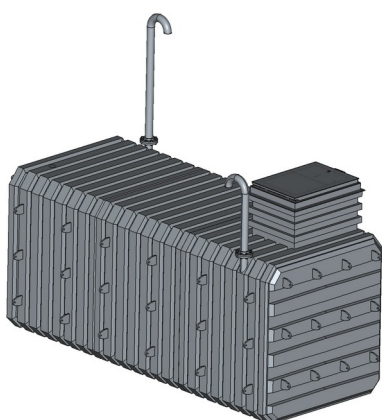
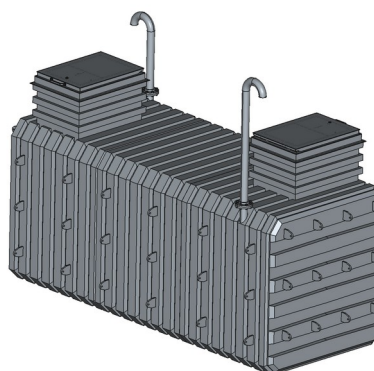


Installation manual

Safe cellar shelter 480



Shelter 480 with one entrance



Shelter 480 with two entrances

1. Intended use and product description

The safe cellar shelter 480 is a ready-made, watertight plastic body with a strong steel frame that is encased in a layer of reinforced concrete during installation. The product is designed to be fully buried: only the entrance hatch, projecting 10 cm, and the head of the drainage chamber remain above ground level.

The single-entrance version has one vertical shaft with a hatch; the version with a main and an emergency entrance has two shafts on opposite sides, with hatches that open in opposite directions.

Inside there are four shelf levels that convert into sleeping berths, supply and extract ventilation with mechanical assistance through two Ø100 mm pipes, and a 12 V electrical installation. The shelves are placed in the half furthest from the entrance; the near half is left free for the passage and the ladder.

Main dimensions

Parameter	Value
Body dimensions, length × width	480 × 197 cm
Dimensions over the reinforcement holders	503 × 226 cm
Height of the body	209 cm
Height to the top of the entrance hatch	277 cm
Hatch steel thickness	6 mm
Pit, length × width × depth	540 × 260 × 282 cm
Excavation for the drainage chamber	70 × 70 cm, depth 282 cm
Weight of the body	approx. 2 t

Protection category

Standard installation to this manual, using dry concrete, produces a safe cellar shelter.

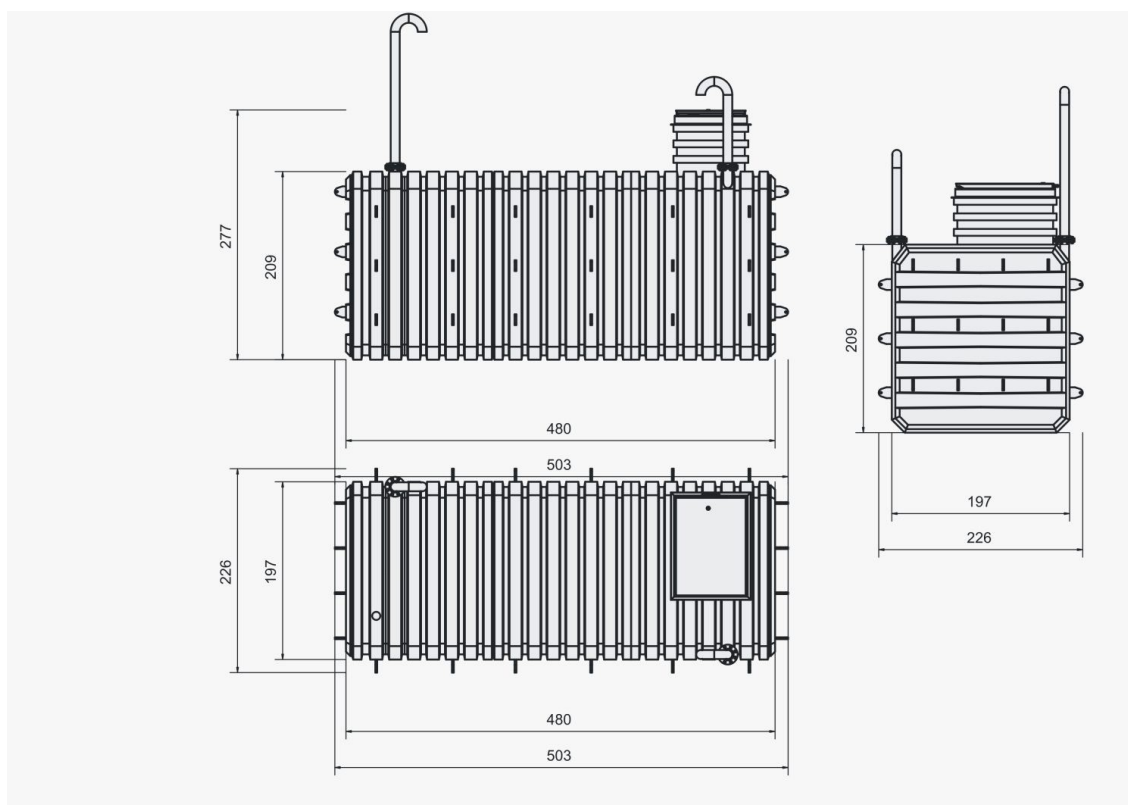
Category S-0: pressure from 0.03 MPa (30 kPa) or a quasi-static load from 60 kN/m². This requires the body to be encased in ready-mixed concrete of strength class C20/25 in a layer of at least 20 cm, together with an entrance hatch certified for this shelter category.

Category S-1: pressure of at least 0.1 MPa (100 kPa). This requires ready-mixed concrete of strength class C25/30 in a layer of at least 30 cm, double reinforcement and an entrance hatch certified for this shelter category.

Double reinforcement layout: two mats of Ø12 mm bar with a 200 × 200 mm mesh — an outer and an inner mat; spacing between the layers 100–120 mm; the layers tied together with Ø8 mm links at 400 mm centres, staggered; concrete cover of at least 40 mm to the outer faces and 50 mm to the insulation; bar laps of 100 mm, with laps in adjacent layers staggered.

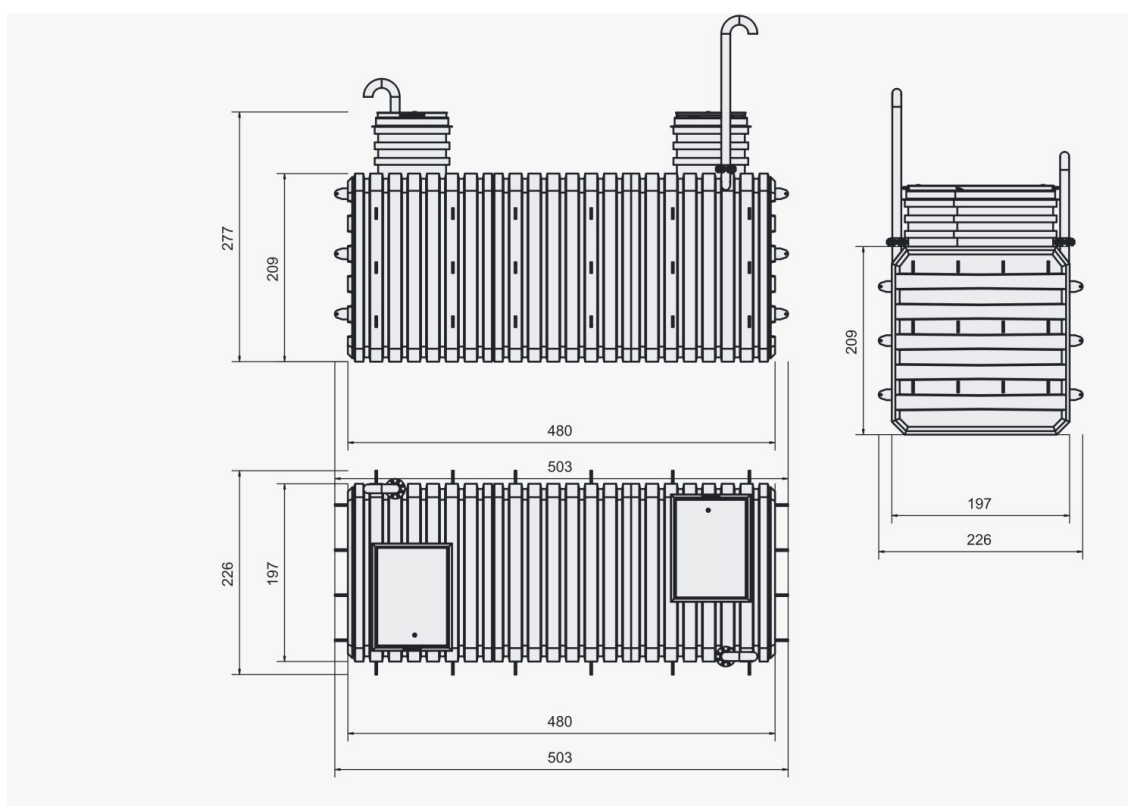
For an exact match to a protection category, order a structural calculation from a design office, taking into account the burial depth, the soil type and the groundwater level.

Dimensioned drawings



Shelter 480 with one entrance — three views, dimensions in centimetres

Actual dimensions may differ from those shown on the drawing by ± 3 % due to shrinkage of the polyethylene.



Shelter 480 with main and emergency entrance — three views, dimensions in centimetres

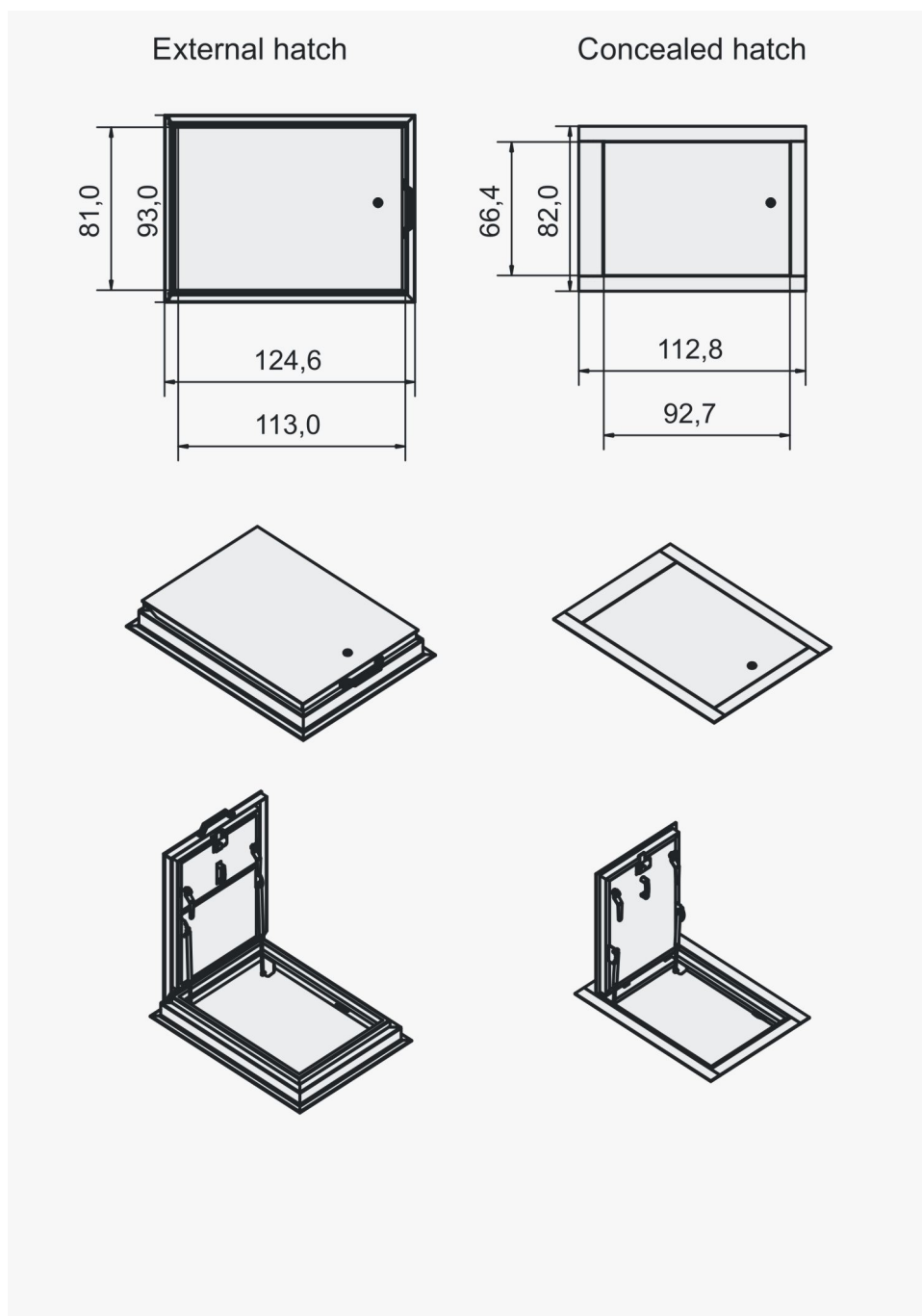
Actual dimensions may differ from those shown on the drawing by ± 3 % due to shrinkage of the polyethylene.

Hatch options

The vertical shaft is fitted with one of two hatches — external or concealed.

The external hatch is made of 6 mm steel and is intended for installation outside a building. It has two sealing lines, and its design prevents rain and snow from entering the shelter.

The concealed hatch is made of 6 mm steel and is intended for installation in the floor of a garage, an outbuilding or directly in the house. Once installed, its surface is flush with the floor.



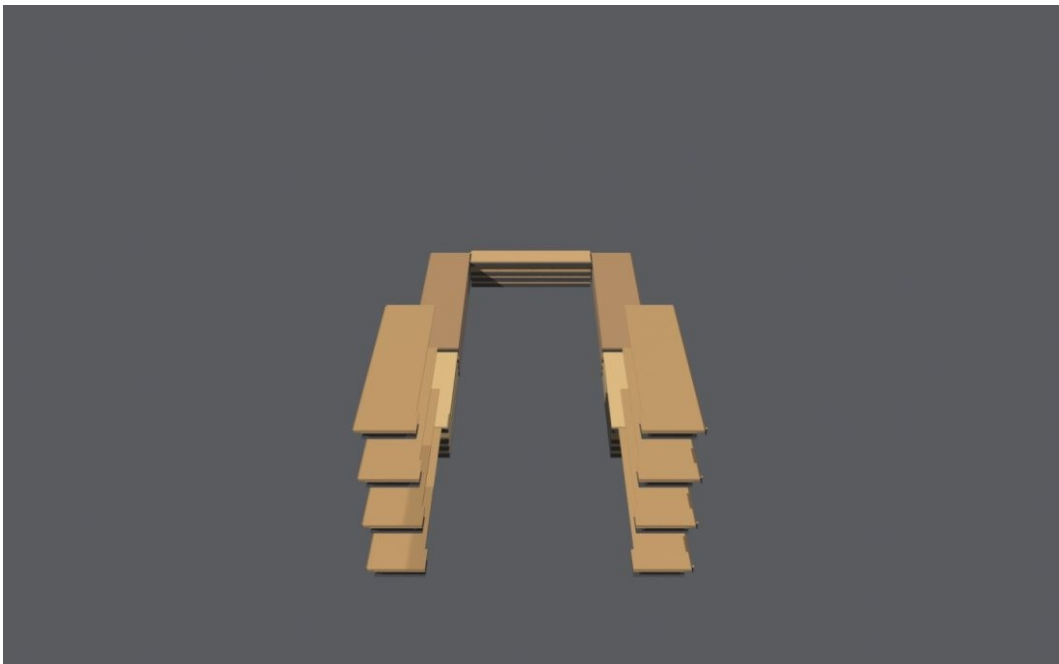
External hatch and concealed hatch: plans with dimensions, closed and open positions

Shelf layout options

The shelves are rearranged without tools: the plywood panel is lifted out together with its steel frame of 40 × 40 mm tube and placed in the chosen position. The front shelves by the entrance, with narrower plywood, are fixed in place and cannot be removed. Twenty shelves are removable: four middle ones on each side, four long ones at the far end and four end shelves.



Standard layout



12 seats



4 berths, 2 seats, table

During conversion the end panels are stacked under the bottom end panel and the freed side panels under the lower berth. The support legs of the lower berths are folded down.

2. Scope of delivery

- Shelter body with internal equipment — 1 pc
- External hatch or concealed hatch — 1 or 2 pcs, according to the number of entrances
- Ventilation pipe Ø100 mm — 2 pcs
- Bolt M14 × 100, nut, washer — 12 pcs each
- Cable gland M16 — 2 pcs
- Backup power supply — 1 pc
- Temperature and humidity meter — 1 pc
- Transformer/converter 240 / 12 V — 1 pc
- Folding toilet with gelling powder and a set of bags — 1 pc
- Emergency radio — 1 pc

Not included in the delivery

Concrete, reinforcement, XPS insulation, geotextile and fixings for the formwork.

Corrugated pipe for the drainage chamber, drainage pipe in a coconut-fibre wrap, dry concrete for backfilling around the chamber.

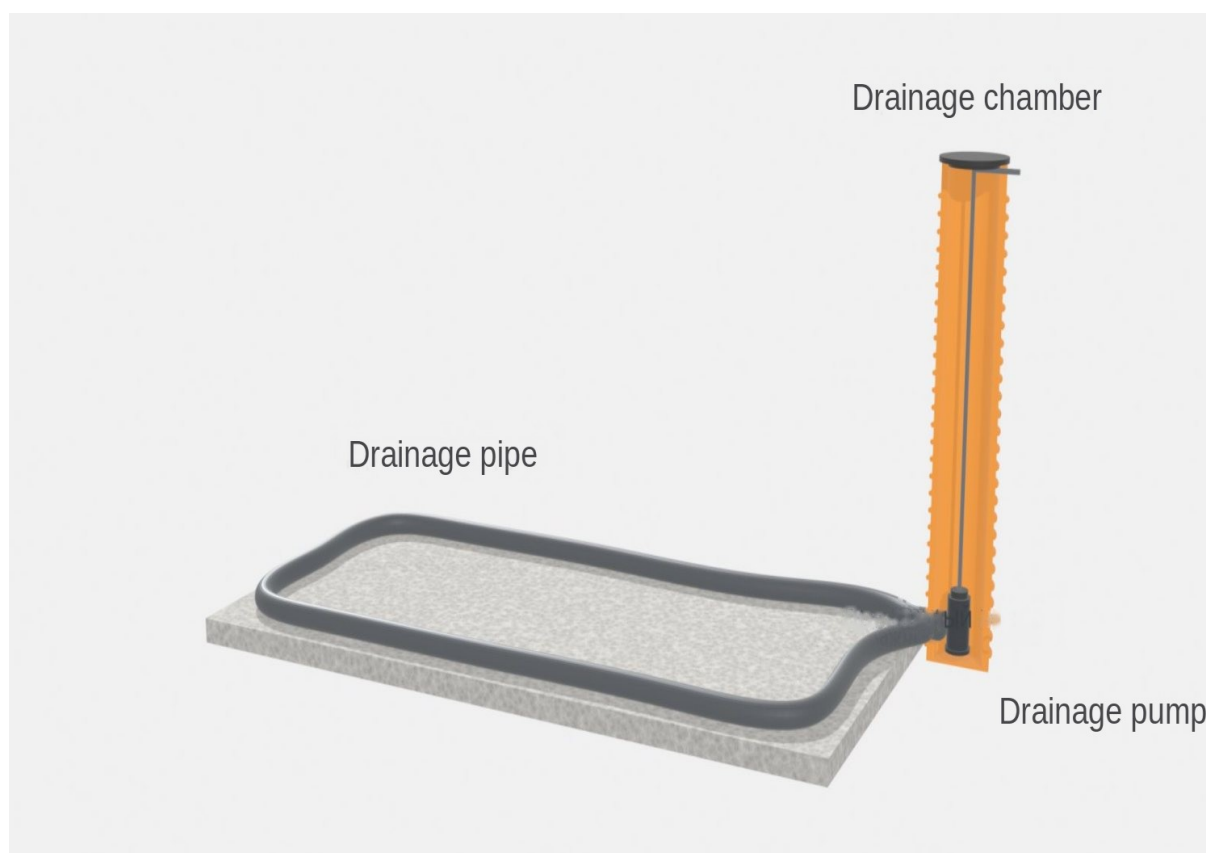
Drainage pump, Ø32 mm discharge pipe and its fittings.

Anchors and ratchet straps for securing the body during concreting.

Earthworks, crane or loader crane for setting the body in place.

3. Drainage system

The shelter 480 is fully buried and, if the groundwater level rises sharply, it can be subjected to considerable pressure. Draining the groundwater once it rises above the safe level is therefore mandatory. The drainage system consists of a ring drain pipe around the body, a collection chamber and a submersible pump with a discharge line.



Drainage system diagram: slab, chamber in section, ring pipe, pump and discharge line

Drainage chamber

The chamber is made of corrugated pipe: internal diameter at least 40 cm, height 290 cm. It is placed in a separate excavation of 70 × 70 cm next to the shelter body. The excavation is taken down to the same depth as the pit. The bottom of the chamber is closed and sits at the same level as the underside of the base slab.

The 10 cm gap between the chamber wall and the soil is backfilled with dry concrete. The top of the chamber projects 5–10 cm above ground level and is closed with a lid.

Ring drain pipe

A flexible corrugated pipe Ø110 mm in a coconut-fibre wrap is used. It is laid directly on the base slab and pressed against the body so that it settles into the sloping corner where the wall meets the floor. The pipe runs in one piece around three sides of the shelter; on the fourth side both of its ends are led 5 cm past the inner wall into the drainage chamber and offset across the width so that they do not butt against each other.

Pipe length per unit — 14.3 m. Once laid, the pipe is covered with gravel.

Drainage pump and discharge line

A submersible drainage pump with a float switch is lowered into the chamber. A pump with a built-in float is recommended. The pump is set on a support or suspended so that its bottom edge is 10 cm above the chamber floor — otherwise it will draw in the settled silt.

A Ø32 mm pipe is run upwards from the pump discharge port. No non-return valve is fitted!!! Above ground level, just under the chamber lid, it turns through 90° and projects 10 cm beyond the outer wall of the

chamber. The outfall line is connected to this outlet — to a storm drain, a drainage ditch or to ground lying below the level of the plot.

Important

Check that the pump float moves freely and does not catch on the chamber walls.

The pump is supplied from a separate circuit with a residual current device.

The discharge outlet must not be directed towards the shelter: the water has to run away from the pit.

4. Electrical installation

The electrical system consists of two independent circuits.

Circuit 1 — emergency

It is powered by a portable power station and runs the mechanical ventilation and two LED lights. Power is supplied through a car socket; qualified personnel may replace it with XT60, MC4 PV, Aviation Plug or another connector to suit the particular power station. The power station can be charged from a mains charger or from a solar panel: for this, a second cable is run through the gland alongside the 12 V cable.

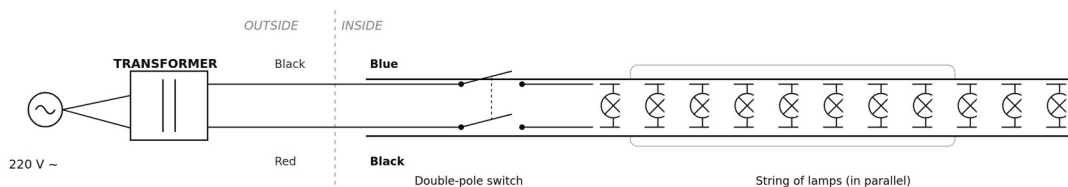
Circuit 2 — normal operation

It is supplied from the 220/230 V mains. Outside the shelter a transformer converts the alternating current to 12 V direct current, which is fed inside through a 12 V line.

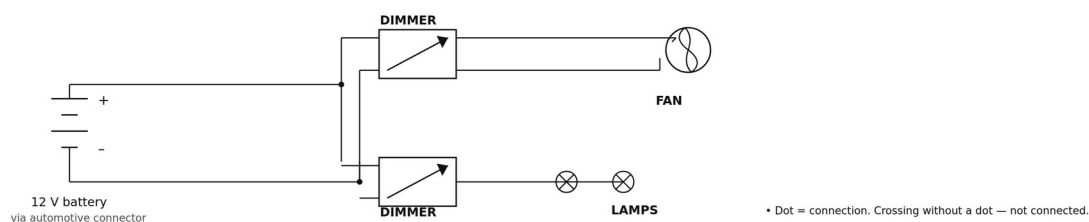
The cable entry is made with a watertight M16 cable gland: the hole is drilled with a 14 mm bit and the gland is fitted with its seal.

SCHEMATIC DIAGRAM

MAIN CIRCUIT (MAINS POWER)



EMERGENCY POWER (12 V =)



Electrical schematic diagram

Important

Check the polarity of the normal-operation circuit before switching on.

All work on the 220 V mains must be carried out by a qualified electrician.

5. Installation and materials required

5.1. Materials per unit

Material	Quantity
Soil excavated from the pit and the chamber excavation	41.0 m ³
Concrete for the base slab 540 × 260 × 15 cm	2.11 m ³
Concrete encasing the body, 20 cm layer	30.76 m ³
Concrete of the shaft collar, 20 cm layer	0.28 m ³
Concrete, total	33.15 m ³
Ø12 reinforcement for the base slab	136.4 m / 121 kg
Ø12 reinforcement for the cage around the body	511.3 m / 454 kg
Ø12 reinforcement, total	647.7 m / 575 kg
XPS 100 mm — top surface	9.76 m ² — 14 boards 0.6 × 1.2 m
XPS 70 mm — sides, ends, shaft	17.78 m ² — 25 boards 0.6 × 1.2 m
Geotextile	approx. 48 m ²
Drain pipe Ø110 in a wrap	14.3 m
Corrugated pipe for the chamber, Ø400 internal	2.9 m
Discharge pipe Ø32	approx. 3.7 m
Dry concrete for backfilling around the chamber	approx. 1.2 m ³

The quantities are taken from the 3D model of the product and include no allowance for waste. Add 5–10 % when ordering.

5.2. Two methods

Dry concrete. A dry concrete mix of strength class C20/25 or higher is used. The mix is placed in layers no thicker than 40 cm; each layer is evenly wetted with water and compacted, and the next layer follows once the previous one has set.

Ready-mixed concrete. Concrete of strength class C20/25 is used, consistence class S3, freeze-thaw resistance from XF1, watertight. The placing height per operation is no more than 40 cm.

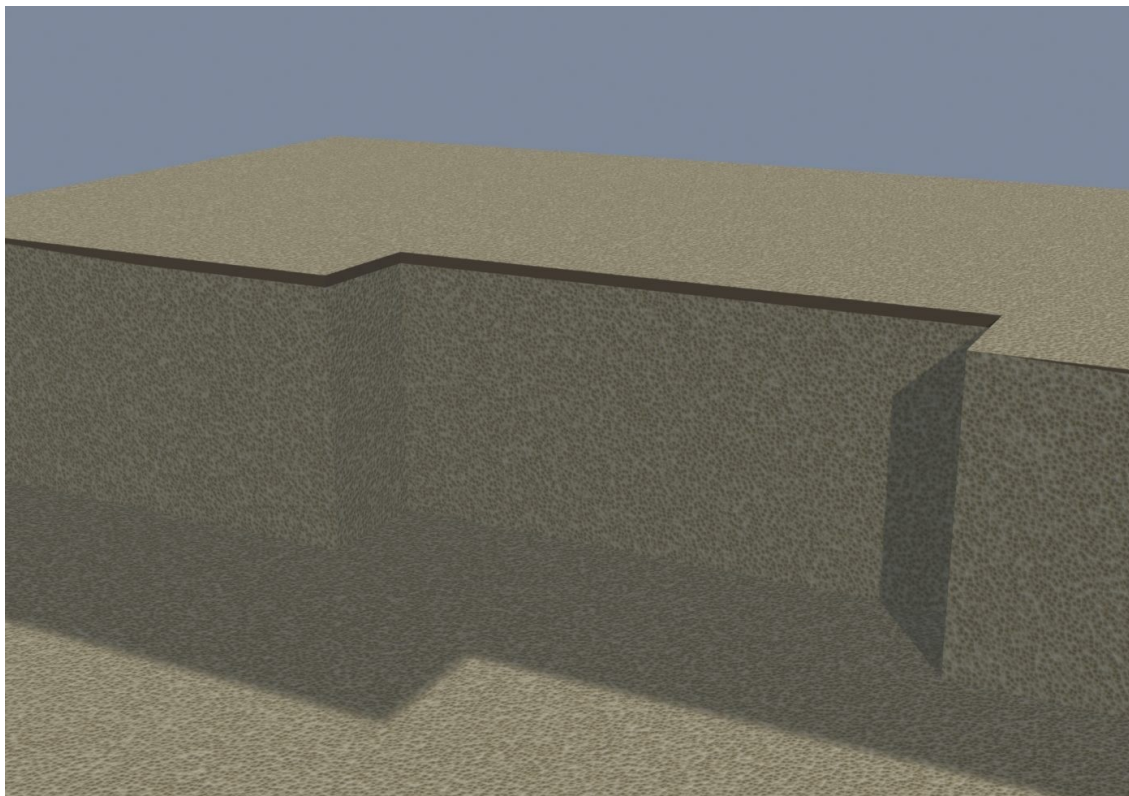
Caution

When placing the first layer of ready-mixed concrete, watch the tension of the ratchet straps: concrete can get under the body and lift one of its sides.

5.3. Installation steps

Step 1. Pit

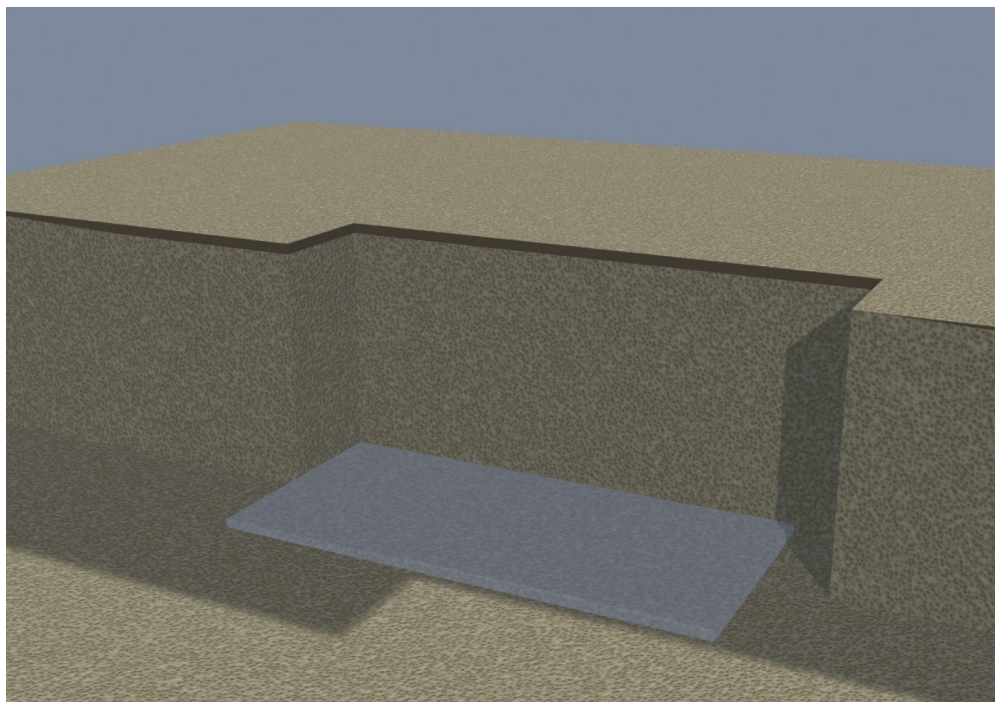
The pit measures 540×260 cm at the bottom, with a depth of 282 cm from ground level. This depth gives a burial in which the surface of the entrance hatch stays 10 cm above ground. At the near end an additional excavation of 70×70 cm is taken down to the same depth — for the drainage chamber. Total volume of excavated soil about 41.0 m^3 .



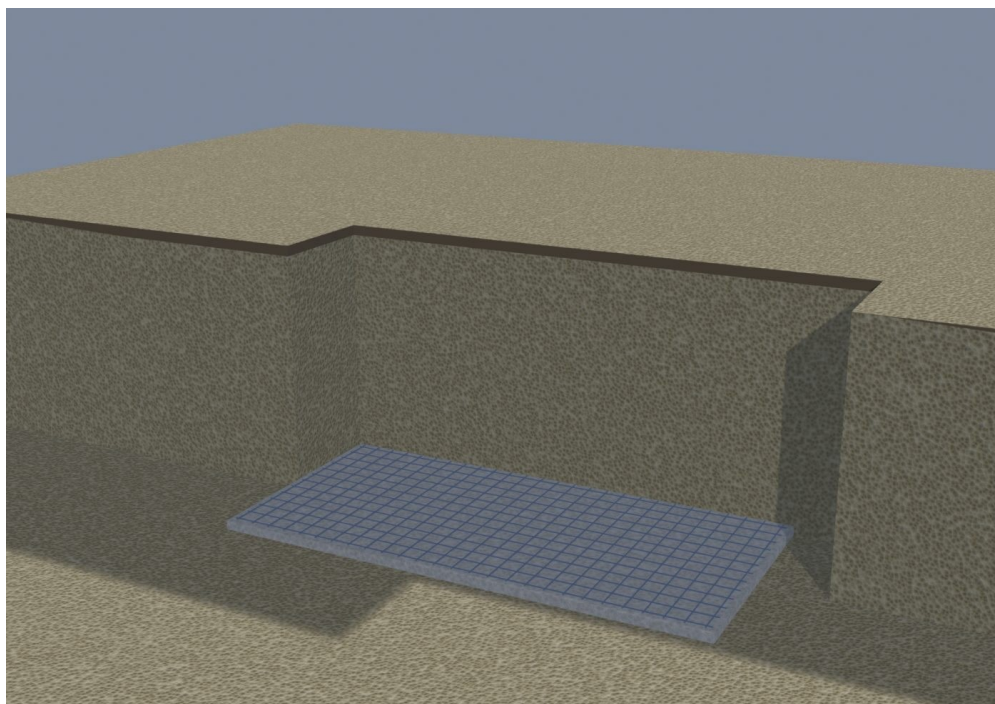
Step 1. Pit 540×260 cm, depth 282 cm, and the excavation for the chamber

Step 2. Base slab

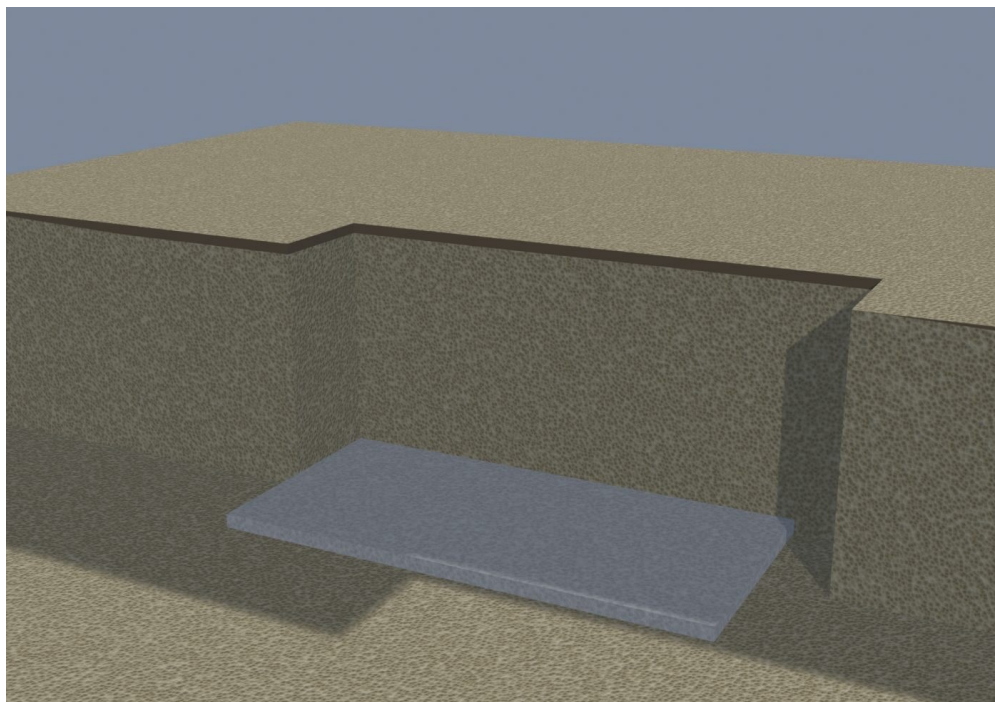
A reinforced concrete slab 540×260 cm and 15 cm thick is cast on the bottom of the pit: a 10 cm layer of concrete, the reinforcement mat, then a 5 cm layer. Concrete required: 2.11 m^3 .



Step 2. Bottom layer of concrete, 10 cm



Step 2. Mat of Ø12 mm bar with a 200 × 200 mm mesh — 136.4 m, 121 kg



Step 2. Slab finished, 15 cm thick

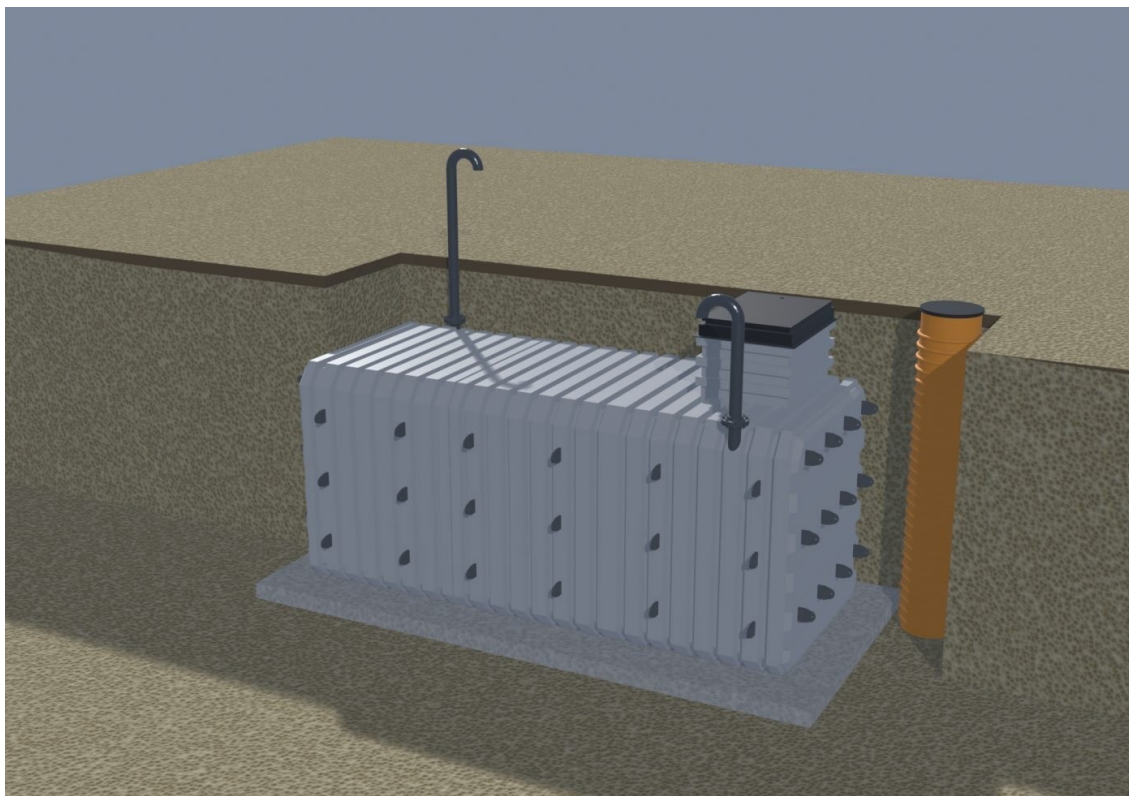
Provide anchors in the slab for the ratchet straps.

Step 3. Drainage chamber

The chamber is set into the excavation next to the shelter body. Its bottom is level with the underside of the slab and the gap around it is backfilled with dry concrete. Details in section 3.

Step 4. Setting the body

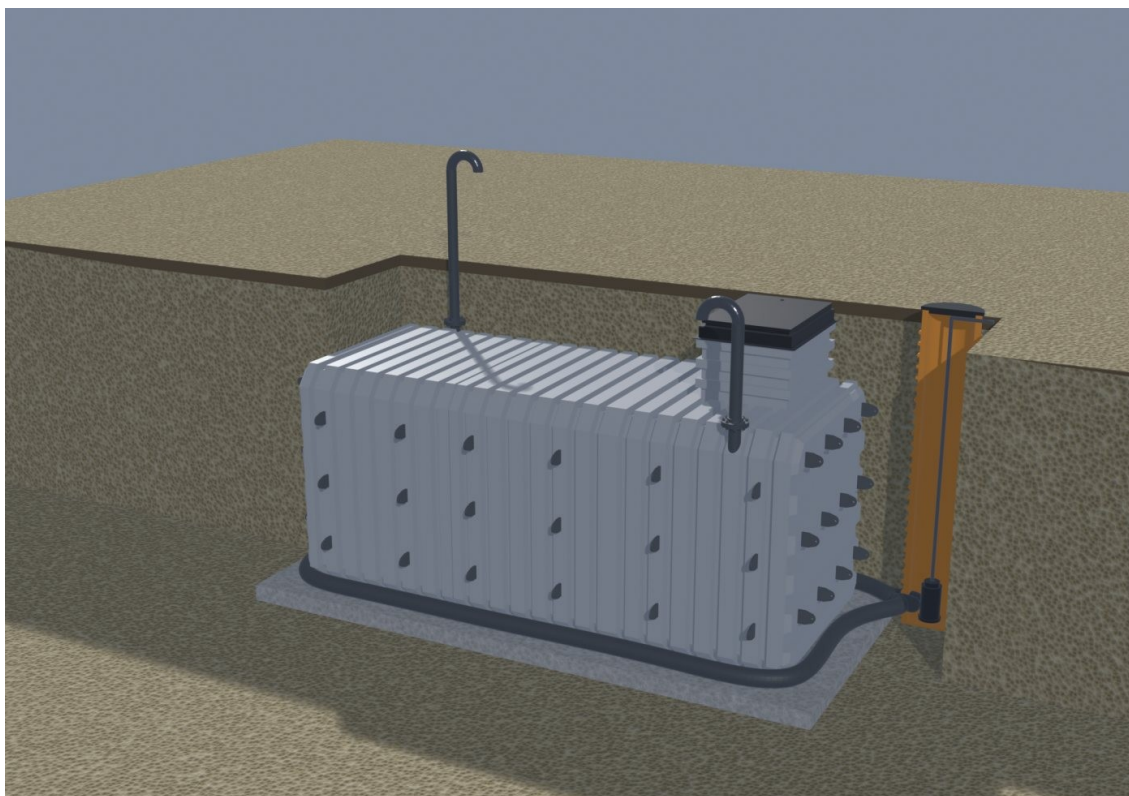
The body is lowered onto the finished slab by crane or loader crane and secured to the anchors with ratchet straps. The shelter is positioned with its shaft on the side away from the drainage chamber. Before lowering, fit the reinforcement bars into the holders on the body.



Step 4. Body set on the base slab

Step 5. Drain pipe and pump

The Ø110 pipe in its wrap is laid around the body and both ends are led into the chamber. The pump is lowered into the chamber and the Ø32 discharge line is fitted, with its outlet projecting beyond the chamber wall. Details in section 3.



Step 5. Drain pipe laid, pump and discharge line installed in the chamber

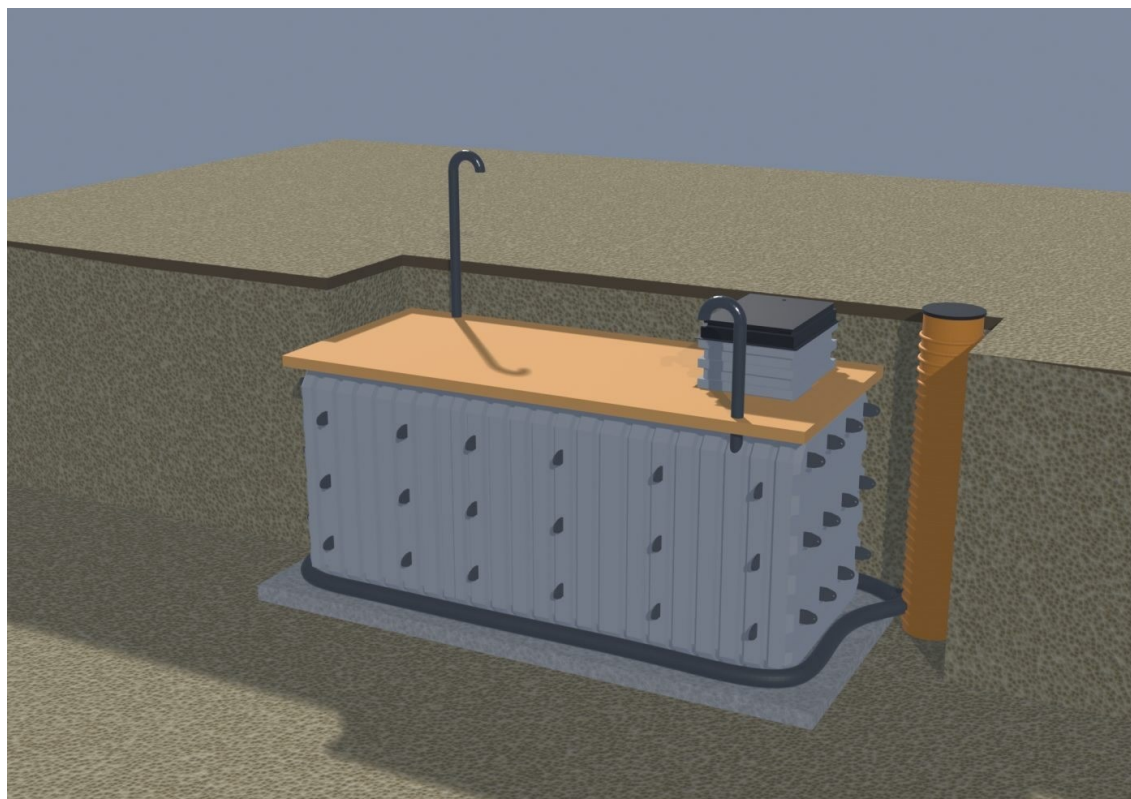
Step 6. Ventilation

Fit both Ø100 mm pipes before any concreting starts. The low pipe emerges from the upper chamfer of the

side wall near the shaft; the tall one is diagonally opposite, its 1500 mm steel section ending in two half-bends and a grille.

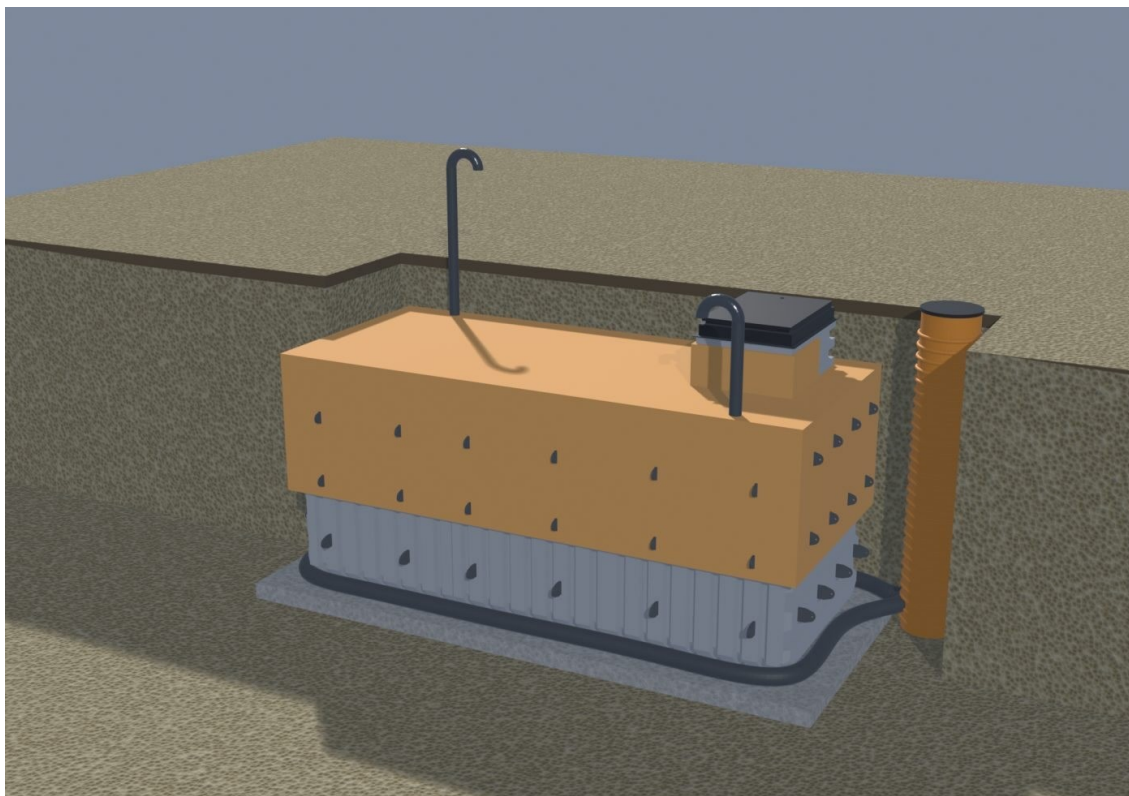
Step 7. Insulation

The top surface of the body is insulated with 100 mm XPS boards — 9.76 m², 14 boards. The top boards cover the end faces of the side boards all around the perimeter.



Step 7. Insulation of the top surface, XPS 10 cm

The sides and ends are insulated with 70 mm boards to a height of 120 cm from the top surface, and the shaft with the same 70 mm boards. In total 17.78 m², 25 boards. Lay the boards tight against each other, stagger the joints at the corners and cover the insulation with geotextile.

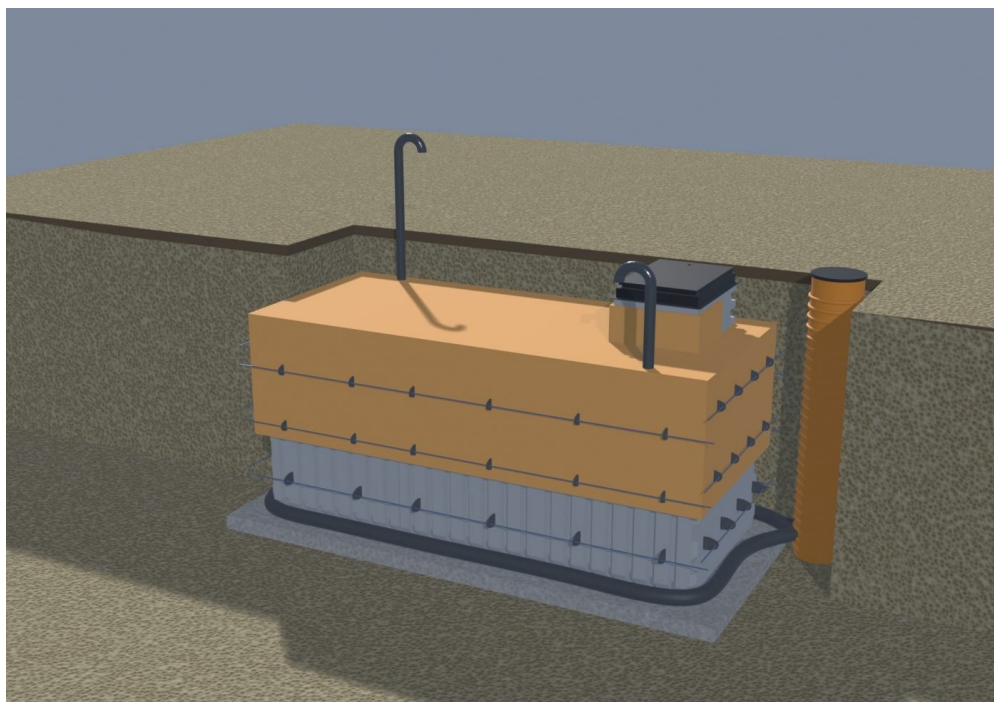


Step 7. Insulation of sides, ends and shaft, XPS 7 cm

Step 8. Reinforcement

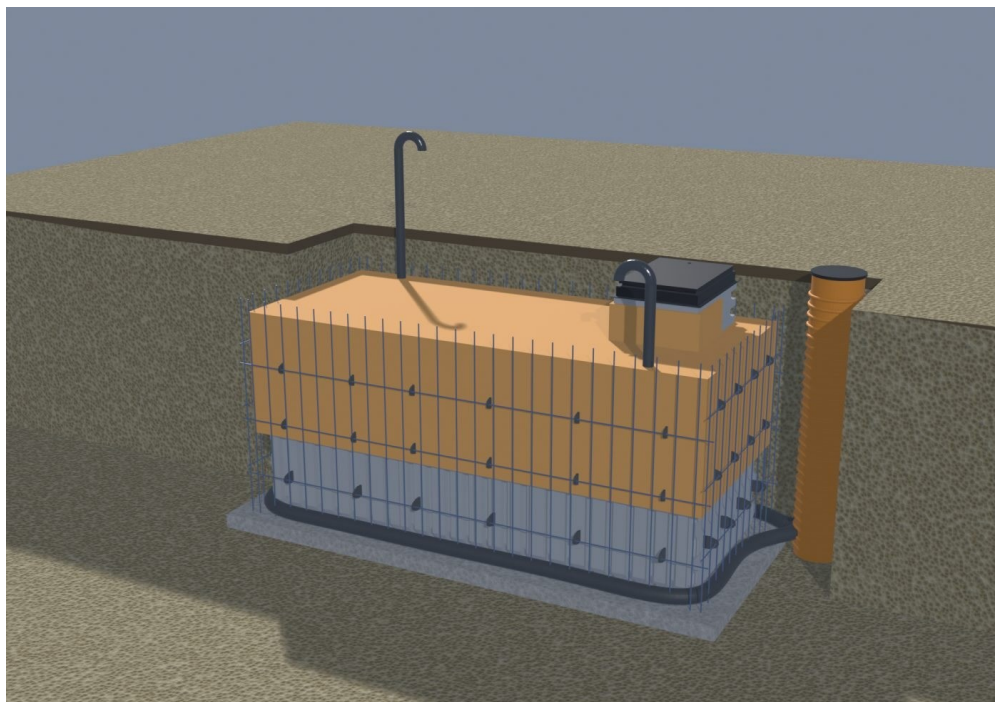
A mat with a 200×200 mm mesh of $\varnothing 12$ mm bar is built around the body. The mat is held 50 mm clear of the insulation and bars lap 100 mm at joints.

Stage 1. Fit the longitudinal and transverse bars into the holders welded to the body: three rows on each side and three on each end. Quantity: 44.5 m.



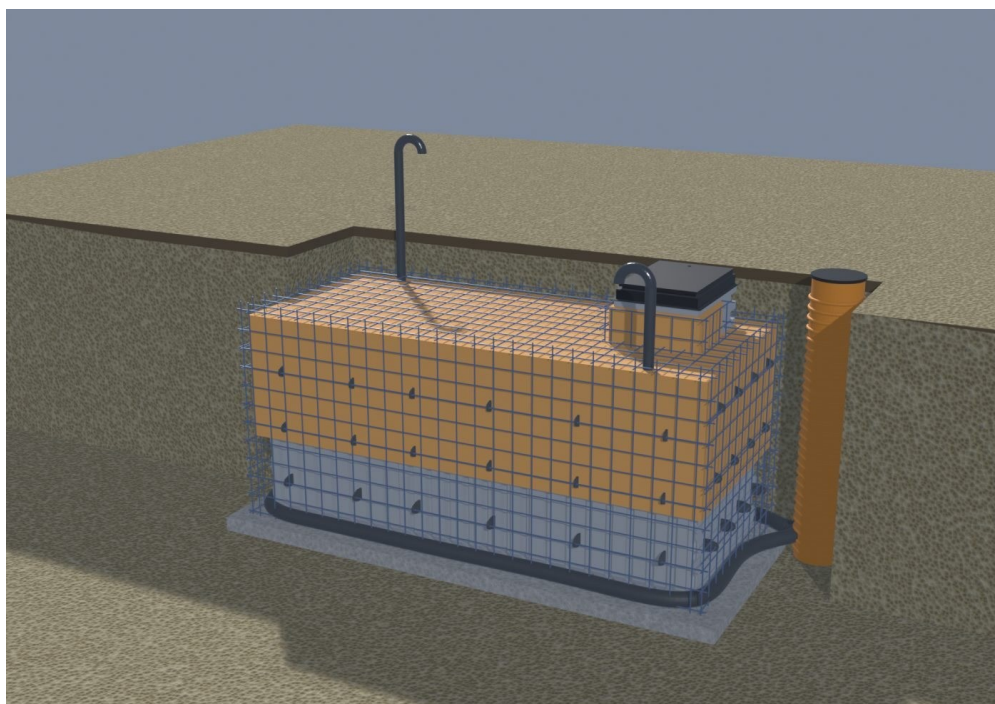
Step 8, stage 1. Bars in the holders on the body

Stage 2. Tie vertical bars at 200 mm centres along the sides and ends. The tops of the bars run into the upper mat with a 100 mm lap. Quantity: 177.4 m.



Step 8, stage 2. Vertical bars at 20 cm centres

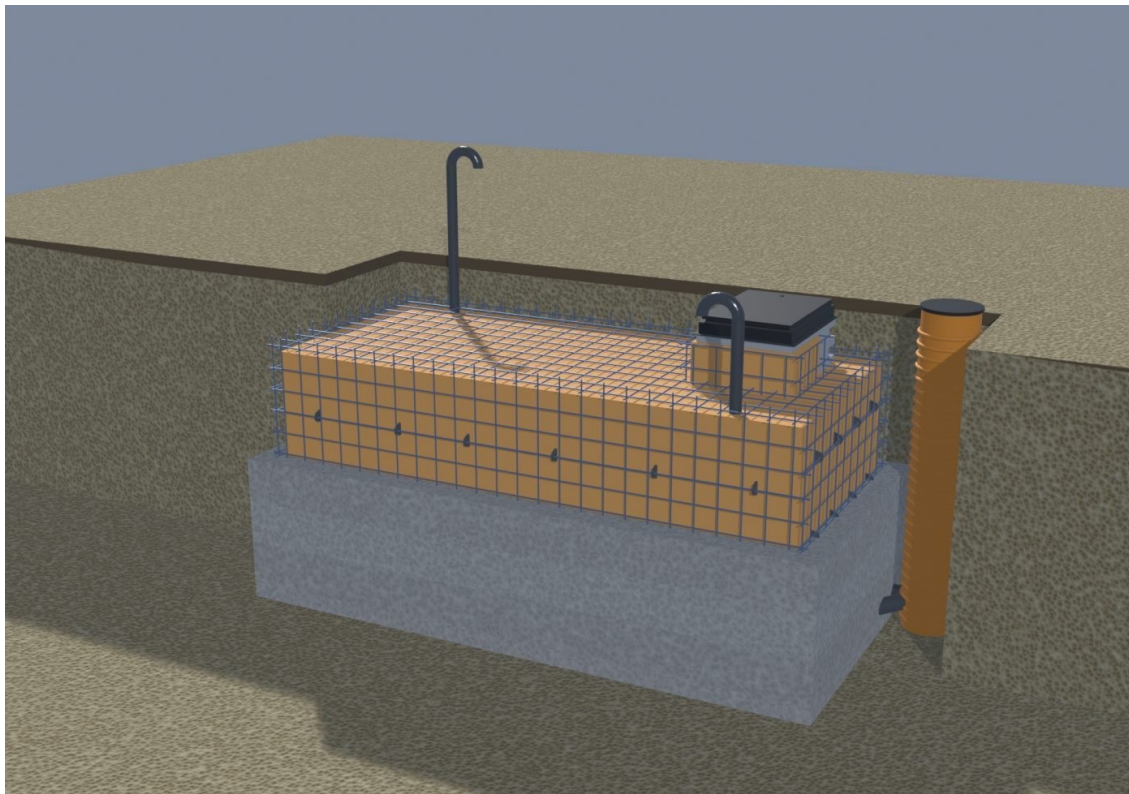
Stage 3. Add the remaining horizontal rows and build the mat over the top surface. The mat passes around the shaft — bars must not cut through the body. The shaft walls are reinforced separately, up to the underside of the hatch frame. Quantity: 274.3 plus 15.1 m.



Step 8, stage 3. Mat around the body and reinforcement of the shaft

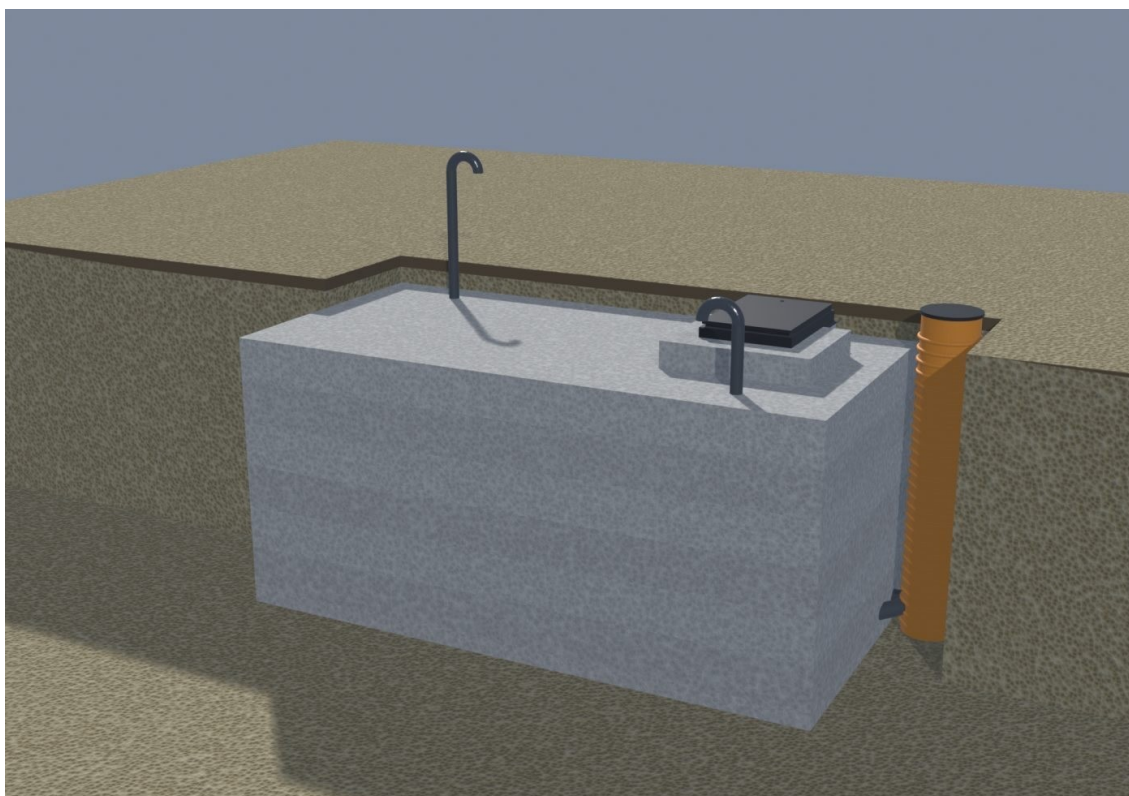
Step 9. Concreting

Concrete is placed in lifts of no more than 40 cm, working from the bottom up. The layer around the body is 20 cm for category S-0. A 20 cm layer of concrete is kept above the insulation of the top surface. Concrete required for the encasement: 30.76 m³.



Step 9. Concreting in 40 cm lifts

The shaft is encased on all four sides with a 20 cm layer up to 5 cm below ground level. Concrete required: 0.28 m³.



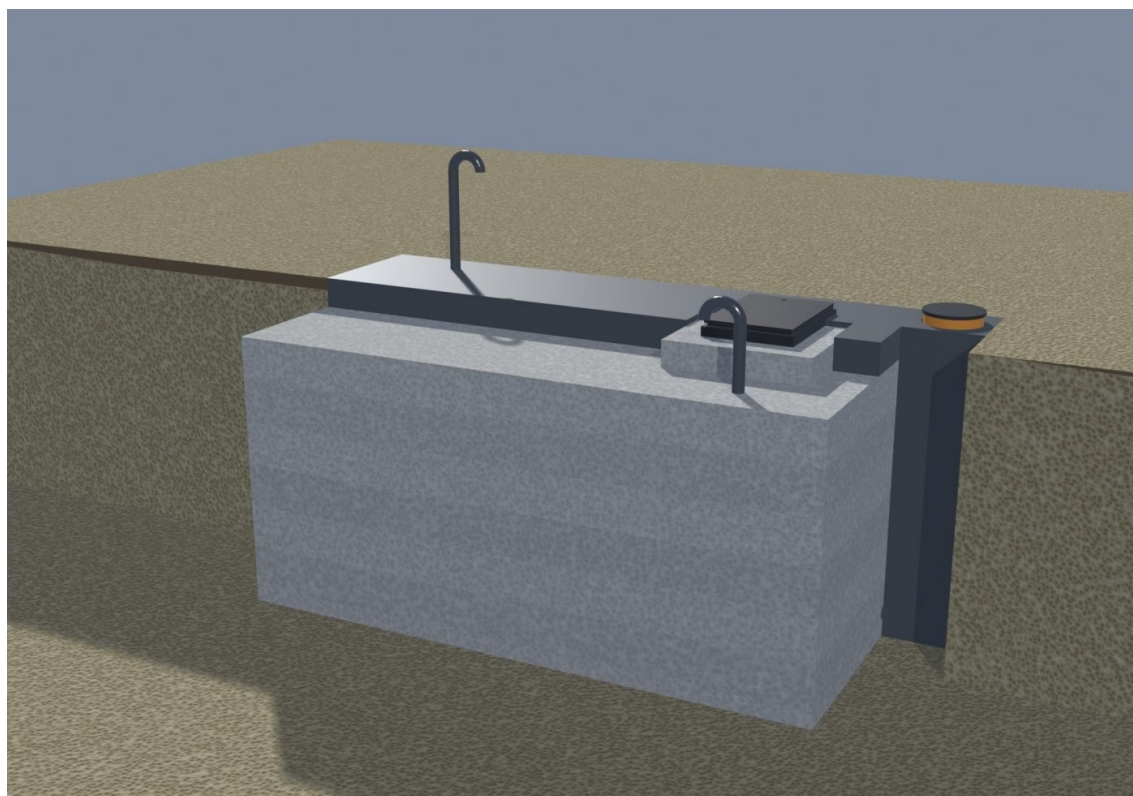
Step 9. Encasing the shaft

When concreting, make sure that soil from the walls does not fall into the concrete: this lowers its quality and causes microcracks and porosity.

Step 10. Backfilling

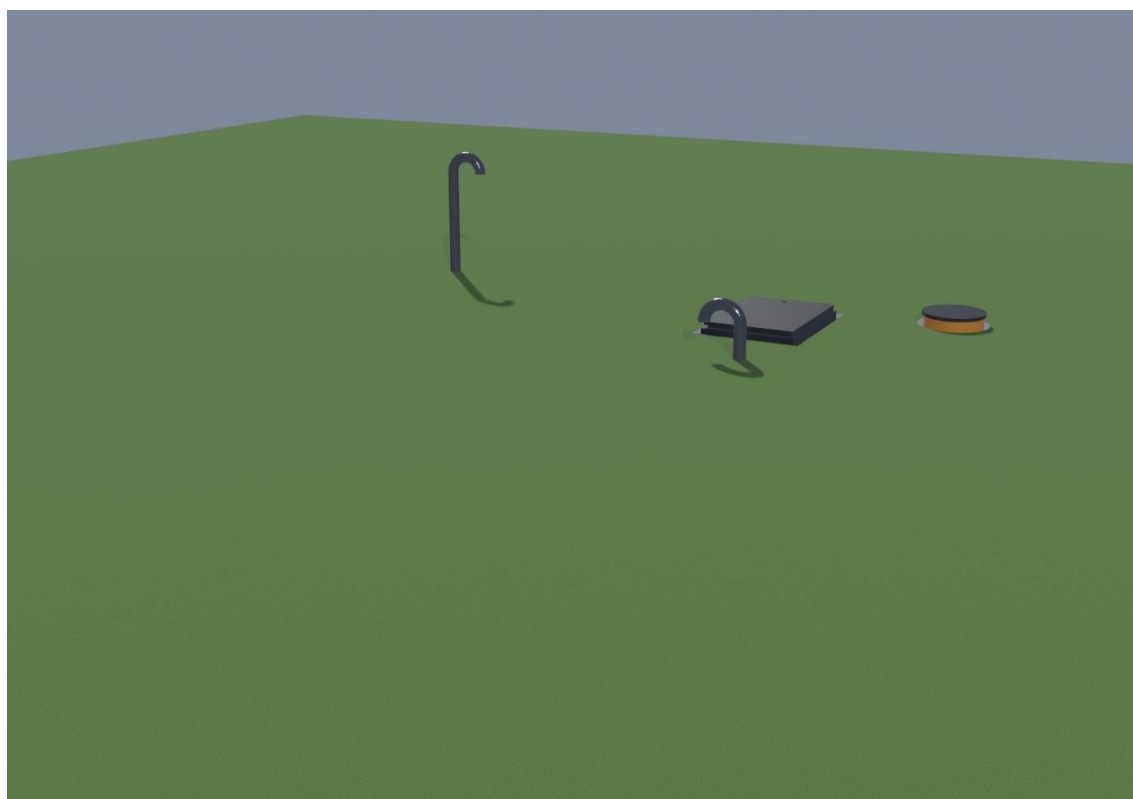
Once the concrete has gained strength, the working space is backfilled with soil compacted in layers. A soil

layer of about 28 cm remains above the concrete up to ground level. The excavation around the chamber is filled with dry concrete.



Step 10. Backfilling with soil

Only the entrance hatch, projecting 10 cm, the head of the drainage chamber with its lid and the two ventilation pipes remain above ground.



The finished shelter after backfilling and restoring the lawn

6. Warranty terms

During the warranty period the buyer is entitled to free repair of the product in the event of manufacturing defects. The warranty covers the operation of the fittings, the quality of the food-contact material, the floor and shelves, mechanical joints and welds.

The warranty is limited to manufacturing defects and does not cover:

- normal wear of parts, natural ageing, damage to paint and surfaces caused by use and the environment
- minor geometric deviations that do not affect the quality of the product
- damage caused by natural disasters, fire, domestic factors and force majeure
- damage caused by third parties, including during delivery or installation not in accordance with this manual
- damage and deformation resulting from changes in geometry after installation that are inherent in the structure
- corrosion arising from scratches and damage to the paint on the frame and joints

The warranty is void if the product has been repaired or modified without prior consultation with the manufacturer.

Item	Period
Product as a whole	24 months
Weather station, LED lighting	12 months
Power supply	As stated by its manufacturer
Expected service life	at least 50 years

Keep this manual

The manual will be needed for servicing the product and for any warranty claim.

Manufacturer

Company	BPR-PLASTECH SPÓŁKA Z OGRANICZONĄ ODPOWIEDZIALNOŚCIĄ
Address	Konduktorska 18, lok. 7, 02-775 Warszawa, Polska
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