system

The plumbing equipment, faucets, washbasins, water closets and piping, used to build houses with the DC FORM system, are standard products which are available on the market and must conform to the applicable standards and codes. The piping for the potable water supply and for the drainage system should be installed in the floor slab before the concrete is poured.

It is strongly recommended to foresee openings in the slabs to be used as a mechanical shaft to install all plumbing pipes. Pipes can also be incorporated in the concrete walls before putting in place the second side of the concrete form.

5.7 Electrical system

All the electric system can be installed by placing empty piping directly on the floor forming. A minimum of 25 mm (1 in.) space is needed between the pipes and the panels.

6. POURING THE CONCRETE

The pouring of the concrete walls requires the use of motor-driven concrete mixers and preferably a concrete pump. The pump may be stationary or it may be supplied with a telescoping arm.

The hoses used for the pouring of the concrete must have an interior diameter of less than 50 mm (2 in.) to be used in wall of 100 mm (4") thick. Use as much possible of fixed steel pipes and a minimum of flexible hose in order to reduce the friction and to increase the pressure.

(Refer to the pump manufacture instructions for the use of the concrete pump and for the cleaning). In places where the pouring equipment is not available, it is possible to pour the concrete by hand.

7. REMOVING THE COMPONENTS

7.1 Removing the components

Remove the components in the following order:

- Handle nuts
- Plates
- Threaded rods
- Panel junctions using the panel extractors
- Panels

The only components that stay in place are the spacers.

7.2 Cleaning the components

All the plastic components must be cleaned from concrete, preferably by pressure washing. Do not use any oil or petroleum base cleaning agent.

7.3 Release agent

A release water-based agent is employed to keep the panels in good condition. The panels must be sprinkled with the release agent before and after the pouring of the concrete.

8. TRANSPORT AND STORAGE

8.1 Transport

As the panels are lightweight and stackable, transportation can be done without using any specialised equipment.

8.2 Storage

The panels must be stacked and stored on a levelled surface and must be protected from the sun for a prolonged period of time.

Prepared by:
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