

## European Technical Assessment

**ETA-22/0831  
of 29/12/2022**

### General Part

**Technical Assessment Body  
issuing the European Technical  
Assessment**

Statybos produkcijos sertifikavimo centras  
(SPSC)

**Trade name of the construction  
product**

ICF THERMO NEO

**Product family to which the  
construction product belongs**

Non load-bearing permanent shuttering kits  
based on shuttering elements of thermal  
insulating material EPS

**Manufacturer**

UAB "Šilputa", Sodų g. 14, Skaidiškės,  
LT-13270 Vilniaus district, Lithuania

**Manufacturing plant**

UAB "Šilputa", Sodų g. 14, Skaidiškės,  
LT-13270 Vilniaus district, Lithuania

**This European Technical  
Assessment contains**

25 pages, including 2 annexes which forms an  
integral part of this assessment

**This European Technical  
Assessment is issued in  
accordance with regulation (EU) No  
305/2011, on the basis of**

European assessment document  
EAD 340309-00-0305

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## **Specific part**

### **1. Technical description of the product**

#### **1.1 General**

This European Technical Assessment - ETA - is being issued for the kit-system **ICF THERMO NEO** on the basis of agreed data (information), deposited with the SPSC, which identifies the products that have been assessed and judged.

Changes to the product and (or) production process, which could result in the deposited data (information) being incorrect, should be notified to the SPSC before the changes are introduced. The SPSC will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment (alterations) to the ETA, shall be necessary.

An integral wall finish (renderings, coatings and plasterboards) as well as construction materials for completing the structure, such as concrete, reinforcement, pipes, ducts, wall ties, moisture proofing if required, etc. do not form part of the shuttering kit and, therefore, are not considered in the European Technical Assessment.

#### **1.2 Shuttering elements**

ICF THERMO NEO is a non-loadbearing permanent shuttering system applicable as formwork for reinforced concrete walls cast in-situ. Shuttering system is based on shuttering elements of one-layered expanded polystyrene (EPS) leaves which are prefabricated in connection with ladders of steel. The ladders consist of two equal leg angle profiles and spacers of steel wire which connect the profiles. The spacers are fastened to the steel profiles by welding. The steel profiles of the ladders are completely enclosed in the expanded polystyrene (EPS) of the shuttering leaves.

The upper and lower surfaces of the shuttering leaves are castellated and the vertical surfaces are tongue and groove to form a tight fit when joined together. The outer surfaces have tapered grooves running vertically. At the inner surfaces offset to the grooves ribs are situated which serve as mechanical fixing of the shuttering leaves to concrete. They also form locks for end stops and lintel elements.

The minimum thickness of concrete core is 144 mm or 194 mm with an associated maximum thickness of concrete core of 160 mm or 210 mm.

The shuttering elements are 250 mm to 500 mm thick and 300 mm high. The standard length is 1000 mm and can be adapted on site by cutting.

Available shuttering elements dimensions presented in Table 1.

The resulting concrete infill structural pattern is of continuous type concrete wall, which is only perforated by steel spacers at points. The steel spacers are regularly arranged and the sum of the cross-sectional area of the spacers is less than 0,005 percent of the area of the wall.

All details about shape and dimensions of the shuttering elements are given in this European Technical Assessment, Annex 1.

The principal drawing of the shuttering elements connected in the corner of the building is presented in Annex 2.

#### **1.3 Accessory parts**

Special elements are also part of the kit as end elements and lintel bottom leaves which are produced in the same manner of expanded polystyrene (EPS).

End leaves are inserted in the gaps between the shuttering leaves at opening of the wall.

Lintel bottom leaves shall be inserted in the gaps between the shuttering leaves and form the bottom of shuttering of a lintel. Before concreting the leaves have to be supported.

**Table 1 . ICF THERMO NEO shuttering elements**

Wall thickness, mm	(Internal) shuttering leaf thickness, mm	(External) shuttering leaf thickness, mm	Concrete core thickness $b_{max}$ , mm
250	45	45	160
300	45	95	160
350	45	145	160
400	45	195	160
450	45	245	160
500	45	295	160
300	45	45	210
350	45	95	210
400	45	145	210
450	45	195	210
500	45	245	210

## **2. Specifications of the intended use in accordance with the applicable EAD**

### **2.1 General**

The shuttering kit is intended to be used for the construction of load-bearing (structural) or non-load-bearing (non-structural) external walls above or below ground and internal walls for residential and nonresidential buildings.

When using this type of construction below ground a waterproofing according to applicable national rules shall be provided depending on whether water not exerting pressure or water exerting pressure is to be dealt with. The waterproofing shall be protected from mechanical damage by impact resistance protective layer.

### **2.2 Assumed working life**

The provisions made in this European Technical Assessment are based on the assumed working life of 50 years, provided that the product is subject to appropriate installation, use and maintenance. These provisions are based upon the current state of the art and the available knowledge and experience.

The assumed working life of a system cannot be taken as a guarantee given by the producer, but is to be used as a mean for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

Assumed intended working life means that it is expected that, when the working life has elapsed, the real working life may be, under normal use conditions, considerably longer without major degradation affecting the Basic requirements for construction works.

The relevant and applicable use categories in accordance with EOTA GD 14 for the product are:

- category IA2: product with no direct contact but possible impact on indoor air;
- category S/W 3: product with no contact to and no impact on soil, ground or surface water.

### **2.3 Provisions related to manufacturing, packaging, transportation and storage**

The shuttering kit ICF THERMO NEO is applied on site according to the procedure laid down in the technical file deposited with the SPSC.

Concerning product packing, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on transport, storage, maintenance, replacement and repair of the product as he considers necessary.

The shuttering elements shall be protected against damage during transportation and storage. The shuttering elements shall be covered if necessary, in particular to avoid deterioration by UV-radiation.

The product may only be supplied as non-load bearing, permanent shuttering elements.

## **2.4 Provisions related to the design and use of the product**

### **2.4.1 Design**

The European Technical Assessment only applies to the manufacture and use of the shuttering kit. Verification of mechanical resistance and stability including application of loads on the kit is not subjected to the European Technical Assessment.

The kit of shuttering elements is used to contain fresh concrete as a permanent shuttering. During construction kit is subjected to pressure of the fresh concrete. After the concrete core has set and hardened, the shuttering kit no longer has a load bearing function. In the works the shuttering elements provide an essential part of the thermal insulation and form the basis of additional finishes.

The shuttering kit is fit for its intended use, provided that the design of the concrete core with required reinforcement are in accordance with the Eurocode EN 1992 series, taking the standards and regulations in force at the place of use into account.

When designing the following conditions shall be observed:

- design is carried under the responsibility of an engineer experienced in these elements;
- the shuttering kit is installed correctly according manufacturer instructions.

The manufacturer has to ensure that all necessary information concerning planning and installation is made know to those who are responsible for design and execution of structures with ICF THERMO NEO.

### **2.4.2 Installation**

The product only achieves its performances under the intended uses if it is applied in accordance with the manufacturer's instructions or – in absence of such instructions – according to the usual practice of building professionals, considering particularly the following points:

- – installation by appropriately trained personnel;
- – installation with the required tools;
- – precaution during installation;
- – application in suitable weather conditions.

The information as to method of repair on site and handling of waste products shall be respected.

An assembly plan shall be prepared for each structure. The assembly plan shall indicate the designation of the shuttering elements required to construct each part of the structure. The assembly plan shall be available on the building site.

After assembly, open joints shall be sealed with e. g. PU foam recommended by manufacturer or other suitable means.

The reinforcement shall be installed according to the design, ensuring that there is adequate concrete cover.

For the minimum reinforcement the instructions given by the manufacturer are to be considered.

### **2.4.3 Concreting**

The concrete shall be designed, manufactured, conveyed and placed in accordance with the standards and regulations in force at the place of use. Requirements for concrete consistency - slump class S4 according standard EN 206 and a maximum aggregate size  $D_{max}$  of 8 mm to 16 mm. Recommended by the manufacturer minimum concrete compressive strength class - C25/30. Concrete pressure and the instructions given by the manufacturer are to be observed.

Recommended concreting speed is 10 m<sup>3</sup> per hour. Shuttering elements resist a concreting speed of 1,0 m per hour in vertical direction. The maximum height that can be concreted without a technological break is one floor of the building, but not more than 3,3 meters in height.

#### 2.4.4 Ducts and services

Ducts and services shall be located in the leaves of shuttering elements where possible. If ducts and services are in the concrete core, their impact on the mechanical resistance and stability, safety in case of fire and the wall's building physical characteristics shall be taken into consideration. Horizontal slots in the concrete core is not allowed.

#### 2.4.5 Finishes and fixing of objects

The walls shall be protected with appropriate internal and external finishes. Cladding or its substructure shall be fixed in the concrete core.

Fixing of objects in the shuttering leaves is impossible for objects of important sizes and weight. The part of the fixing which is significant for the mechanical resistance shall be anchored in the concrete core. This applies in particular to hand rails, etc.

#### 2.4.6 Manufacturer's responsibilities with regard to installation

It is the responsibility of the European Technical Assessment holder to ensure that the information on the product characteristics and on the product application is given to the person(s) concerned.

Information on mounting instructions provided by the manufacturer to SPSC.

The installation instructions, including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical documentation.

### 3. Performance of the product and references to the methods used for its assessment

#### 3.1 Generalities

The identification and characteristics of the raw materials, constituents and final product and the manufacturing methods are part of the technical file that the manufacturer submitted to SPSC. The assessed properties of the kit lead to conclude that it is fit for use for the application as stated in clause 2.1 of the European Technical Assessment.

There may be other requirements applicable to the products resulting from other applicable national regulations and administrative provisions. These requirements need also to be complied with.

The performance of ICF THERMO NEO for the essential characteristics is given in Table 2.

**Table 2 .** Essential characteristics and performances of the product ICF THERMO NEO

No.	Essential characteristics	Product performance
Basic requirement for construction works 1: Mechanical resistance and stability		
1	Resulting structural pattern	See Clause 3.2.1
2	Efficiency of filling	See Clause 3.2.2
3	Possibility of steel reinforcement	See Clause 3.2.3
Basic requirement for construction works 2. Safety in case of fire		
4	Reaction to fire	See Clause 3.3.1
5	Resistance to fire	See Clause 3.3.2

No.	Essential characteristics	Product performance
Basic requirement for construction works 3. Hygiene, health and environment		
6	Content, emission and (or) release of dangerous substances	See Clause 3.4.1
7	Water vapour permeability	See Clause 3.4.2
8	Water absorption	No performance assessed
9	Water tightness	No performance assessed
Basic requirement for construction works 4. Safety and accessibility in use		
10	Bond strength	No performance assessed
11	Resistance to impact load	No performance assessed
12	Resistance to filling pressure	See Clause 3.5.3
13	Safety against personal injury by contact	See Clause 3.5.4
Basic requirement for construction works 5. Protection against noise		
14	Airborne sound insulation	No performance assessed
15	Sound absorption	No performance assessed
Basic requirement for construction works 6. Energy economy and heat retention		
16	Thermal resistance of the wall	See Clause 3.7.2
17	Thermal inertia	No performance assessed
Basic requirement for construction works 7. Sustainable use of natural resources		
18.	Resistance to deterioration	No performance assessed

### 3.2 Mechanical resistance and stability

#### 3.2.1 Resulting structural pattern

The structural pattern is of continuous type concrete wall according to EAD 340309-00-0305.

The dimensions and shapes of the shuttering elements are given in this European Technical Assessment, Annex 1.

#### 3.2.2 Efficiency of filling

The efficiency of filling was assessed by erection of a trial structures in-situ.

Considering the instructions of this ETA clause 2.4, the installation and concreting guide of the manufacturer, the efficient filling without bursting of the shuttering and without voids or any uncovered reinforcement in the concrete core is possible.

#### 3.2.3 Possibility of steel reinforcements

The instructions of the installation guide of the manufacturer are appropriate to incorporate reinforcements in the walls, in accordance with EN 1992-1-1 or with equivalent national calculation rules. Possibility of steel reinforcement has been assessed by visual inspection.

### **3.3 Safety in case of fire**

#### **3.3.1 Reaction to fire**

The reaction to fire of the EPS shuttering elements used in the ICF THERMO NEO shuttering system covered in this European Technical Assessment is class E according to EN 13501-1.

#### **3.3.2 Resistance to fire**

The minimum thickness of the continuous concrete core can be rounded up to 150 mm the fire resistance class of walls with a minimum concrete strength class C16/20 according to Table A.1 of Annex 4 of EAD 340309-00-0305 is REI 120.

### **3.4 Hygiene, health and environment**

#### **3.4.1 Release of dangerous substances**

According to the manufacturer's declaration of performances the shuttering elements ICF THERMO NEO taking account of the EU database does not contain any dangerous substances.

Within the scope of this assessment, there may be other requirements applicable to dangerous substances resulting from transposed European legislation or applicable national regulations and administrative provisions (see EU database and the different national regulations).

#### **3.4.2 Water vapour permeability**

The design value of water vapour diffusion resistance coefficient ( $\mu$ ) of expanded polystyrene, in accordance with EN ISO 10456 is 60.

#### **3.4.3 Water absorption**

No adverse reaction caused by the capillarity of the shuttering leaves was observed during the filling assessment. No other performance assessed.

#### **3.4.4 Water tightness**

Wall finishes (internal and external) are not part of the kit. No performance assessed.

For internal protection (in rooms with splashing water and/or high humidity), the recommendations of the manufacturer shall be followed.

### **3.5 Safety in use**

#### **3.5.1 Bond strength**

No performance assessed.

#### **3.5.2 Resistance to impact load**

The wall finishes are not part of the kit. Therefore, the impact resistance based on impact tests has not been assessed.

#### **3.5.3 Resistance to filling pressure**

Resistance to filling pressure is satisfactory when filling of 3,3 m high wall construction (storey's height) with bracing supports.

The maximum aggregate size  $D_{max}$  shall be 16 mm and the slump class of the concrete shall be S4 according to EN 206, Table 3.

In addition, the resistance to filling pressure was verified by erection of a trial structures in-situ. The resistance to filling pressure has been controlled during filling and on completion of the filling. The requirements in respect to cracking and failure of the system elements and horizontal bowing of shuttering are satisfactorily met.

The conditions of the trial test are the following:

- bracing support for shuttering leaves of 45 mm thicknesses;
- thickness of shuttering leaves:  $\geq 45$  mm;
- thickness of concrete core: 160 mm and 210 mm;
- wall height: 3,3 m;



- consistency of concrete: slump class S4;
- filling rate:  $\leq 10 \text{ m}^3$  per hour (3 l/s);
- maximum deformation of the shuttering wall: not visible.

### 3.5.4 Safety against personal injury by contact

The shuttering elements do not have sharp or cutting edges, even if they are cut for the realization of the particular construction details. There is no risk of abrasion or of cutting injuries.

## 3.6 Protection against noise

### 3.6.1 Airborne sound insulation

No performance assessed.

### 3.6.2 Sound absorption

Wall finishes (internal and external) are not part of the kit. No performance assessed.

## 3.7 Energy economy and heat retention

### 3.7.1 Thermal conductivity

The declared thermal conductivity of the EPS shuttering elements used in the ICF THERMO NEO shuttering system covered in this ETA is  $0,031 \text{ W/m}\cdot\text{K}$ , according to EN 13163. The design value  $0,033 \text{ W/m}\cdot\text{K}$ . The design value of the reinforced concrete core is  $2,50 \text{ W/m}\cdot\text{K}$ .

### 3.7.2 Thermal resistance of the wall

The values of total thermal resistance  $R$  of the plain EPS shuttering elements with reinforced concrete core, considering influence of the ladders, in end use conditions (without inner and outer finishes) are given in this ETA, Table 3.

The calculations have been carried out in accordance with EN ISO 10211 and EN ISO 6946, taking into account a thermal conductivity design value of  $0,033 \text{ W/m}\cdot\text{K}$  for the EPS, and a tabulated design value of  $2,5 \text{ W/m}\cdot\text{K}$  for the reinforced concrete ( $2400 \text{ kg/m}^3$ ), according to EN ISO 10456.

**Table 3** : Total thermal resistance  $R$  of the plain EPS shuttering elements filled with reinforced concrete in end use conditions

Wall thickness, mm	Shuttering leaves thicknesses, mm	Concrete core thickness $b_{\text{max}}$ , mm	Total thermal resistance $R$ of the wall, $\text{m}^2\cdot\text{K/W}$
250	45 and 45	160	2,372
300	45 and 95	160	3,884
350	45 and 145	160	5,412
400	45 and 195	160	6,939
450	45 and 245	160	8,484
500	45 and 295	160	9,988
300	45 and 45	210	2,387
350	45 and 95	210	3,921
400	45 and 145	210	5,448
450	45 and 195	210	6,984
500	45 and 245	210	8,501

## 3.8 Sustainable use of natural resources. Aspects of durability

### 3.8.1 Resistance to deterioration

Wall finishes (internal and external) are not part of the kit. No performance assessed.

#### **4. Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

In accordance with the European Assessment Document EAD 340309-00-0305 "Non load-bearing permanent shuttering kits/systems based on hollow blocks or panels of insulating materials and sometimes concrete" the applicable European legal act is Decision 98/279/EC, as amended by 2001/596/EC, and system 2+ of assessment and verification of constancy of performance applies.

#### **5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

##### **5.1 Tasks for the manufacturer**

###### **5.1.1 Factory production control (FPC)**

The manufacturer shall set up a production control at his factory and perform regular controls of the production process according to the control plan<sup>1</sup>. This ensures that the product shows the properties stated in this ETA.

The manufacturer may only use incoming materials according to the material data sheets. He shall control the incoming materials according to the provisions specified in the factory production control plan.

The results of the factory production control shall be recorded and evaluated. The records shall include at least the following information:

- name of the product,
- date of manufacturing of the product, batch N° if needed, and date of inspection or control (tests) of the product,
- result of inspections or controls (tests) and, as far as applicable, comparison with the requirements.

The records shall be kept for at least five years. On request they shall be presented to SPSC.

Details concerning extent, type and frequency of the tests or inspections to be performed within the scope of the factory production control shall correspond to the factory production control plan.

##### **5.2 Tasks of the notified body**

###### **5.2.1 Assessment of the construction product**

Assessment of the ICF THERMO NEO EPS shuttering elements has been conducted under the responsibility of the assessment body (SPSC) in accordance with EAD 340309-00-0305. These assessment results should be used for the purposes of assessment of the performance of the construction product in accordance with Regulation (EU) N° 305/2011, Annex V, clause 1.6 (Commission delegated Regulation (EU) No 568/2014).

###### **5.2.2 Initial inspection and continuing surveillance of the factory production control**

Assessment of the FPC is the responsibility of a Notified Body.

An assessment shall be carried out on the required manufacturing steps to demonstrate that the factory production control is in conformity with the ETA and any subsidiary information. This assessment is based on an initial inspection of the factory.

Subsequently continuing inspection of factory production control is necessary to ensure continuing conformity with the ETA. This continuing inspection is performed in accordance with this ETA, clause 5.1.1.

It is recommended that surveillance inspections should be conducted at least twice a year.

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<sup>1</sup> The control plan is a confidential part of the technical file and deposited with SPSC and contains the required information on the factory production control

## **6. Bibliography**

EAD 340309-00-0305, January 2019. Non load-bearing permanent shuttering kits/systems based on hollow blocks or panels of insulated materials and sometimes concrete.

EN 206:2013+A2:2021 Concrete - Specification, performance, production and conformity.

EN 1992-1-1 Eurocode 2 Design of concrete structures - Part 1-1: General rules and rules for buildings.

EN12086:2013 Thermal insulating products for building applications - Determination of water vapour transmission properties.

EN 13163:2012+A1:2015 Thermal insulation products for buildings - Factory made expanded polystyrene (EPS) products – Specification.

EN 13501-1:2018 Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

EN ISO 6946:2017 Building components and building elements - Thermal resistance and thermal transmittance - Calculation methods (ISO 6946:2017, Corrected version 2021-12).

EN ISO 10211:2017 Thermal bridges in building construction - Heat flows and surface temperatures - Detailed calculations (ISO 10211:2017).

EN ISO 10456:2007 Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values (ISO 10456:2007).

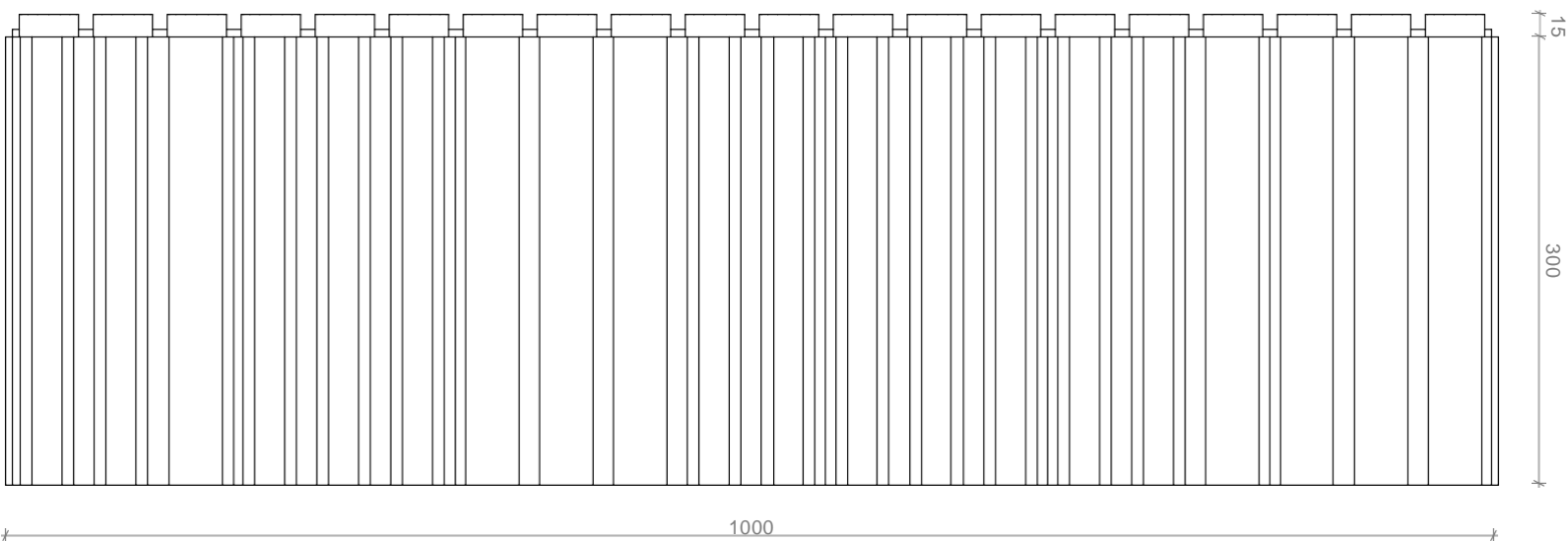
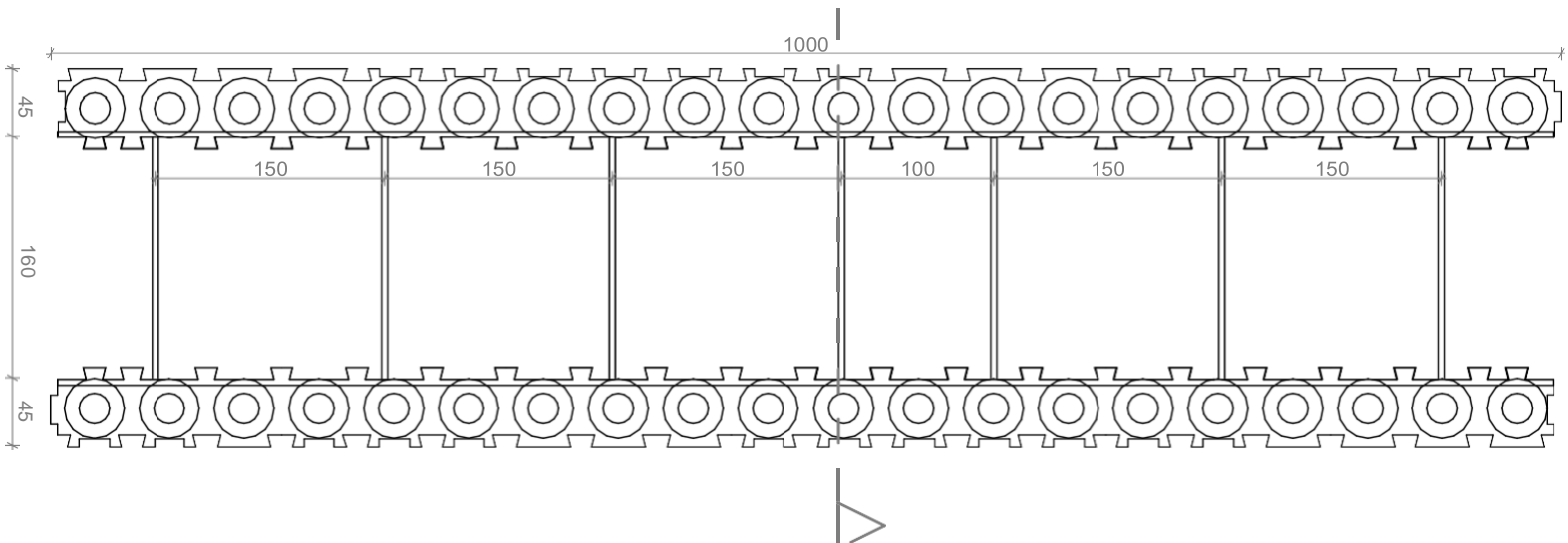
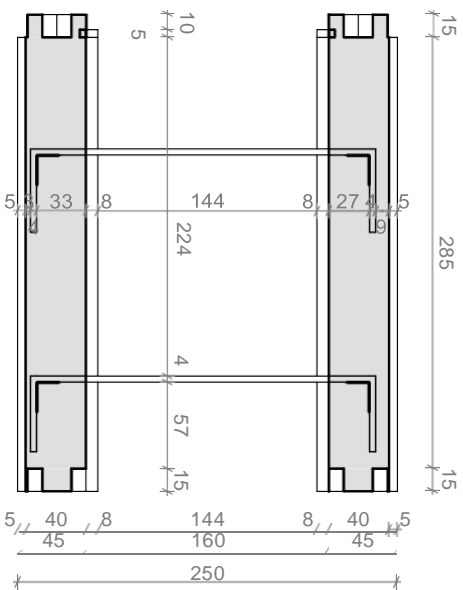
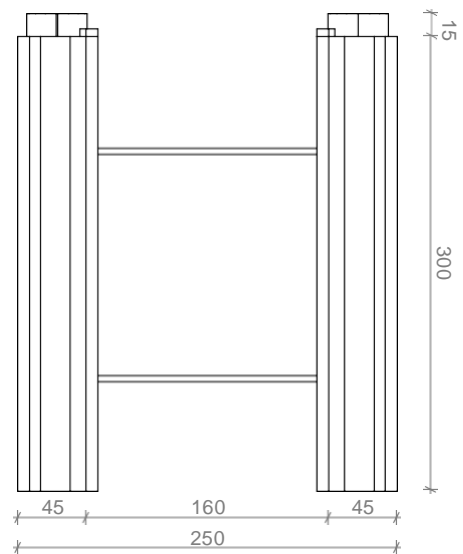
EOTA GD 14:2019 Guidance on Handling the essential characteristic "Content, emission and/or release of dangerous substances" in EAD and ETA (EOTA TR034 (Superseded by EOTA GD14) General BWR3 Checklist for EADs/ETAs - Dangerous substances).

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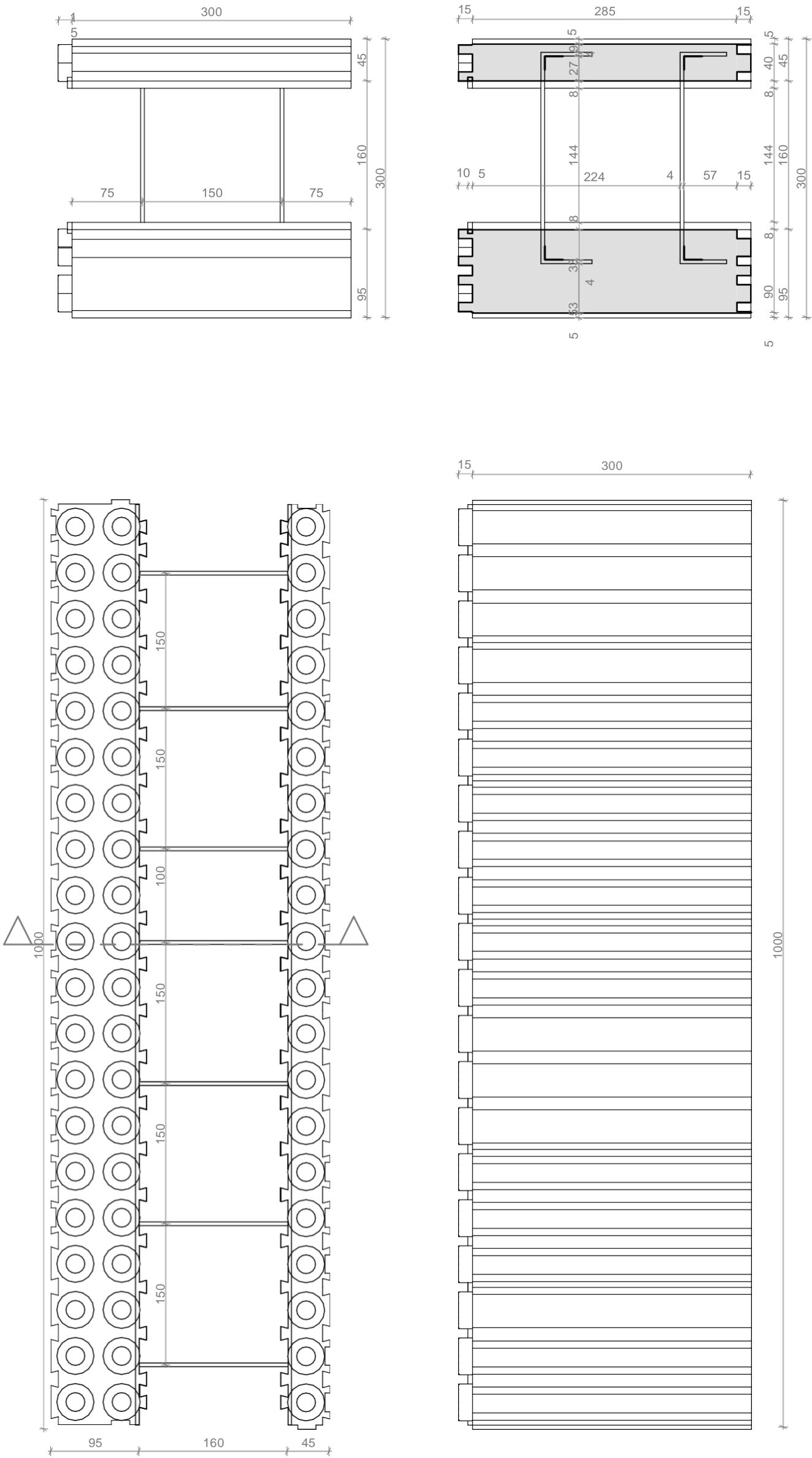
By Statybos produkcijos sertifikavimo centras

Director Valdemaras Gauronskis

**Annex 1**  
Shuttering element ICF 45x160x45

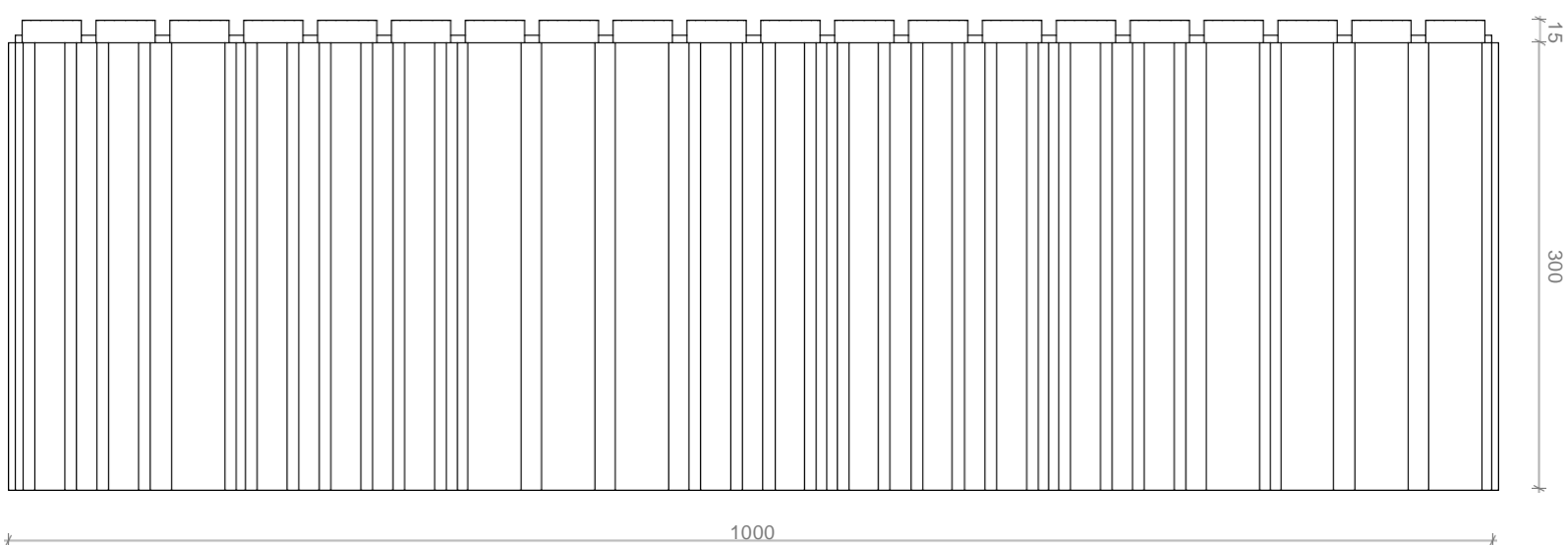
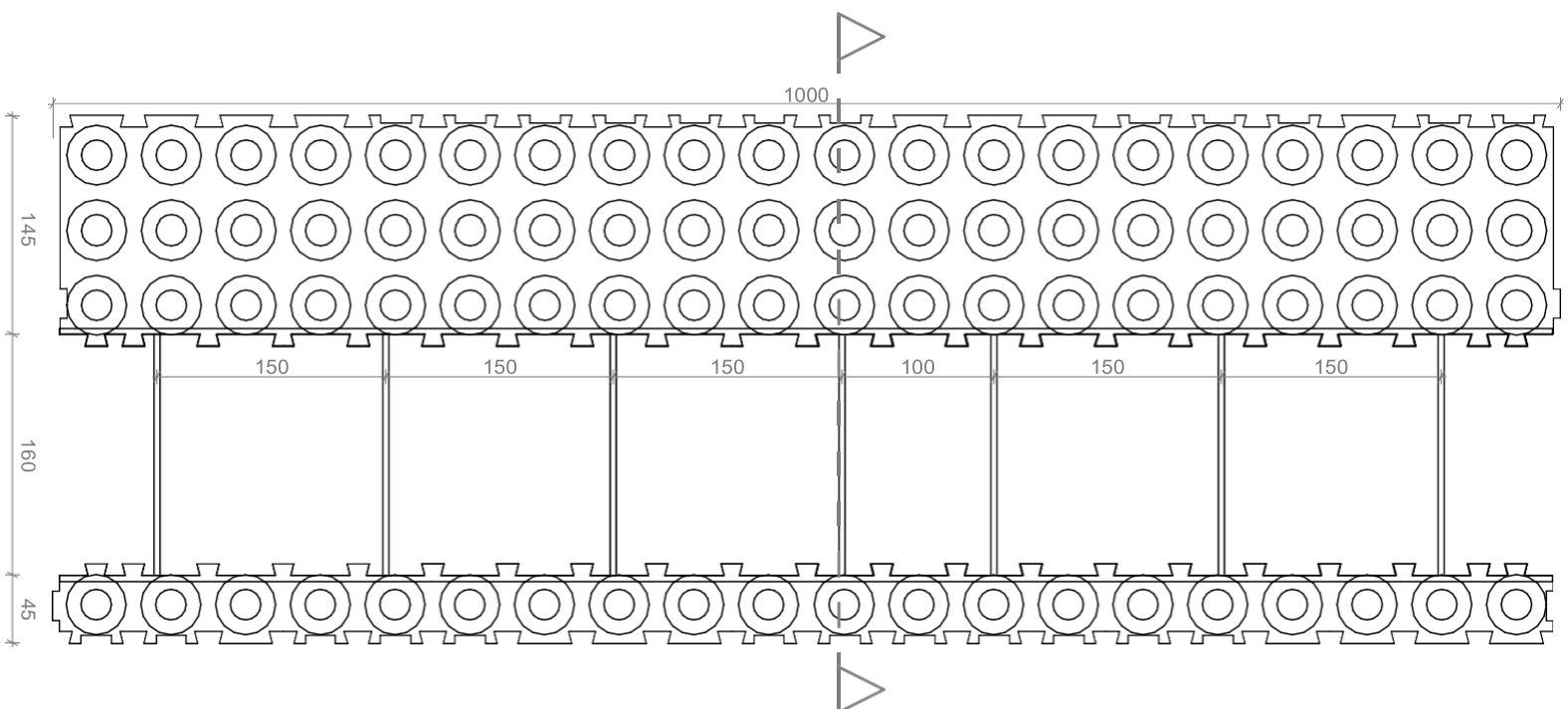
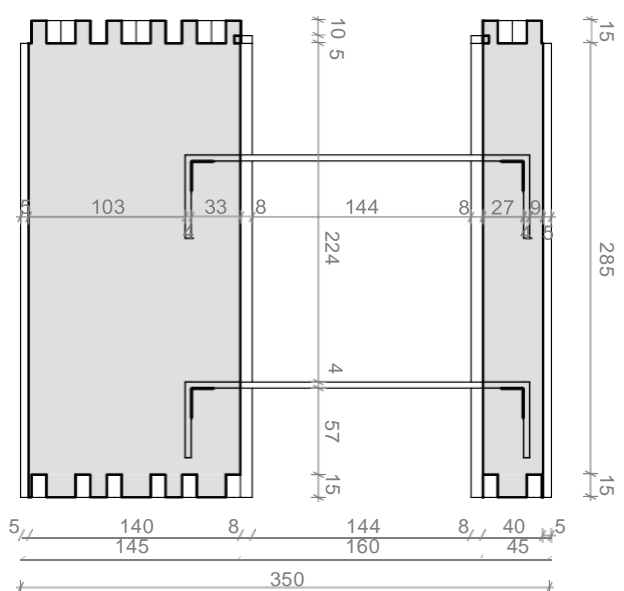
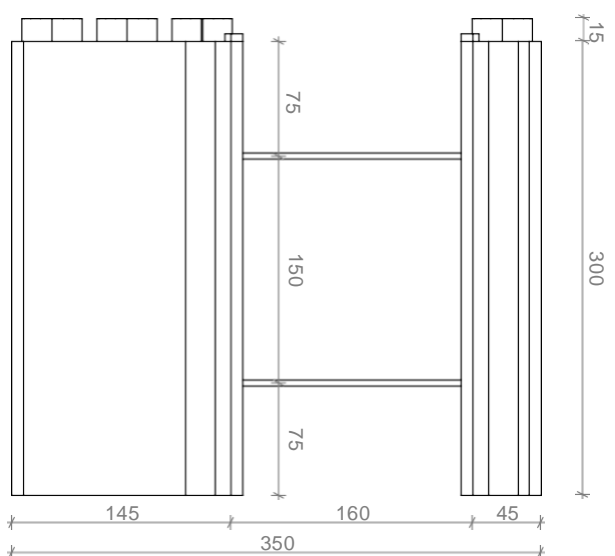


**Annex 1**  
Shuttering element ICF 45x160x95

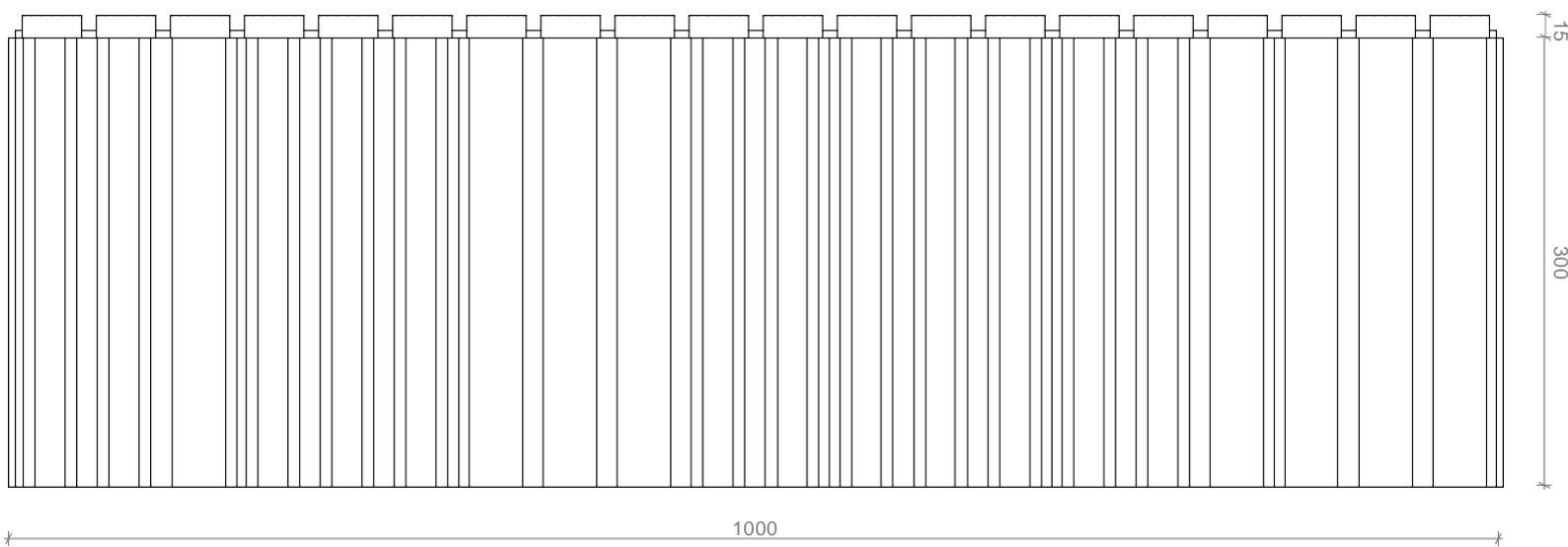
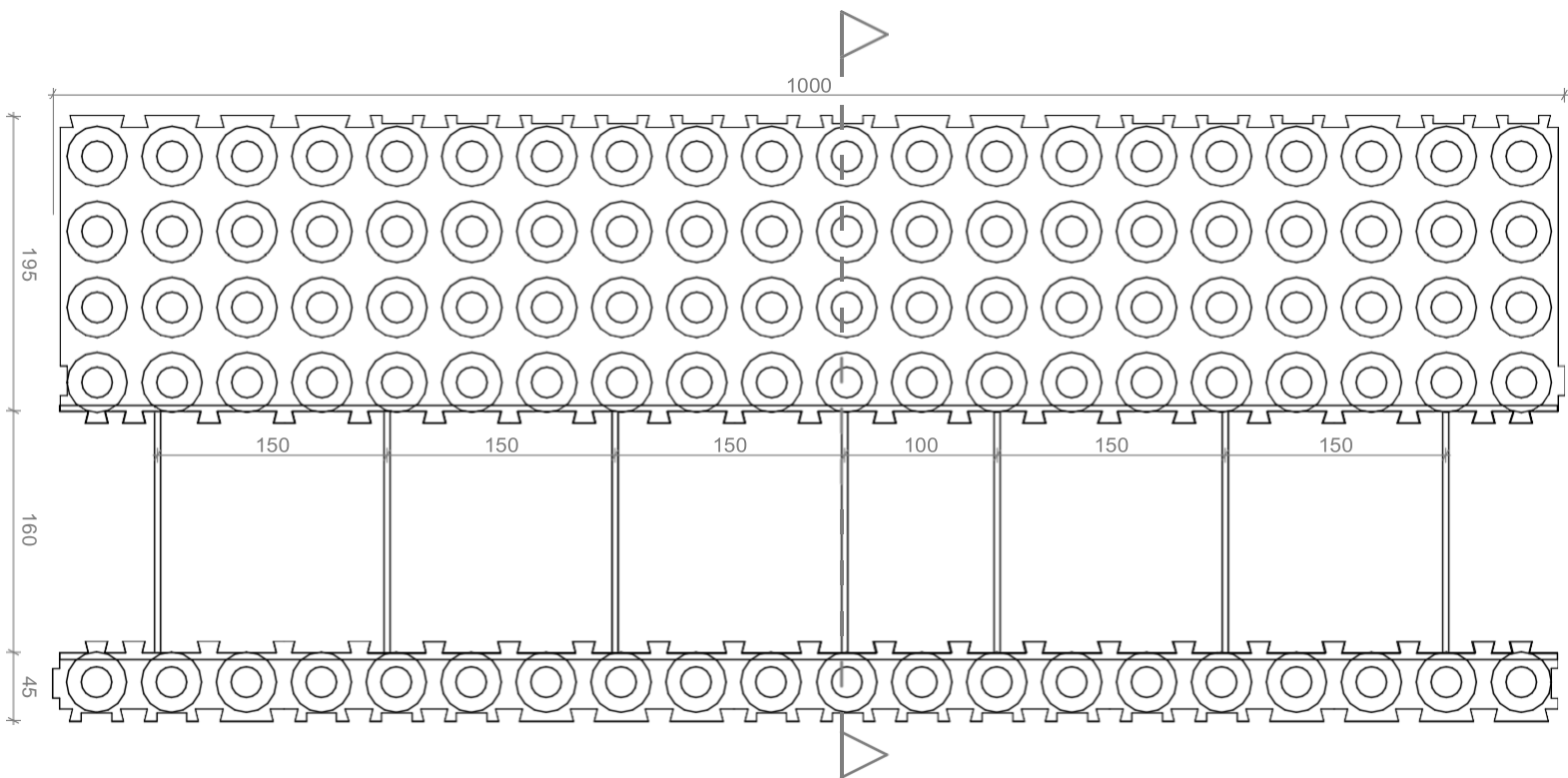
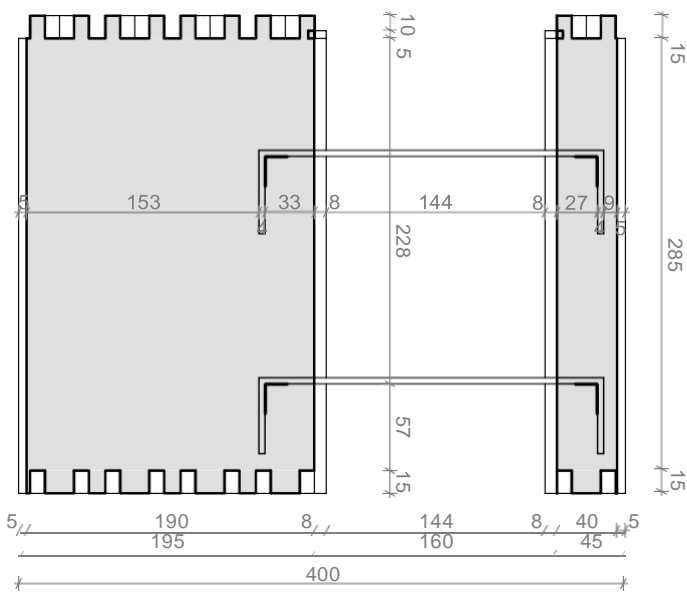
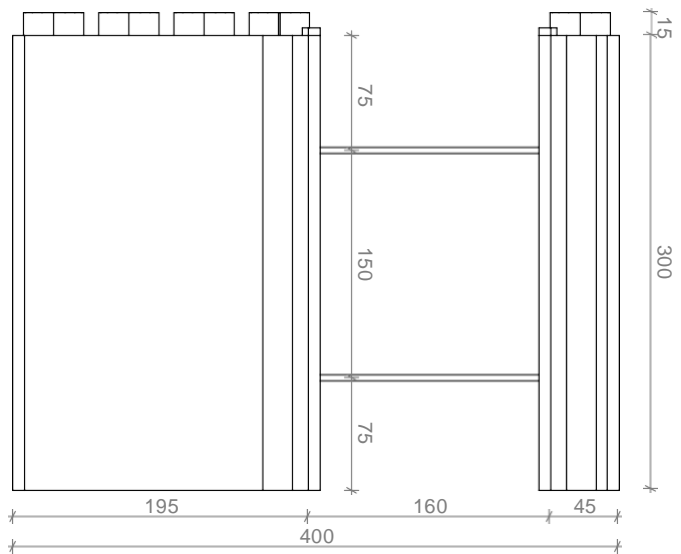


## Annex 1

### Shuttering element ICF 45x160x145



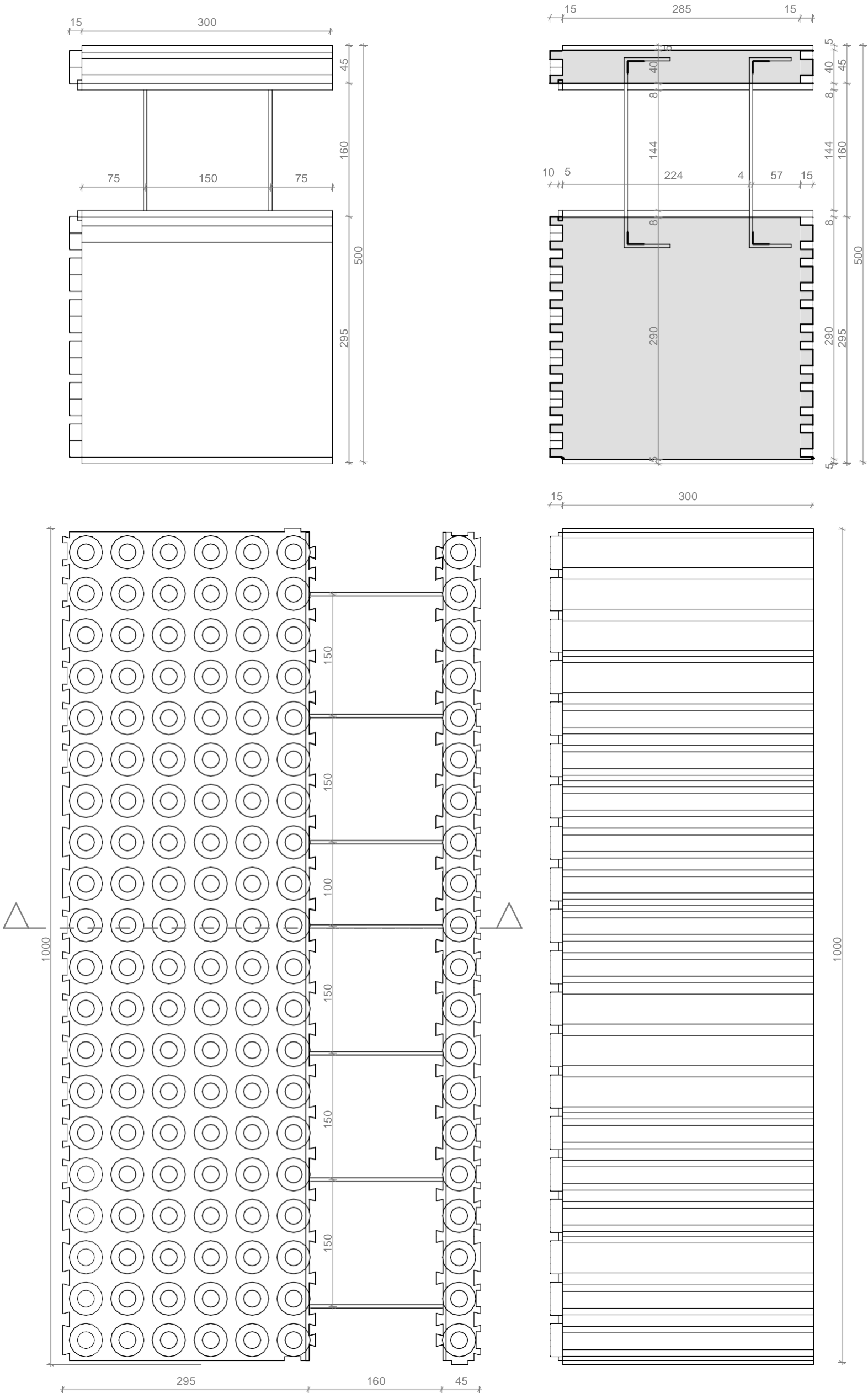
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Shuttering element ICF 45x160x195



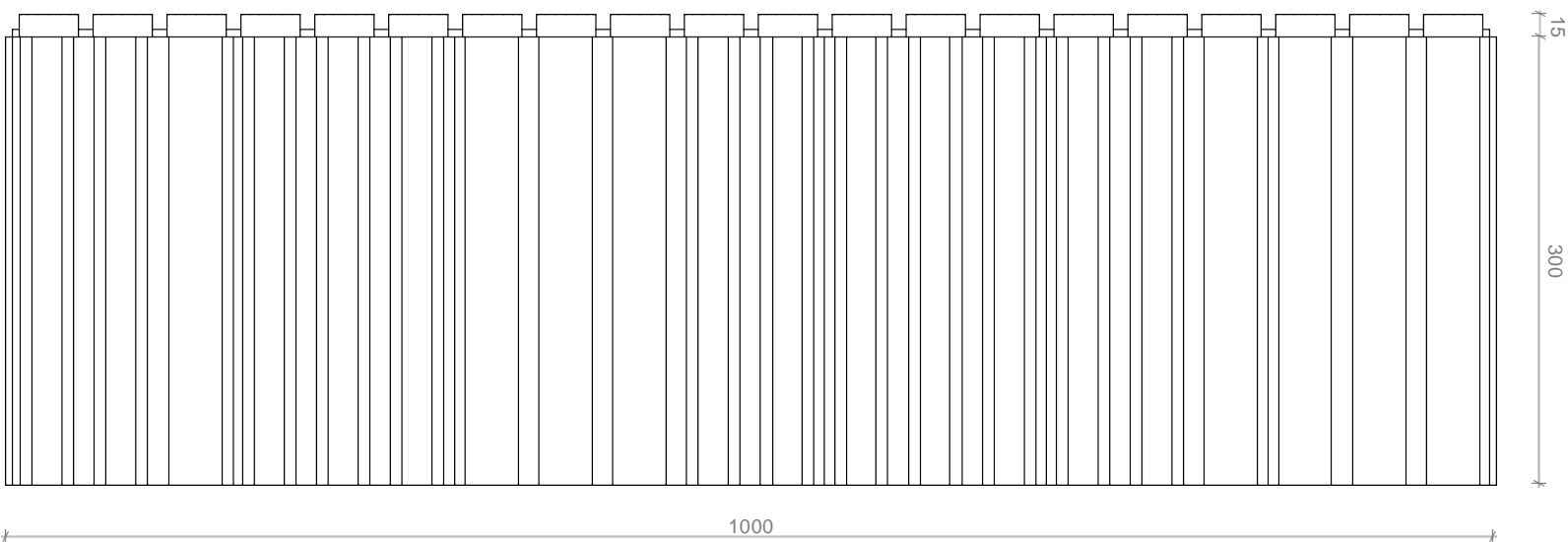
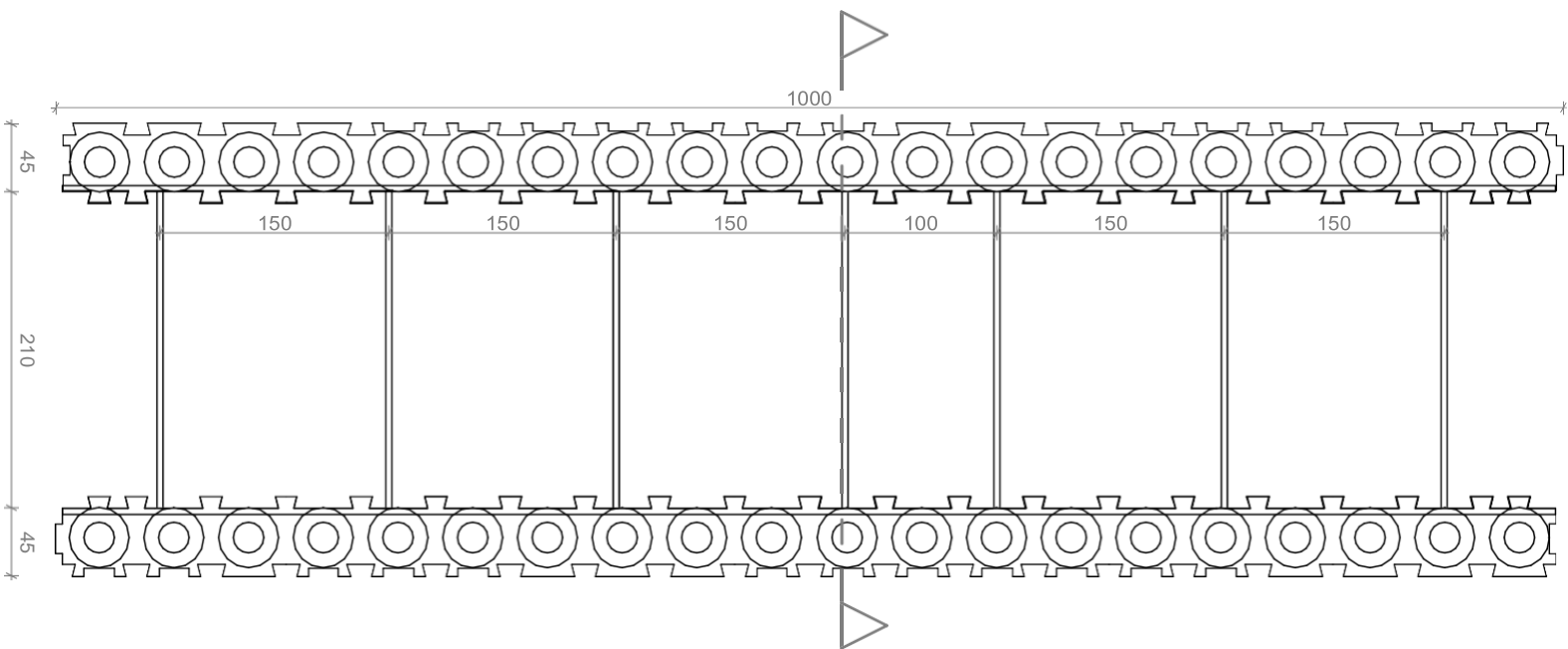
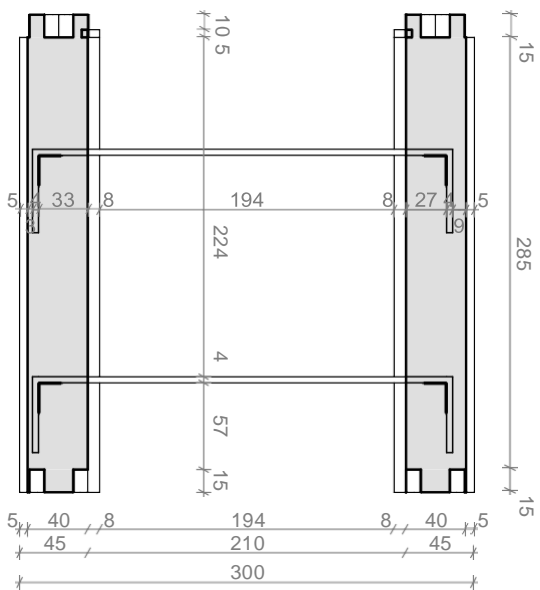
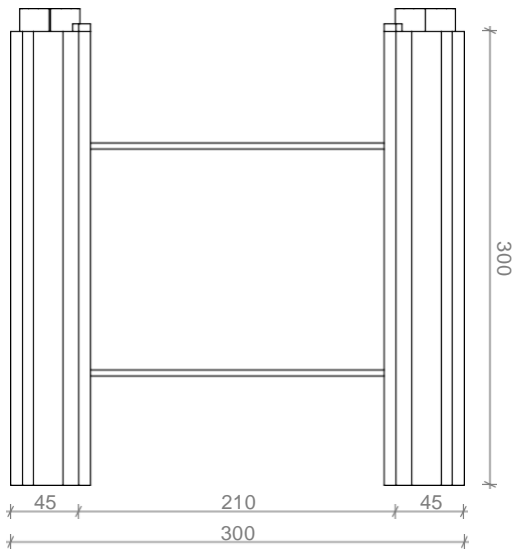




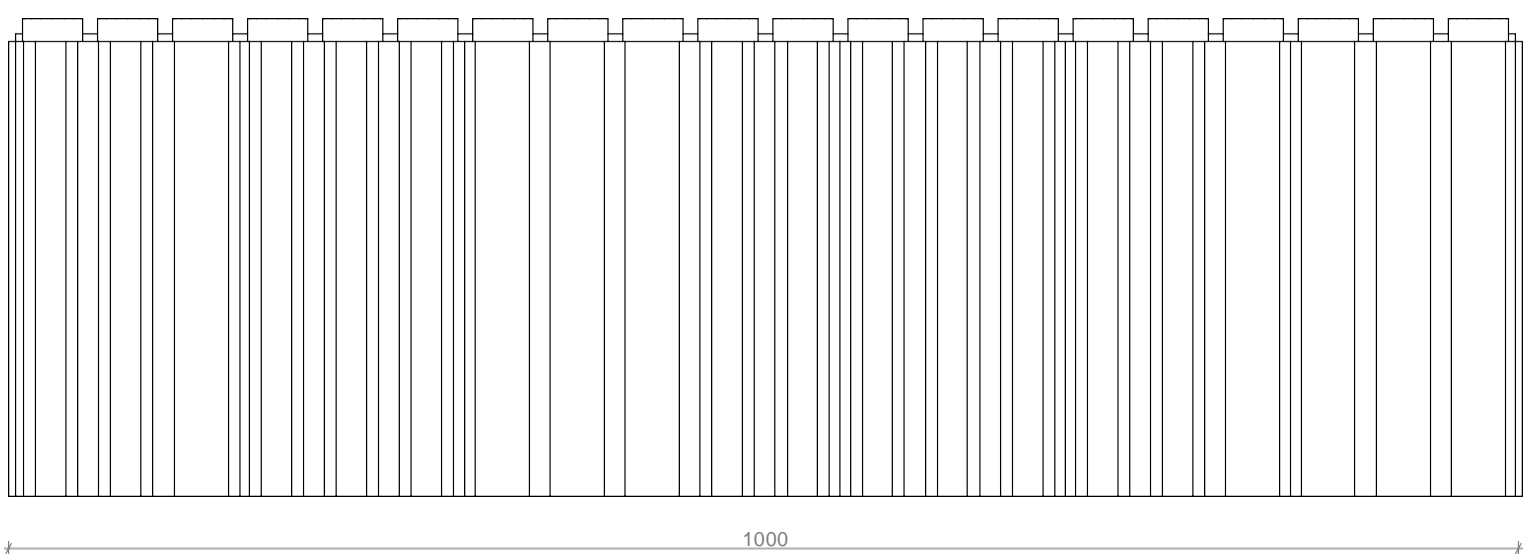
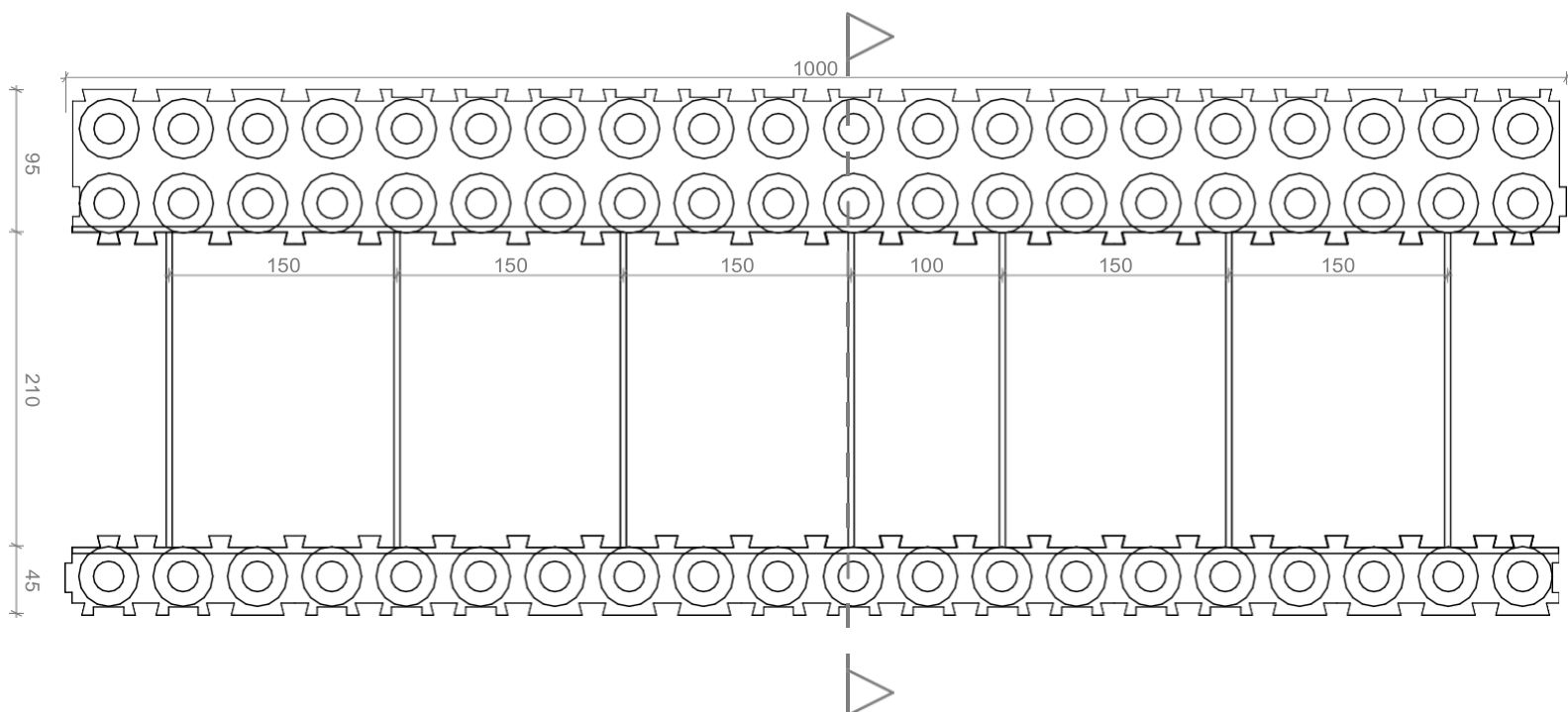
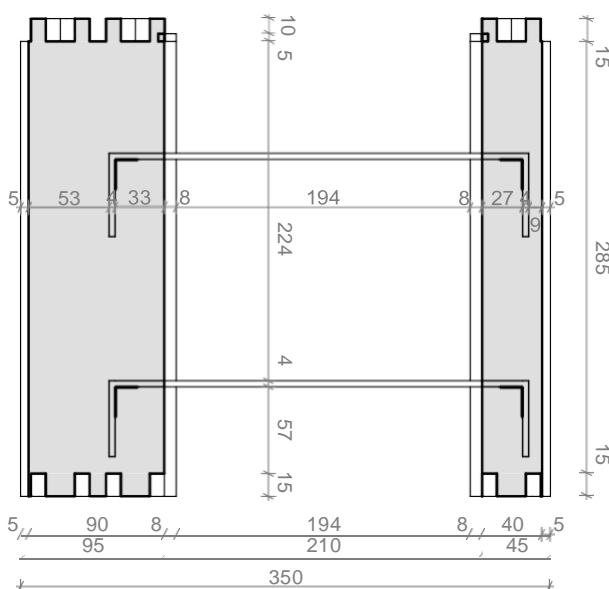
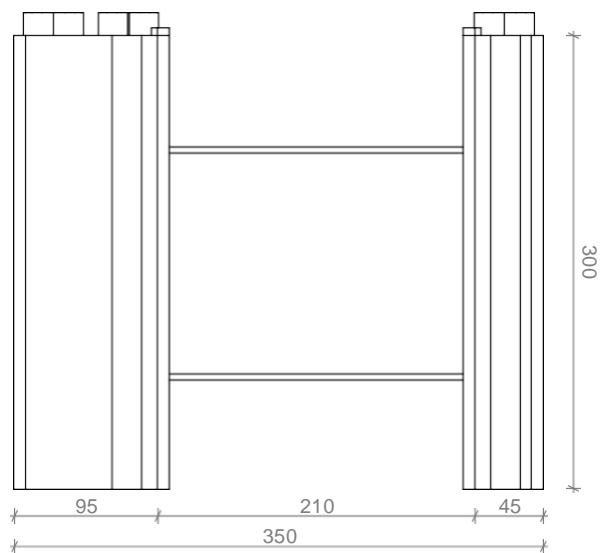
Annex 1  
Shuttering element ICF 45×160×295



**Annex 1**  
Shuttering element ICF 45x210x45

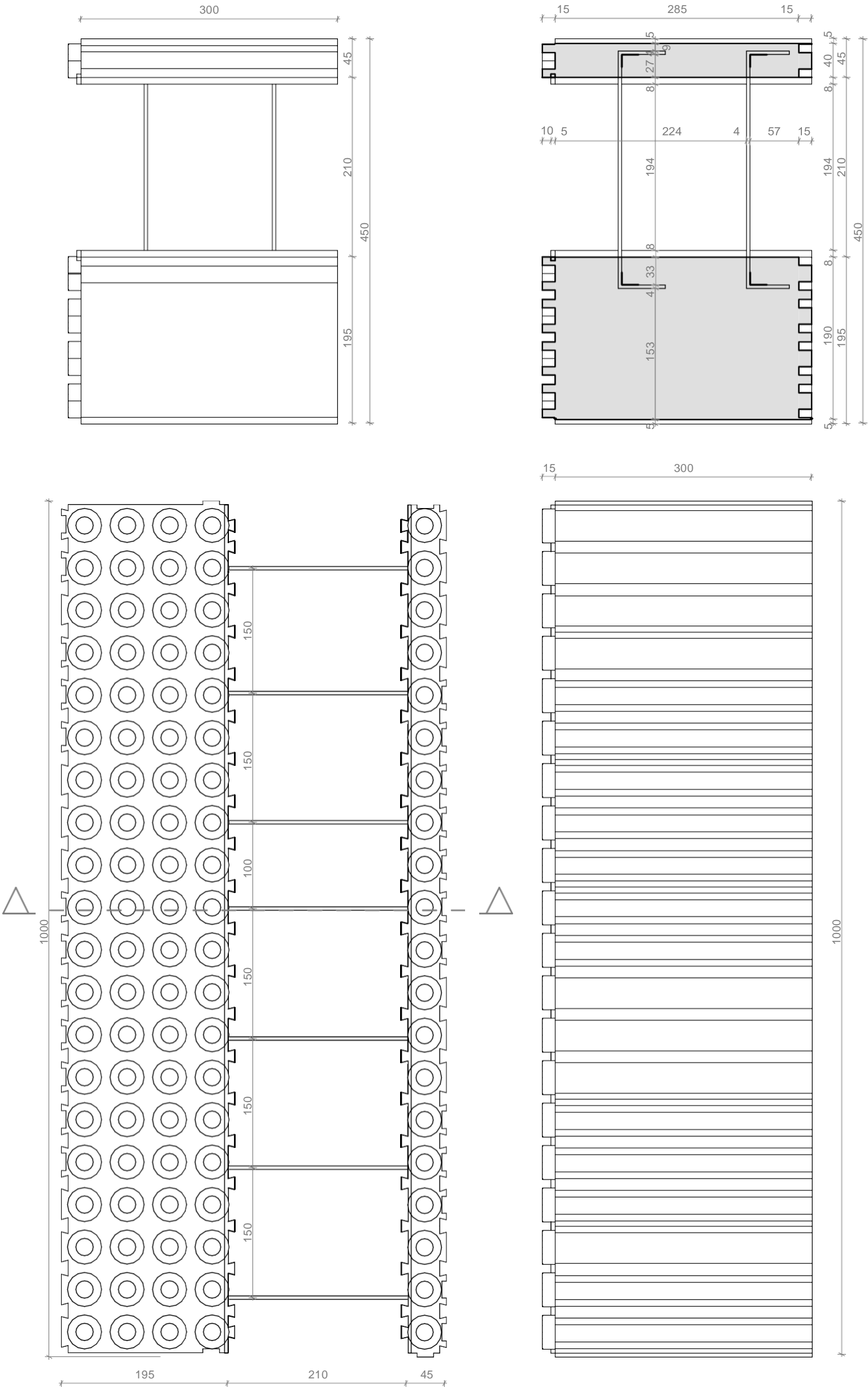


**Annex 1**  
Shuttering element ICF 45x210x95

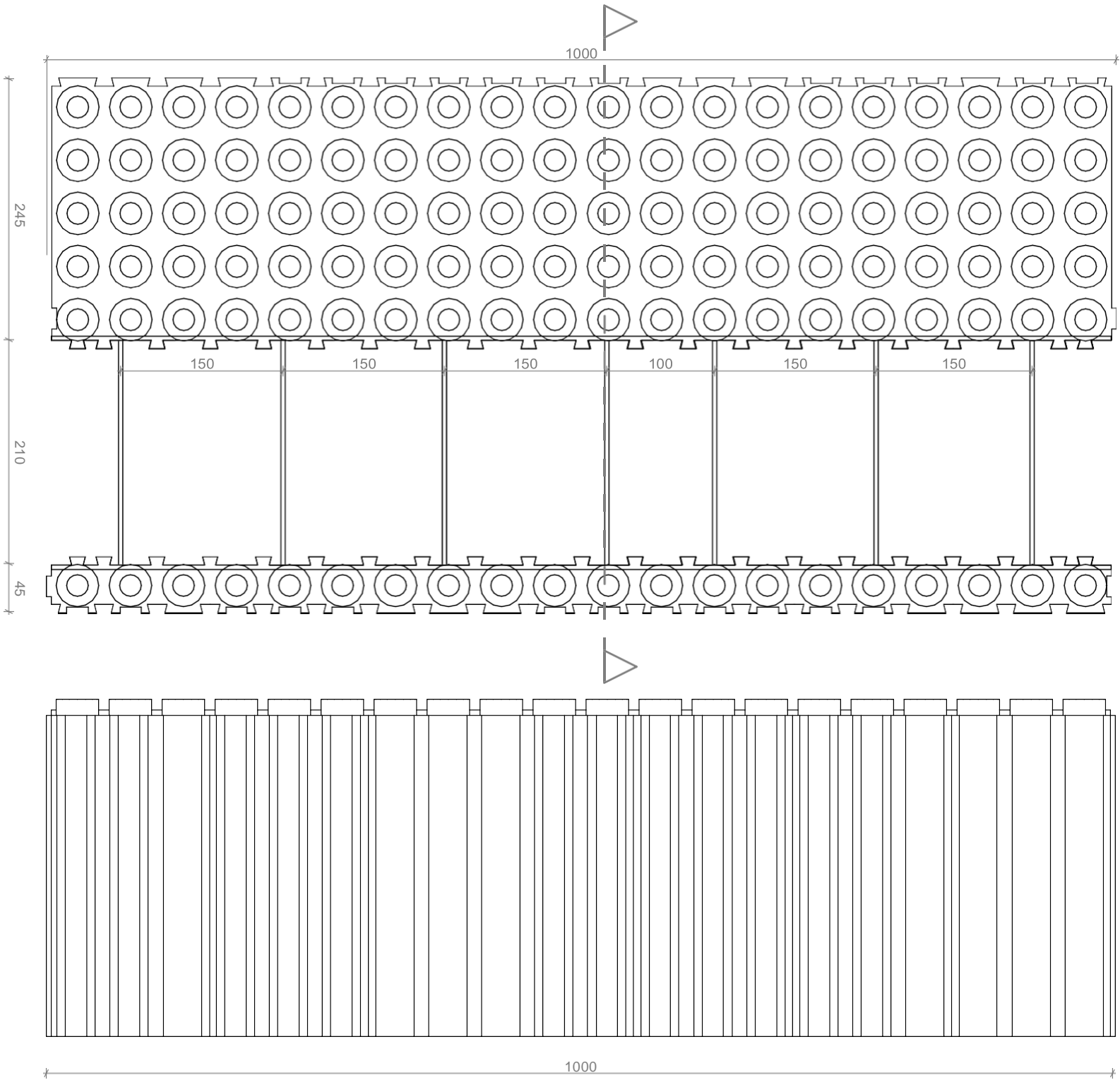
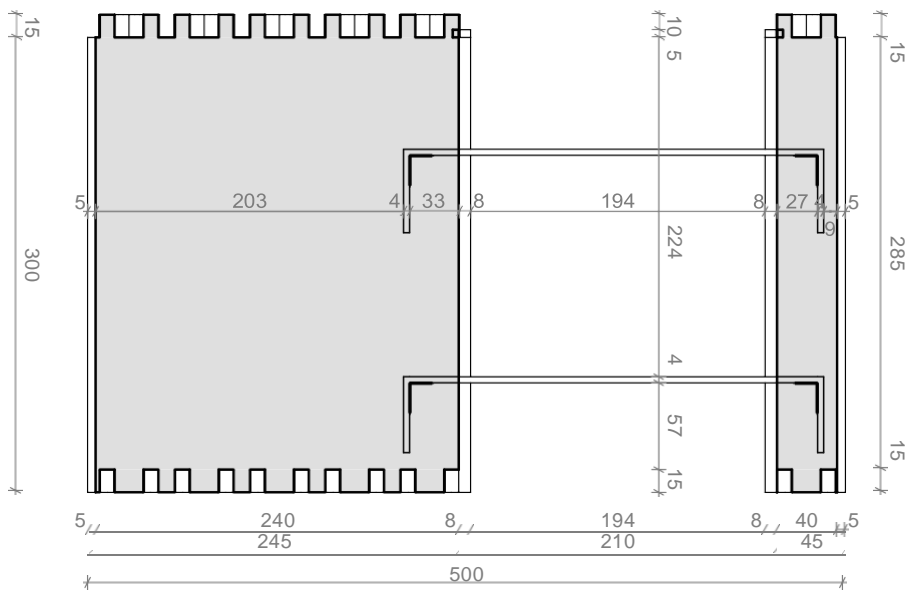
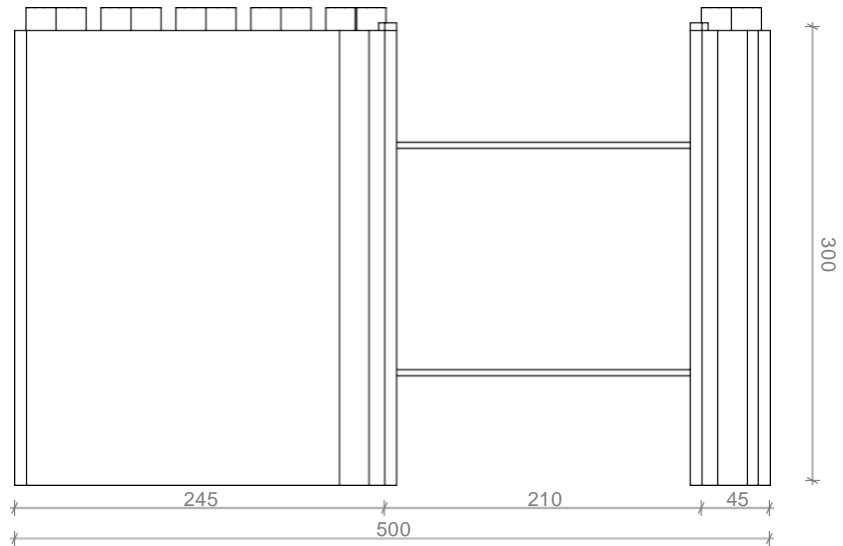




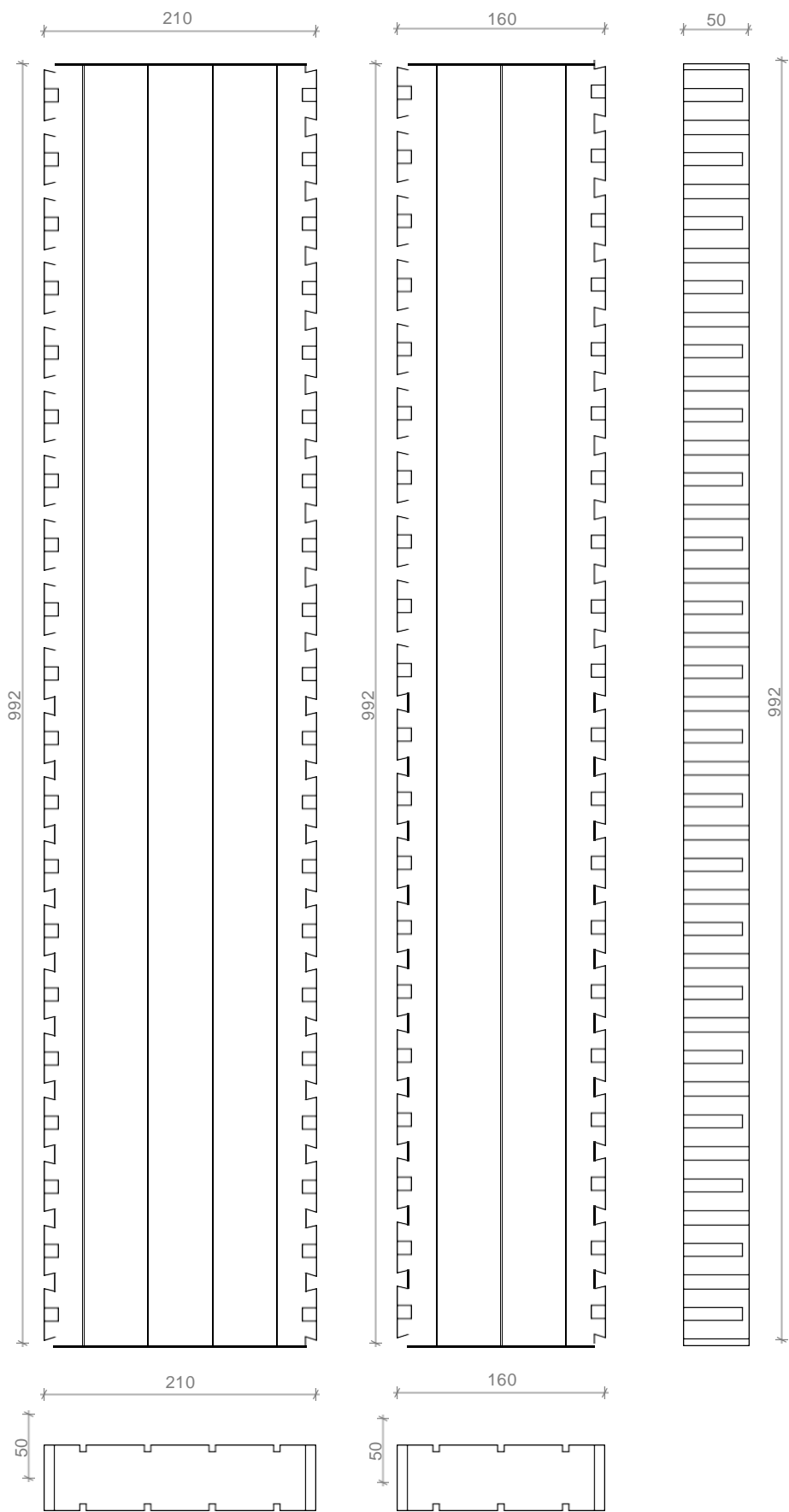
Annex 1  
Shuttering element ICF 45x210x195



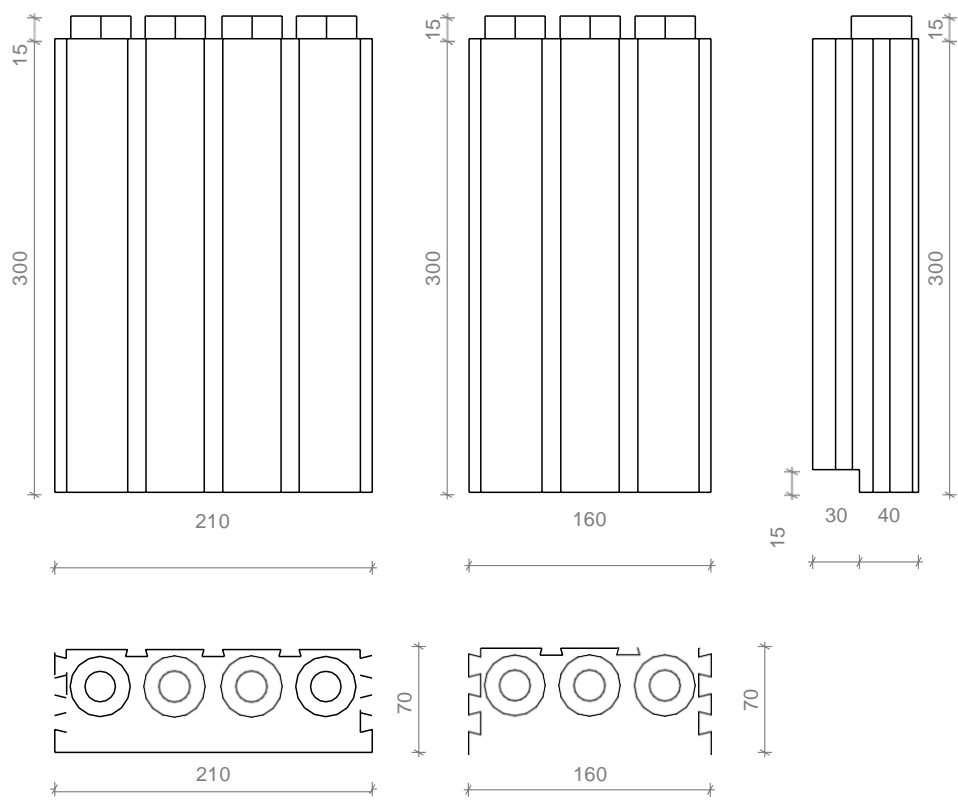
**Annex 1**  
Shuttering element ICF 45x210x245



**Annex 1**  
Lintel bootom leaves



Annex 1  
End leaves





## Annex 2

The principal drawing of the shuttering elements connected in the corner of the building

