

## Technical Specifications | Creating Reinforced Concrete Raised Floors Using Disposable Formworks

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**Job description:** Connecting bases with spacers on the floor to be raised, erecting pipes of the required height on the bases and placing domes on the pipes, 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 PVC pipes 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.

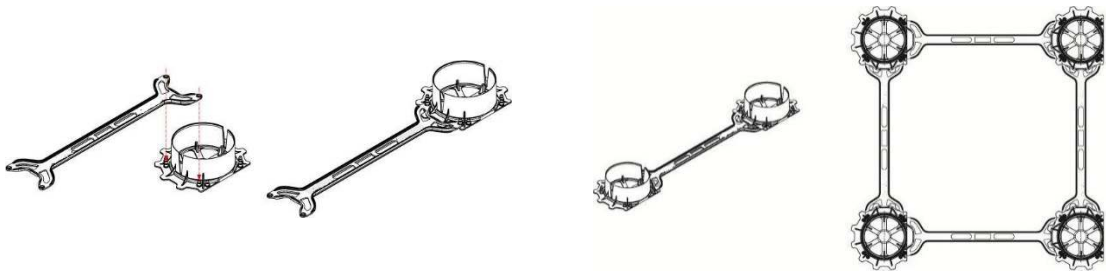
The resulting void space could be used for all kinds of installations (electrical, mechanical, etc.) and / or ventilation.

### 1. Surface preparation

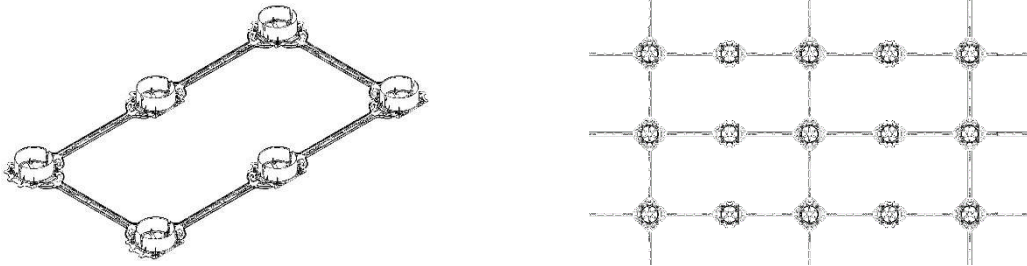
In order to create a smooth surface suitable for installation, the floor must be covered with at least a layer of lean concrete. The thickness of lean concrete should be determined by considering the operating loads specified in the project.

### 2. Installation

- 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.



When used in all directions, a maximum 4 spacer are required per m<sup>2</sup>. 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;



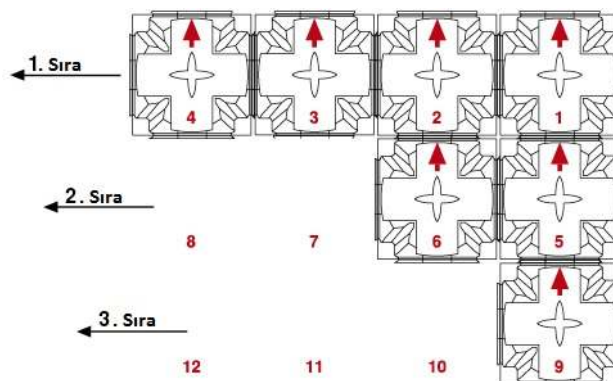
At less than 100 cm heights spacers could be completely omitted except at starting points or around columns etc. assuming a standard wet concrete pressure will be applied. Also, in ramp applications, the spacers cannot be used in the direction of the inclination.

- 2.2. The PVC pipes are cut to the appropriate length to achieve the desired floor height and are placed perpendicular to the slot in each base.

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

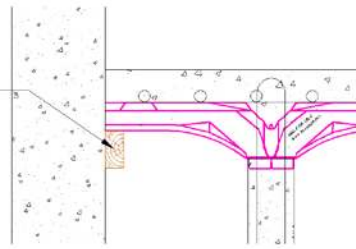
Gradual cutting of the pipes allows also a step like installation up to a certain height. In this case, the slabs in 2 different levels must be connected with the additional steel reinforcement.

- 2.3. Domes (71 x 71 x H15) are placed on PVC pipes 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 pipe and the dome are joined correctly, otherwise dome may fold inward during casting and concrete may leak into the void space.



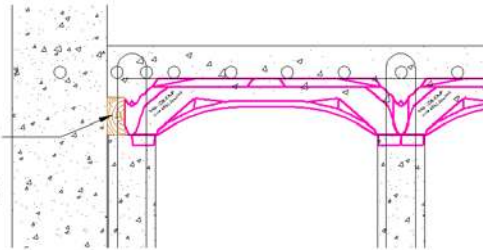
- 2.4. If the last row of domes is longer than the wall at the border, the domes should be cut and placed on wooden laths fixed to the wall at the same level of the PVC pipes finishes.

5x10 kalas / timber



- 2.5. In case the last row of domes is shorter than the wall so as not to place a new row of domes, the PVC columns and dome-wall spacings should be filled with EPS slats with appropriate thickness so that no concrete enters the disposable formwork structure.

5x10 kalas / timber veya / or  
5x10 EPS



- 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. It should be checked for one last time whether 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.
- 2.8. Considering the required operating load, steel mesh is placed on the domes with a minimum of 20 cm of overlap.
- 2.9. After the formwork system is firmly fixed and the steel mesh is laid, the domes could be walked on safely.
- 2.10. 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 PVC pipes. These rebars must be connected to the steel mesh and must be long enough to reach the bottom of the pipe since they are used to reinforce the slab.
- 2.11. At least C25 class (preferably with very small aggregate) and at least S4 viscosity are used to fill the pipes and domes. After the feet and domes are cast, the steel mesh is covered with concrete and concrete casting is continued until the required slab thickness is reached.

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.

- 2.12. 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. It is essential that the domes are poured after making sure that the PVC pipes are filled first.
- 2.13. Poured concrete has to be compacted by vibrators at every stage. Every foot should be stabbed with a steel rod of at least 16 mm thickness with a rounded tip in order to release the air trapped in the PVC pipe during casting.
- 2.14. Depending on the ambient conditions, the concrete should be watered sufficiently as it is done in the normal screed applications after casting.

- 2.15. During the 24 to 48 hours following the concrete pouring, joints should be cut in the floor in such a way not to exceed 1/5 of the floor thickness. Joints should be opened at right angles to each other at intervals determined by the site management.
- 2.16. 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.
- 2.17. 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.
- 2.18. After casting, if the section height is suitable and if there is a manhole, the spacers could be removed and reused.

### 3. Ventilation and installation passages

- 3.1. Depending on the project, prior to the installation of the formworks, sanitary and mechanical installations, holes, and/or reservations can be created for electrical, telephone and similar installations.
- 3.2. The space formed after the casting can be ventilated naturally with PVC 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.
- 3.3. 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.
- 3.4. Any beams/walls etc. due to the interconnected and/or externally disconnected areas, must be connected to other peripheral sections or directly outwards with PVC 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.