

Technical Specifications | Creating Reinforced Concrete Raised Floors Using Disposable Formworks

Job description: Connecting bases with spacers on the floor to be raised, erecting legs of the required height on the bases and placing domes on the legs, thus creating a disposable formwork structure ready for pouring concrete.

Disposable formwork system consists of; 2,5 cm high, rounded circular bases made of recycled PP, spacers made of 59 cm long recycled PP, which connect bases with a 90 degree angle to each other, 125 mm diameter legs made of recycled PVC with a maximum wall thickness of 2 mm that could be cut up to 250 cm in desired heights, domes made of recycled PP with a width and length of 71 x 71 cm and height of 15 cm, which put altogether allows the structure not to collapse while laying steel mesh and pouring concrete afterwards.



The interconnected modules are arranged to form square structures extending in two directions and are prepared to be poured with at least C25 concrete.

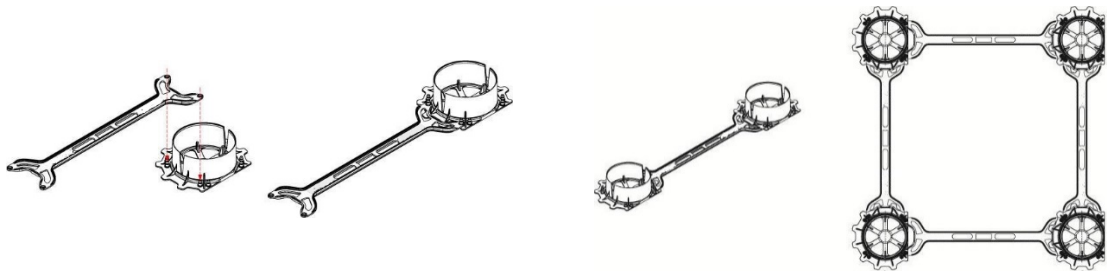
The resulting void space can be used for all kinds of installation passages (mechanical, electrical, plumbing etc.) and/or ventilation.

1. Application area preparation

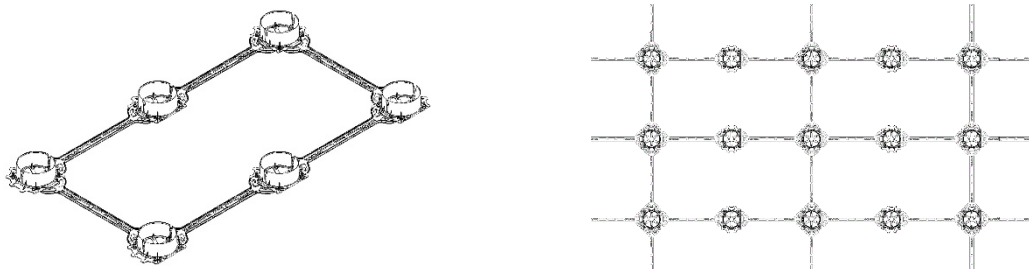
- 1.1. Concrete residues in the application area should be broken, rubble and debris should be removed from the area before installation.
- 1.2. The walls surrounding the application area should be marked according to the project with the required height after concrete. The thickness of the covering concrete (usually 5 or 10 centimeters) and the disposable formwork dome height (15 centimeters) are deducted from this finish level and the length of the legs is marked separately.

2. Installation of formworks

- 2.1. Starting from any corner of the area to be filled, the circular bases are laid from right to left and from top to down, along with the spacers connecting them to each other with 90-degree angles. The bases are laid with their straight sides as close as possible to the surrounding walls so that the formwork structure ends up with as little as possible space on the edges of the filling area. The base at the wall corner is cut to form two perpendicular edges and is placed exactly in the corner.



When used in all directions, a maximum 4 spacer are required per m². However, with respect to the application geometry, it is also possible to connect all the spacers in one direction and to skip 2 or 3 in the other 90-degree direction. For example;



At less than 100 cm heights spacers could be completely omitted except at starting points or around columns etc. assuming a standard wet concrete pressure will be applied. In ramp applications, the spacers cannot be used in the direction of the inclination.

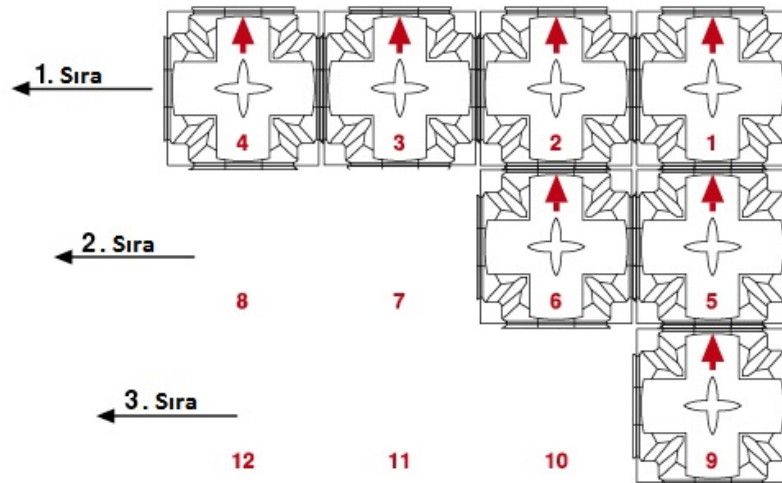
- 2.2. The legs are cut on site to the desired length to achieve the desired floor height, or brought to the site pre-cut in accordance with the project and placed perpendicular to the slot in each base.

Leg length = finished floor height - floor thickness suitable for operating load - 15 cm dome - 2,5 cm base

In stepped applications, half of the leg can be cut vertically in accordance with the step height. The remaining leg can be reinforced by screwing the cut piece into the uncut part of the leg. In this case, the slabs in 2 different levels must be connected with the additional steel reinforcement.



2.3. Domes (71 x 71 x H15) are placed on the legs from right to left and from top to bottom starting from any corner. The arrows on top of the domes must always point away from the installer.

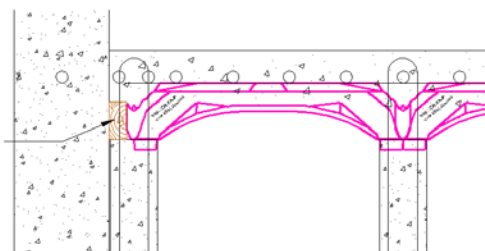


Always check whether if the leg and the dome are joined correctly, otherwise dome may fold inward during casting and concrete may leak into the void space.



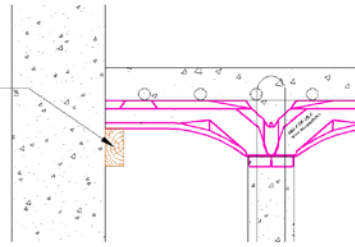
2.4. At the wall finishes, where the legs stand next to the wall, the space between the dome and the wall must be filled with EPS or wood wedges cut to the appropriate thickness and length. The wedges can be laid upon the legs freely.

5x10 kalas / timber veya / or
5x10 EPS



2.5. At the wall finished, where the last row of domes is longer than the distance to the wall so as not to place a new row of domes, the domes must be cut at the full wall distance and placed on the wooden consoles (or steel bracket) fixed to the wall at the appropriate height as the other domes on the legs.

5x10 kalas / timber



- 2.6. All four sides of the formwork system must be tightly closed by sheer walls or other conventional formwork systems and the system must be compacted tightly so that it doesn't move during casting of the concrete.
 - 2.7. In order to prevent concrete from penetrating under the formwork system during concrete pouring, it should be checked for one last time whether if there is any gap between the formwork system and the structural elements surrounding the system. Any open space has to be filled with rabbit's wire, polyurethane foam and like filling agents. The entire surface of the disposable formwork structure has to be completely impervious to concrete.
3. Installation of construction steel
- 3.1. Considering the required operating load, steel mesh is placed on the domes with a minimum of 2 cells of overlap.
 - 3.2. It is recommended to use double row steel mesh for covering concrete thicknesses over 10 cm and to use concrete spacers (trestle, marble, reinforcement pieces etc.) both on disposable formwork domes and between the steel mesh layers. For concrete thicknesses less than 10 cm, a single layer of steel mesh can be used without concrete spacers.
 - 3.3. Depending on the calculated operating loads on top of the reinforced concrete surface, U shaped structural steel rebars (for example 8 mm) are placed into the legs. Unless otherwise specified, at least one 8 mm construction steel with a hook on one end must be placed in the legs at formwork heights of 50 cm and above. These rebars must be connected to the steel mesh and must be long enough to reach the bottom of the leg since they are used to reinforce the slab.
 - 3.4. Steel mesh of the disposable formwork system and the reinforcement in the surrounding shear walls must be connected to each other so that the lateral forces can be transferred to the shear walls and also so that the partially cut domes do not stand alone. If the reinforcement of the shear wall cannot be used for this purpose, steel sprouts should be planted on the wall.

Note: In wide field applications, if the reinforced concrete structure to be constructed has vehicle traffic on it, shear walls should be constructed every 30-40 m considering also the geometry of the application area for the transfer of lateral forces.
 - 3.5. After the formwork system is firmly fixed and the steel mesh is laid, the domes could be walked on safely.
4. Concrete pouring
- 4.1. At least C25 class (preferably with very small aggregate) and at least S4 viscose concrete is used to fill the legs and domes.
 - 4.2. It is advisable to pour the concrete in early hours of the day when the temperature is 30° C and above. If this is not possible, formworks should be wetted.
 - 4.3. When pouring the concrete, first the legs and gussets should be filled up to steel mesh throughout the entire area in order to keep the formwork system stably in balance. The casting of the slab concrete in accordance with the operational loads in the project should be done afterwards.

For inclined castings (for example, to form ramps), concrete with low viscosity could be used for the slab part, but concrete with S4 viscosity should be used for the feet.

- 4.4. In order to avoid overpressure of the formwork structure during casting of the concrete, the mouth of the pump hose should be kept up to 20 cm above the domes. In order to fill the legs with concrete the mouth of the hose should be kept on the dome and arches, not directly into the leg, so that air won't be trapped inside the legs. Concrete should be allowed to flow from the dome and arches into the leg. It is essential that the domes are poured after making sure that the legs are filled first.
 - 4.5. Immediately after filling, before the legs are lost in concrete, all the legs should be stabbed several times with a steel rod of at least 16 mm thickness with a rounded tip in order to release the air trapped in the leg during casting. When pouring the concrete on the domes a vibrator should be used.
 - 4.6. During the casting, the concrete that continues to come from the pump should not be stacked on the dome, the hose should be constantly moved and the concrete should not be allowed to clump anywhere. Otherwise the domes may collapse.
 - 4.7. During large field castings, prior to two domes the casting can be stopped by using rabbit's wire and 10x10 timber.
 - 4.8. Depending on the ambient conditions, the concrete should be moistened sufficiently as it is done in the normal screed applications after casting.
 - 4.9. In case of above 160 cm applications, a suitable manhole opening should be left in the formwork structure in order to control whether the concrete has entered the feet and whether feet are still vertical.
 - 4.10. After casting, if the section height is suitable and if there is a manhole, the spacers can be removed and re-used by entering into the void space below the formwork system after taking the necessary precautions.
5. Ventilation and installation passages
- 5.1. Depending on the project, plumbing and mechanical installations, electrical, telephone and similar installations can be passed between the bases and spacers before placing the legs and domes. After the domes are placed, holes and/or reservations can be created where the installations will pass to the upper area.
 - 5.2. These installations can be mounted on the hanger profiles and clamps to be placed on the floor or on the hanger profiles between the clamps to be installed on the legs when the floor should not be pressed by metal objects.
 - 5.3. The space formed after the casting can be ventilated naturally with pipe elements connected to the perforations of 8-12 cm diameter in 3.50-4.00 m intervals on the perimeter walls. Pipe ends must be sealed against insects with stainless steel wires or plastic nets.
 - 5.4. For a good natural ventilation, the openings of the holes should be opened to the south (hot facade of the building) and the north (cold facade of the building) facades and the holes in the south should be higher than in the north.
 - 5.5. Any beams/walls etc. due to the interconnected and/or externally disconnected areas, must be connected to other peripheral sections or directly outwards with pipes prior to casting.

The parts of the formwork system must be made of non-polluting substances and the manufacturer has to be ISO 9001 certified. The technical and administrative team of the manufacturer should be competent to meet all questions of project developers and field supervisors both during the project phase and during implementation.

All user manuals, installation diagrams, if needed on-site technical support must be included in the product price.