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Designated by the T.R. Ministry of  
Environment and Urbanization in  
accordance with the Regulation for Criteria  
to which Construction Materials Subjected  
published in the Official Journal dated 26  
June 2009 and numbered 27270

## NATIONAL TECHNICAL APPROVAL (UTO)

### TTO-UTO/19-1915

<b>Trade Name</b>	ABS DISPOSABLE FORMWROKS FOR LIGHTWEIGHT FILLINGS
<b>UTO Holder</b>	ABS YAPI ELEMANLARI SAN. TIC. LTD. STI. AydınevlerMah. Sanayi Cad. Centrum Plaza A Blok No:3/Z03 Maltepe/ İstanbul <a href="http://www.absyapi.com.tr">www.absyapi.com.tr</a>
<b>Intended Use</b>	Can be used in all types of structures for the construction of reinforced concrete raised floors with a height between 5-300 cm.
<b>Validity Period</b>	From 27.11.2019 to 27.11.2024
<b>Manufacturing Plant</b>	Atatürk Mah. Lozan Cad. No:13 Esenyurt/ İstanbul
<b>This UTO contains</b>	17 pages including 1 Annex which form an integral part of this approval
<b>Type of Technical Approval</b>	New product without standard (Regulation for Criteria to which Construction Materials Subjected Article:9/1)
<b>Conformity System</b>	System 3
<b>Product Family</b>	19
<b>Reference Guideline</b>	TTO-RD-011 Disposable(Permanent) Formwork



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## I LEGAL BASIS AND GENERAL CONDITIONS

1. This TTO-UTO/19-1915 has been issued and released by TTO Engineering Certification Testing Services Limited Company in accordance with the following legislation:

1.1. Law No. 4703 on the Preparation and Implementation of Basic Legislation on Products.

1.2. Regulation on Construction Materials published in the Official Journal dated 10.07.2013 and numbered 28703 (305/2011/EU).

1.3. Regulation for Criteria to which Construction Materials Subjected published in the Official Journal dated 26.06.2009 and numbered 27270.

2. This UTO may not be given or transferred to anyone except the above-mentioned manufacturer and production facility without the permission of TTO Engineering Certification Testing Services LLC.

3. In case the changes in the factory production control plan that may affect the performance of the product in the structure are determined by the authorities and / or conformity assessment institutions and the findings are reported to TTO Engineering Certification Testing Services Limited Company LLC in accordance with Article 15 of the Regulation for Criteria to which Construction Materials Subjected, this UTO can be suspended or canceled by TTO Engineering Certification Testing Services LLC.

4. The reproduction / release of the UTO shall be made in full text, including its convey in the electronic environment. Partial publication of UTO may be made with the permission of TTO Engineering Certification Testing Services LLC. In this case, partial printing (texts and illustrations in advertising brochures, etc.) shall not conflict with the UTO or contain misleading statements.

5. The UTO is published in Turkish. Translation into other languages may be made by sworn translators and this translation may be used with the approval of TTO Engineering Certification Testing Services LLC.



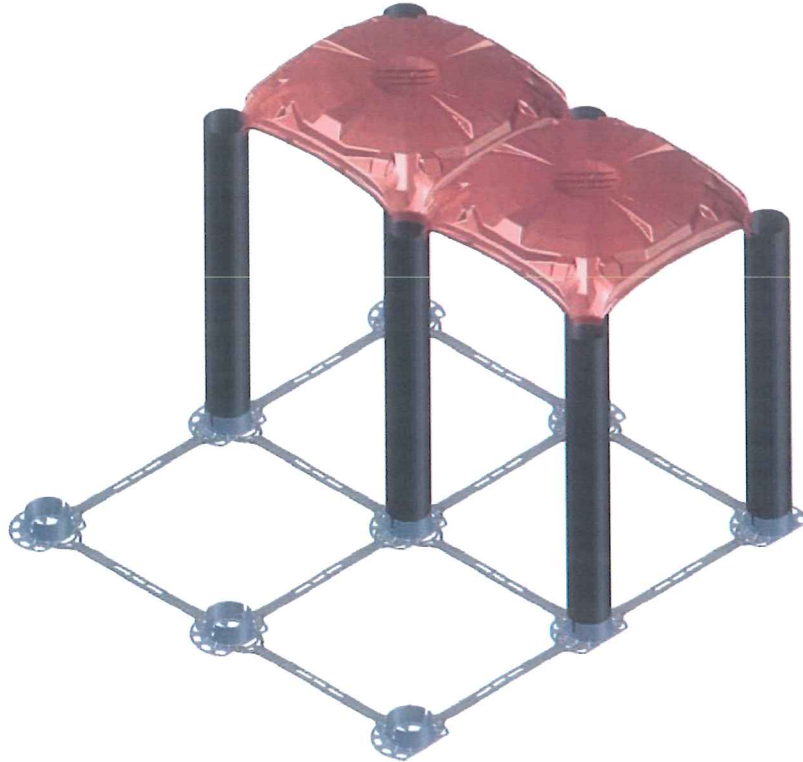


## II SPECIFIC PART OF THE NATIONAL TECHNICAL APPROVAL

### 1. Technical Description Of The Product And Intended Use

#### 1.1. Definition of product

ABS DISPOSABLE FORMWROKS FOR LIGHTWEIGHT FILLINGS (hereinafter product), which is subject to this National Technical Approval (UTO), comprises disposable formwork construction elements made of polypropylene (PP) that meet the requirements of the TS EN 15345 standard, which are shaped according to the project and which have grooves and rust spacers on the top for the installation of steel rebars. A steel mesh of the type to be calculated according to the dead and live loads described in the structural design is laid on top of the disposable formwork and covered with at least C25 / 30 class concrete of appropriate thickness (minimum 4 cm).



#### 1.2. Intended Use

The product is used in all types of structures for the construction of reinforced concrete slabs with a height from 5 cm to 300 cm.



## 2. Specification of Building Materials and Verification Methods

This National Technical Approval for the product of this document has been issued on the basis of agreed data, deposited at TTO, which identifies the product that have been assessed and judged. Changes to materials, to the composition or to characteristics of the product, or to the production process, which could result in this deposited data being incorrect, should be immediately notified to TTO before the changes are introduced. TTO will decide whether or not such changes affect the UTO, and, if so, whether further assessment or alternations to the UTO are considered necessary.

Assessment of the performance of the product part of this document for the intended use in the sense of; essential requirement for construction work 2 and 4 “Safety in Case of Fire” and “Safety and Accessibility in Use” and general aspects relating to the performances of the construction product have been made in accordance with the Reference Guideline TTO-RD-011 Disposable(Permanent)Formwork

### 2.1. Mechanical resistance and stability

The technical design (static project) of the load-bearing reinforced concrete slab and the raised reinforced concrete slab to be obtained as a result of using the product shall be made in accordance with TS 500: Requirements for design and construction of reinforced concrete structures standard and Turkish Building Earthquake Code.

### 2.2. Safety in Case of Fire

#### 2.2.1. Reaction to fire

The reaction of fire according to EN 13501-1 of product is **E** according to result of tests conducted in accordance with EN 11925-2

#### 2.2.2. Gas release in case of fire

In order to determine gas emissions during fire, the product was tested in accordance with EN ISO 5659-2 standard and the average concentrations of toxic gas in the smoke generated at the specific heat flux level of 50 kW/m<sup>2</sup> are shown in the table below:

Component	CO <sub>2</sub>	CO	NO	NO <sub>2</sub>	SO <sub>2</sub>	HCl	HF	HCN	Hbr
Concentration (mg/m <sup>3</sup> )	0	1817,2	42,9	1700,2	0	6,54	0	63,5	0

## **2.3. Safety and Accessibility in Use**

### **2.3.1. Impact resistance**

The impact resistance of the product is 43kJ/m<sup>2</sup> according to result of test conducted in accordance with EN ISO 179-1.

### **2.3.2. Bending strength**

The bending strength of the product is 53,1 MPa according to result of test conducted in accordance with EN ISO 178.

### **2.3.3. Tensile strength & elongation at break**

The tensile strength of the product is 28,8 MPa and elongation at break is 5% according to results of tests conducted in accordance with EN ISO 527-1 & EN ISO 527-2

### **2.3.4. Determination of immersion depth**

The immersion depth of the product is 75 Shore D according to result of test conducted in accordance with EN ISO 868.

### **2.3.5. Softening temperature**

The softening temperature of the product is 151,2 °C according to result of test conducted in accordance with EN ISO 306.

### **2.3.6. Dimensions**

Dimensions of the product are given in cm and measured using a caliper gage. The maximum permissible deviation is  $\pm 1,00$  mm for length, width and height and  $\pm 0,50$  mm for thickness.

Product dimensions can range from 30-75 cm in length and width and 5-300 cm in height

### **2.3.7. Density**

The density of the product is 0,922 g/m<sup>3</sup> according to result of test conducted in accordance with EN ISO 1183-1. The deviation of the density value declared by the manufacturer shall not be  $\pm 10\%$  more than this value.

## **3. Assessment of Conformity and Performance and G Marking**

### **3.1. Conformity System**

According to the decision 1999/94/EC of the European Commission decision as amended by Decision of the European Commission 2012/202/EC the conformity system is 3.





### 3.2. G Marking

G-marking must be applied to the product according to the “*Regulation for Criteria to which Construction Materials Subjected*”.

The duties of the manufacturer and the conformity assessment institution in accordance with Annex 1(E) of the “*Regulation for Criteria to which Construction Materials Subjected*” for the conformity assessment to be carried out for the G marking for the product according to the confirmation system specified in 3.1 are stated below:

- the manufacturer shall carry out factory product control,
- the notified body shall carry out Initial type-testing<sup>1</sup> of the product.

### 3.3. Duties of the Manufacturer

#### 3.3.1. Factory product control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system includes control of raw materials, production process control and post-production control processes. The manufacturer uses the raw materials according to the specification specified in the control plan.

Records contain at least the following information:

- Name of products and raw materials,
- Inspection and control method,
- Production date, lot number and inspection date of the product,
- The reference value / range specified in the inspection result and control plan,
- Signature of the person responsible for factory production control.

Records shall be kept by the manufacturer for at least five (5) years. The tests for factory production control and their frequency, and tolerance values are included in the factory production control plan kept by TTO.

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<sup>1</sup> Communiqué on the Implementation of Compliance Confirmation Systems in accordance with the Regulation for Criteria to which Construction Materials Subjected Article 7-1 (ç) and Article 17-1.



### 3.3.2. Initial type-testing

Unless there is any change in the factory production control plan, the tests performed by the TTO at the stage of granting this National Technical Approval and accepted as the initial type test are as shown in Table 1.

Table1: Initial type-tests

No	Subject of control	Testing method	Criteria	Number of samples
1	Fire Reaction Class	Article 2.1.1	Declared value	9
2	Gas release in case of fire	Article 2.1.2	Declared value	5
3	Impact resistance	Article 2.3.1	Declared value	5
4	Bending strength	Article 2.3.2	Declared value	5
5	Tensile strength & elongation at break	Article 2.3.3	Declared value	5
6	Immersion depth	Article 2.3.4	Declared value	5
7	Softening temperature	Article 2.3.5	Declared value	5
8	Dimensions	Article 2.3.6	Declared value & suitable / not suitable	3
9	Density	Article 2.3.7	Declared value & suitable / not suitable	3

### 3.4. G Marking

The G mark is attached to the packaging of the product. The G mark is included with the following information.

Conformity assessment institution no:  
Company: (Name or registered trademark of the manufacturer)  
Address: (registered address of the manufacturer)  
Factory: (Name and registered trademark of the factory where the product is manufactured)  
The year the G mark is attached: (Last two digits of the year the mark is attached) OYYY-OXXX: (OYYY-Institution no, OXXX- Document no. issued by the institution)  
UTO no: (Abbreviated name of National Technical Approval Institution and the UTO number)  
Additional information to be provided in the Declaration of G Conformity:  
Fire reaction class, impact strength, bending strength, tensile strength & elongation at break, immersion depth, softening temperature, dimensions, density





## 4. Information On The Suitability of the Product For Its Intended Use

### 4.1. Production

The production plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at TTO.

If requested, it is given to the organization that will carry out the conformity assessment activities during the conformity assessment process. The confidentiality of the information in the production control plan is essential.

### 4.2. Installation procedures and principles

Given in the Annex

### 4.3. Storage, transport and loading

The products are stacked on wooden or plastic pallets and shipped with wooden or plastic pallets. Since the materials are stacked on top of each other, the four corners and the middle of the bottom product are supported with wooden wedges so that the bottom material does not deform with the weight on it. After the products are stacked on pallets, they are fastened with polyethylene belts and coated with thin polyethylene foil.

Storage of the products can be done in open areas provided that it does not exceed 2 years. If stored in an open area, the products should be protected with cover. The covering material prevents them from being exposed to direct sunlight. Products can be stored indoors for much longer. Necessary fire protection measures should be taken in storage areas, products should be kept away from fire and welded manufacturing should not be done near the products.

*This National Technical Approval TTO-UT0/19-1915 has been approved by TTO Engineering Certification Testing Services LLC. Approval Commission and issued in Ankara on 27.11.2019*

Halil SİRKİNTİ  
General Manager



## 5. References

### Standards

- TS EN 15345 Characterization of plastics – recycled plastics - recycled materials from polypropylene (PP)
- TS EN 13501-1 Construction products and structural elements, fire classification - Part 1: Classification using data obtained from behavior tests against fire
- TS 500 Design and construction rules of reinforced concrete buildings
- TS EN ISO 5659-2 Plastics - Smoke formation - Part 2: Determination of optical density by single chamber test
- TS EN ISO 179-1 Plastics - Determination of Charpy impact properties - Part 1: Impact test without a measurement device
- TS EN ISO 178 Plastics - Determination of bending properties
- TS EN ISO 527-1 Plastics - Determination of tensile properties - Part I: General principles
- TS EN ISO 527-2 Plastics - Determination of tensile properties - Part 2: Test conditions for molding and extrusion plastics
- TS EN ISO 868 Determination of stiffness of plastics and ebonite by durometer
- TS EN ISO 306 Plastics - Thermoplastic materials - Determination of Vicat softening temperature (VST)
- TS EN ISO 1183-1 Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method

### Regulations and Communiqués

- Construction Materials Regulation (305/2011 / EU)
- Regulation for Criteria to which Construction Materials Subjected
- Regulation on Fire Protection of Buildings
- Turkish Building Earthquake Code
- Communiqué on the Implementation of Conformity Confirmation Systems in accordance with the Regulation on Criteria for Construction Materials

### Guide Document

- TTO-RD-O11 Disposable flooring blind (permanent) mold

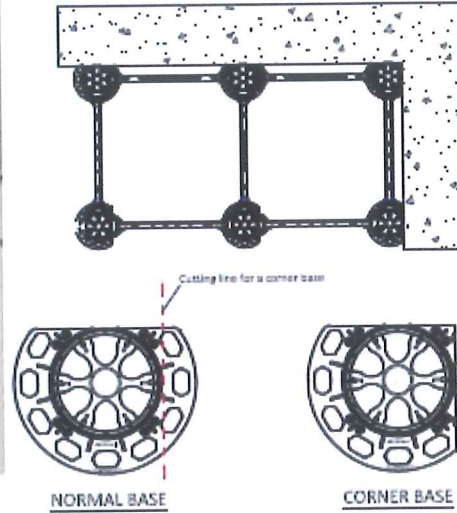
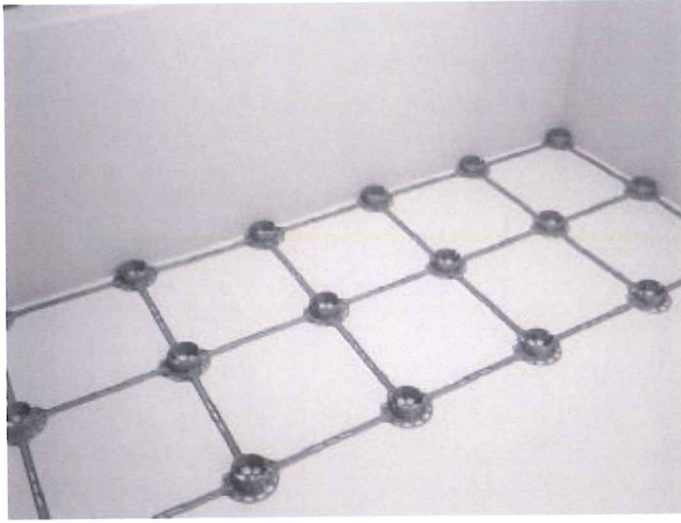
### Test Reports

- Sert, S., Özdemir, H., A., 2019, Inspection and Test Report, Directorate of TSE Test and Calibration, Chemistry Laboratory Gebze, Kocaeli, Report No: 485112
- Sümer, A., Güven, S., 2019, Inspection and Test Report, Directorate of TSE Test and Calibration, Construction Materials Fire and Acoustic Laboratory, Istanbul, Report No: 493936
- Sümer, A., Güven, S., Çalış, M., 2019, Inspection and Test Report, Directorate of TSE Test and Calibration, Building Materials Fire and Acoustic Laboratory, Istanbul, Report No: 498821
- Şimşek, O., Yazıcıoğlu, S., 2019 Gazi University Faculty of Technology, Department of Civil Engineering, Inspection and Test Report, Ankara

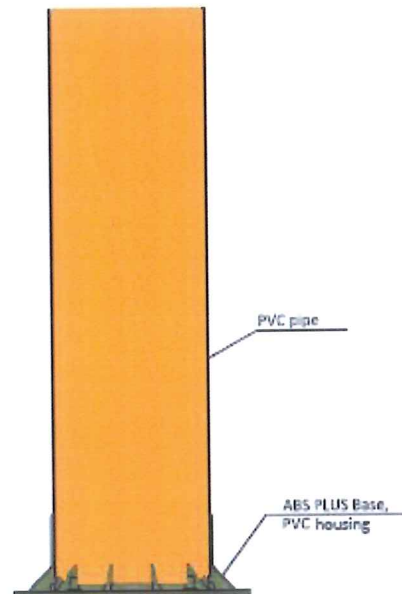
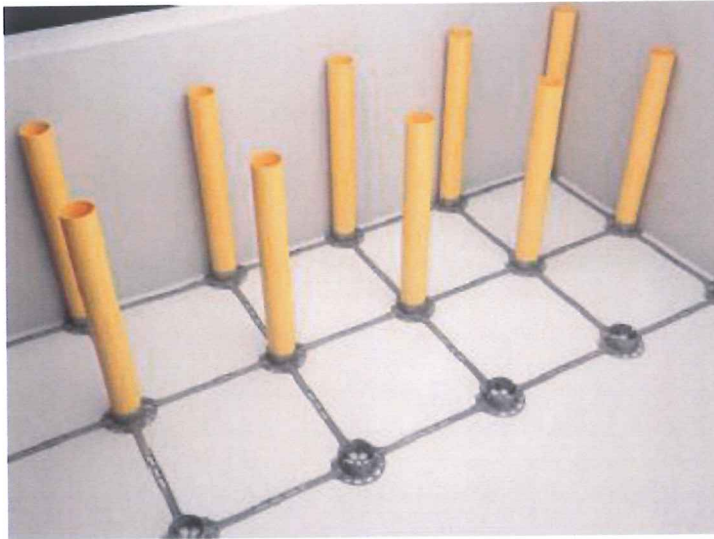


## Annex: Installation Guide

1. Place the ABS Plus bases from right to left and from top to bottom using the spacers so that the base's flat side is adjacent to the wall. Cut the base creating a second edge so that it fits into a corner.



2. Press the PVC pipes that have been cut according to the project firmly into the base slots.

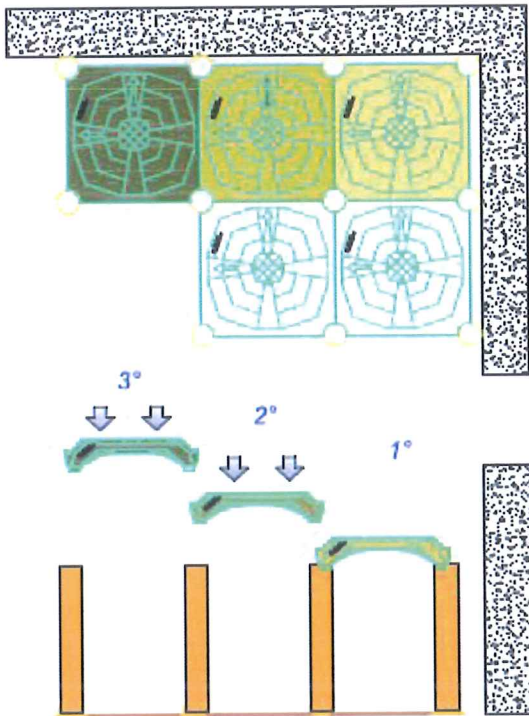




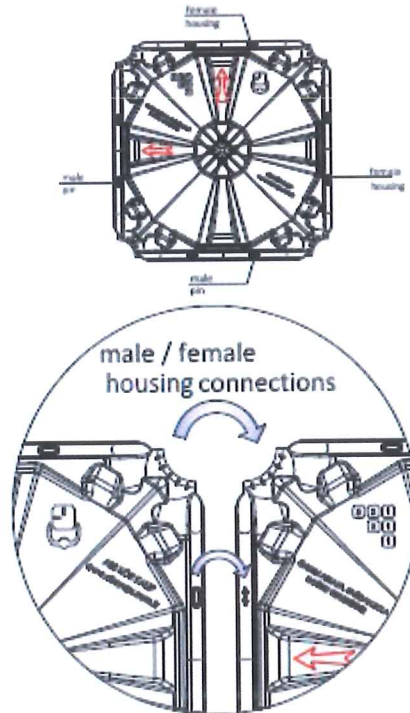
**3.** Place the ABS PLUS domes on the PVC pipes, from right to left and from top to bottom, checking that the domes fit over each other and on the PVC pipes firmly.



Place the domes first from right to left and then from top to bottom.

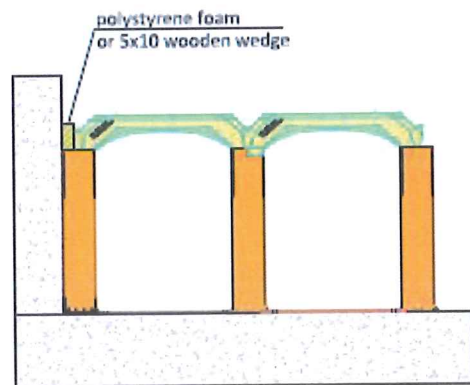
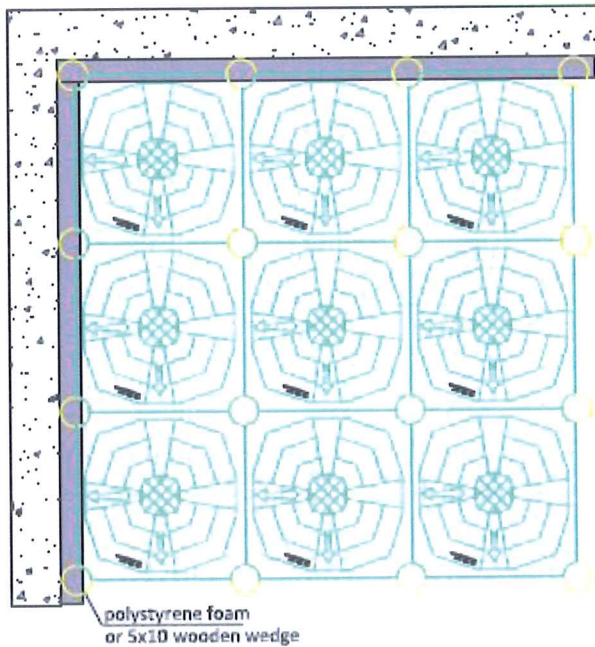


The arrows on the domes should always indicate the direction in which the installation operator looks.



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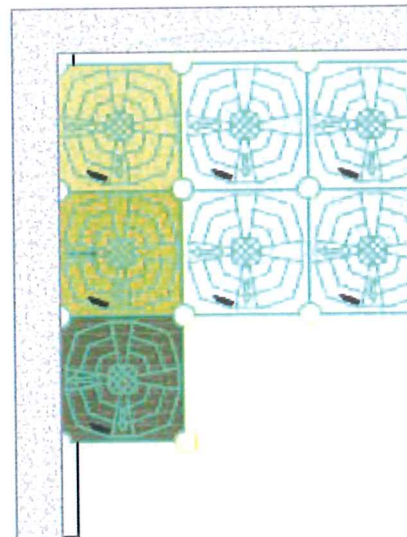
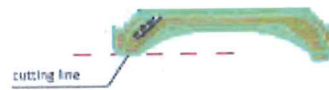
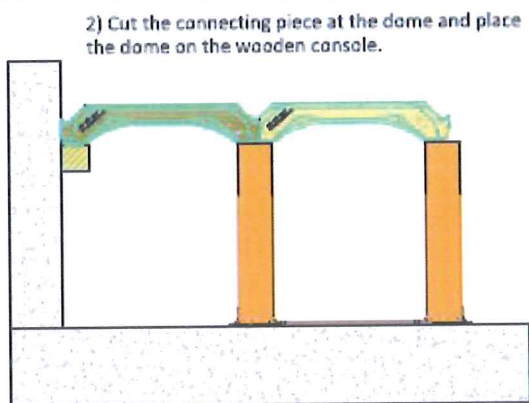
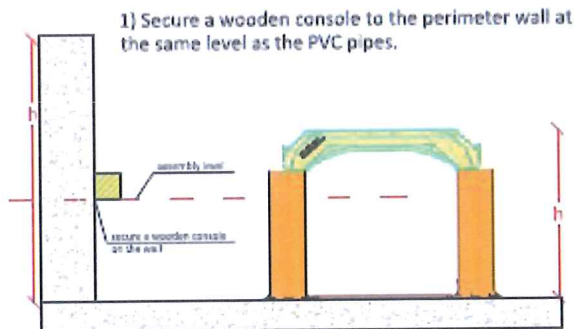
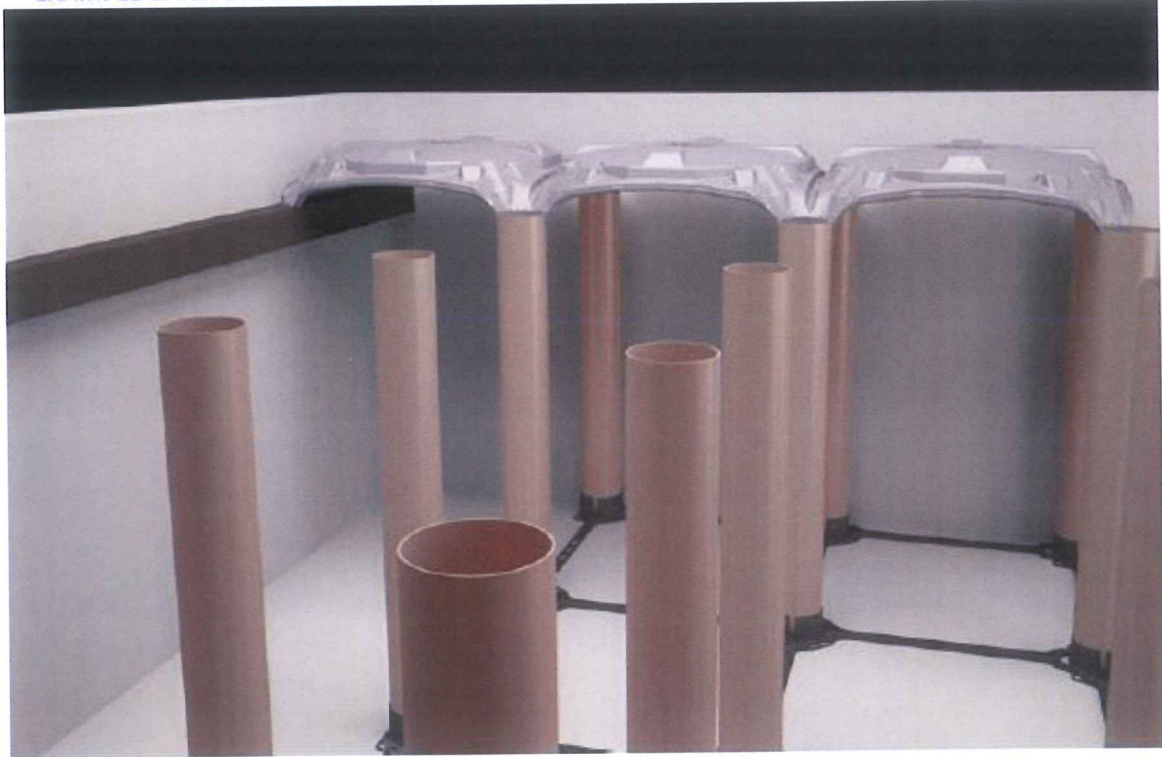
4. In the case of full-dome wall finishes where the PVC pipes are adjacent to the walls, place polystyrene foam or 5x10 wooden wedges on the pipes and close the cavities against concrete leaks.





**5. Inserting the last row of ABS Plus domes:**

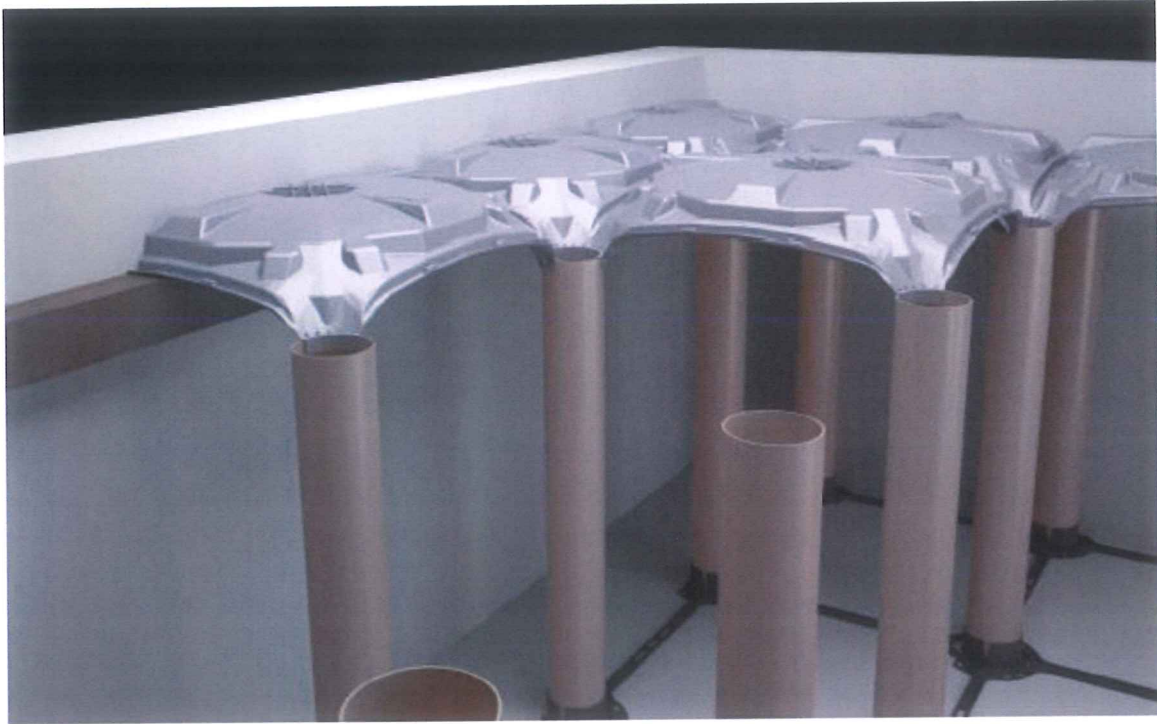
**EXAMPLE 1: Full dome on the wooden console attached to the wall.**



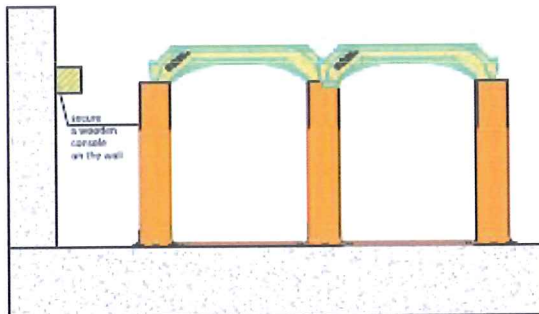


**6. Inserting the last row of ABS Plus domes:**

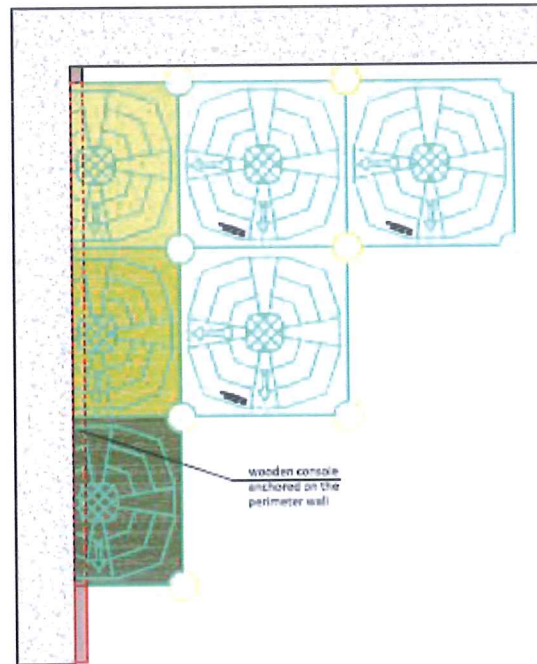
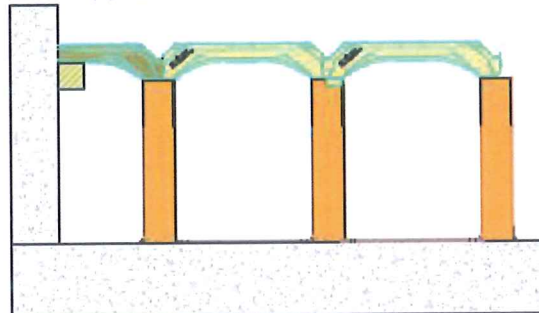
*EXAMPLE 2: Placing a cut dome on the wooden console attached to the wall.*



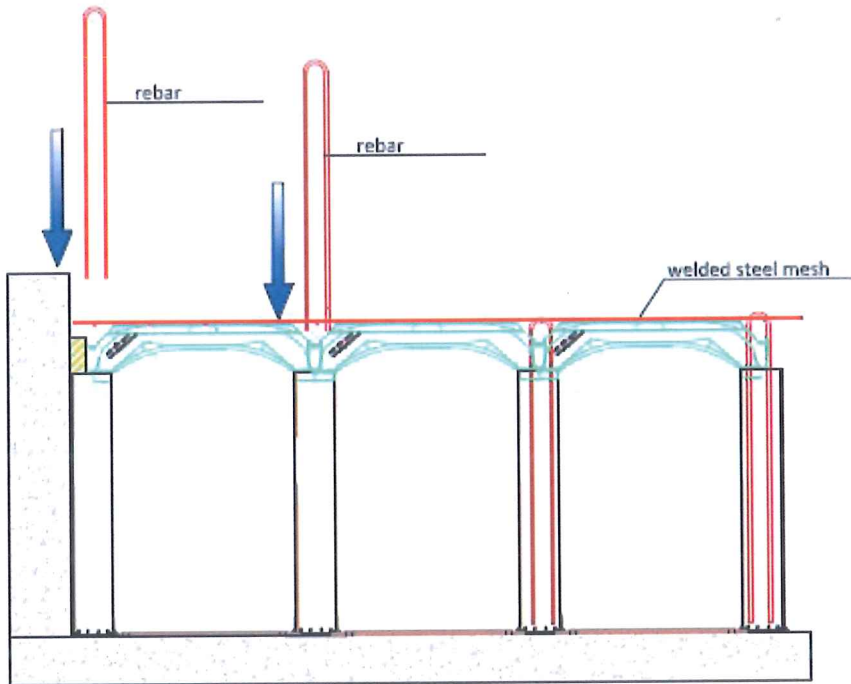
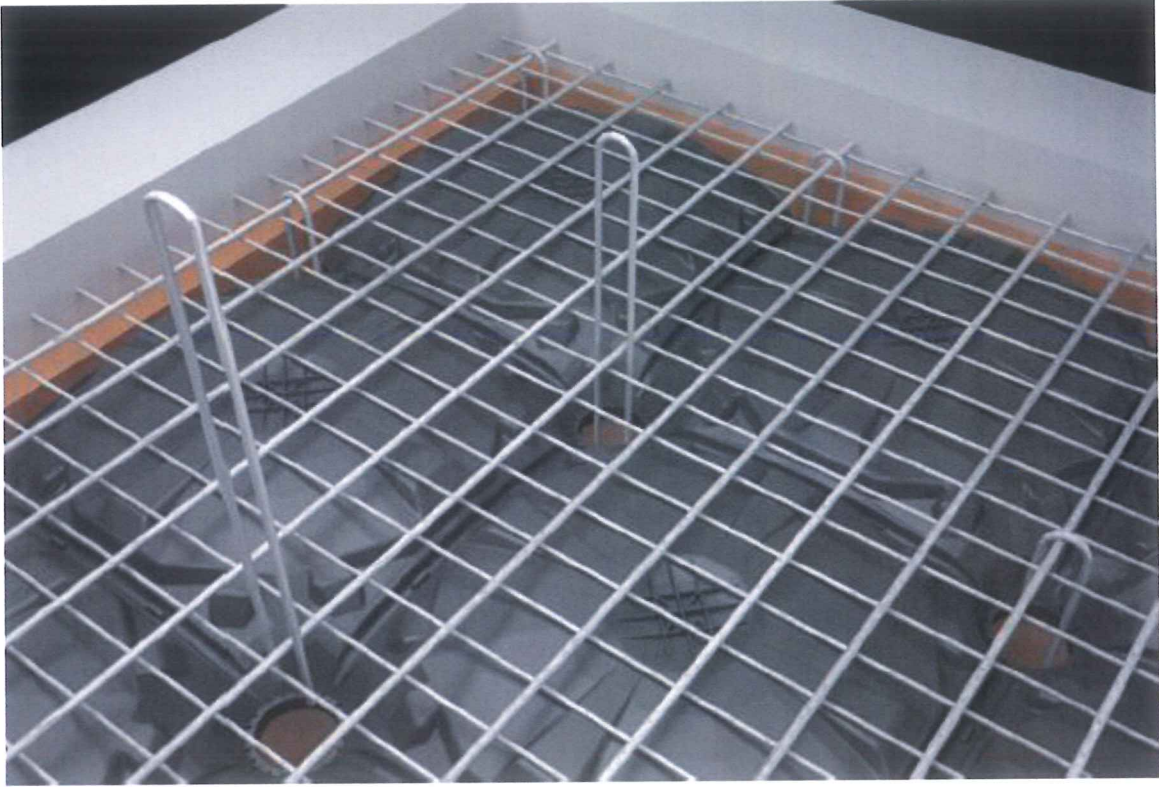
1) Secure a wooden console on the perimeter wall taking into account the height of the dome to be cut.



2) Cut the dome at the exact size to close the opening and place it on the pipe and the console.



7. Place project specific welded steel mesh on the concrete-sealed disposable formworks and place vertical steel rebars into the PVC pipes.



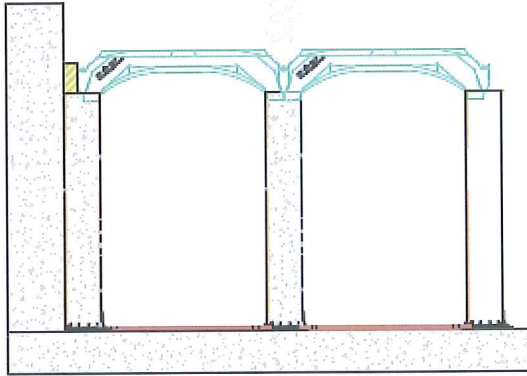
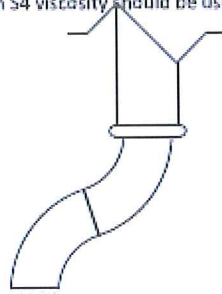


## 8. Concrete pouring and important considerations

### 9. Filling the pipes with concrete

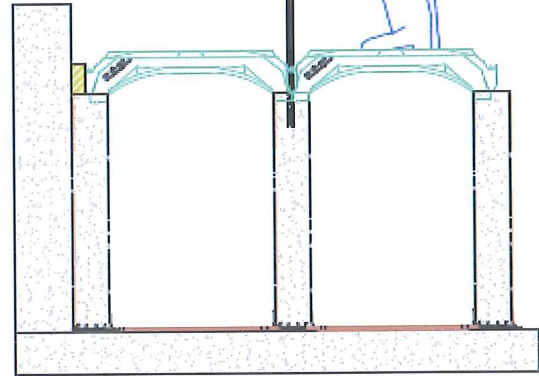
First, the PVC pipes are filled with at least C25 class and at least S4 viscose concrete. For inclined castings (for example, to form ramps), concrete with low viscosity could be used for the slab part, but concrete with S4 viscosity should be used for the feet.

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.



### 10. Aerating the pipes

Every PVC pipe 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 pipe during casting.



Use a vibrator when pouring the concrete of the slab on top of the domes, making sure that the concrete is fully spread and settled.

Depending on the ambient conditions, the concrete should be moistened sufficiently as it is done in the normal screed applications after casting.

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.

