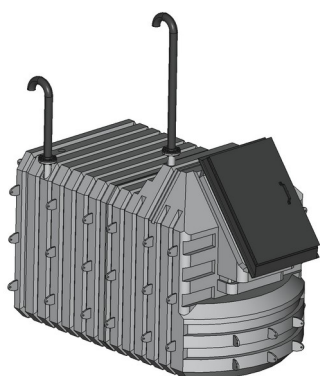
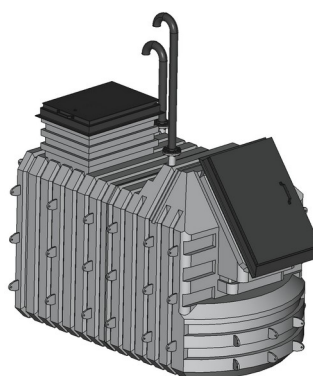


Installation manual

Safe cellar shelter 350



Safe cellar shelter 350 with one entrance



Safe cellar shelter 350 with main and emergency entrance

1. Intended use and product description

The safe cellar shelter 350 is a ready-made, watertight plastic body with a strong steel frame that is encased in a layer of reinforced concrete during installation. This design gives the product its strength, protection against groundwater and a short installation time: the main site works are limited to digging the pit, setting the body in place and concreting.

The shelter is fitted with heavy-duty steel doors made of 6 mm steel plate. The single-entrance version has an inclined entrance door; the version with a main and an emergency entrance additionally has a vertical shaft with a watertight lid.

Inside there are four shelf levels that convert into sleeping berths, a supply and extract ventilation system with two Ø100 mm pipes, and a 12 V electrical installation.

Main dimensions

Parameter	Value
Body dimensions over the ribs, length × width	342 × 196 cm
Body height to the flat roof	208 cm
Height including the vertical shaft	269 cm
Steel door thickness	6 mm
Pit, length × width × depth	400 × 250 × 170 cm
Weight of the body	approx. 2 t

Protection category

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

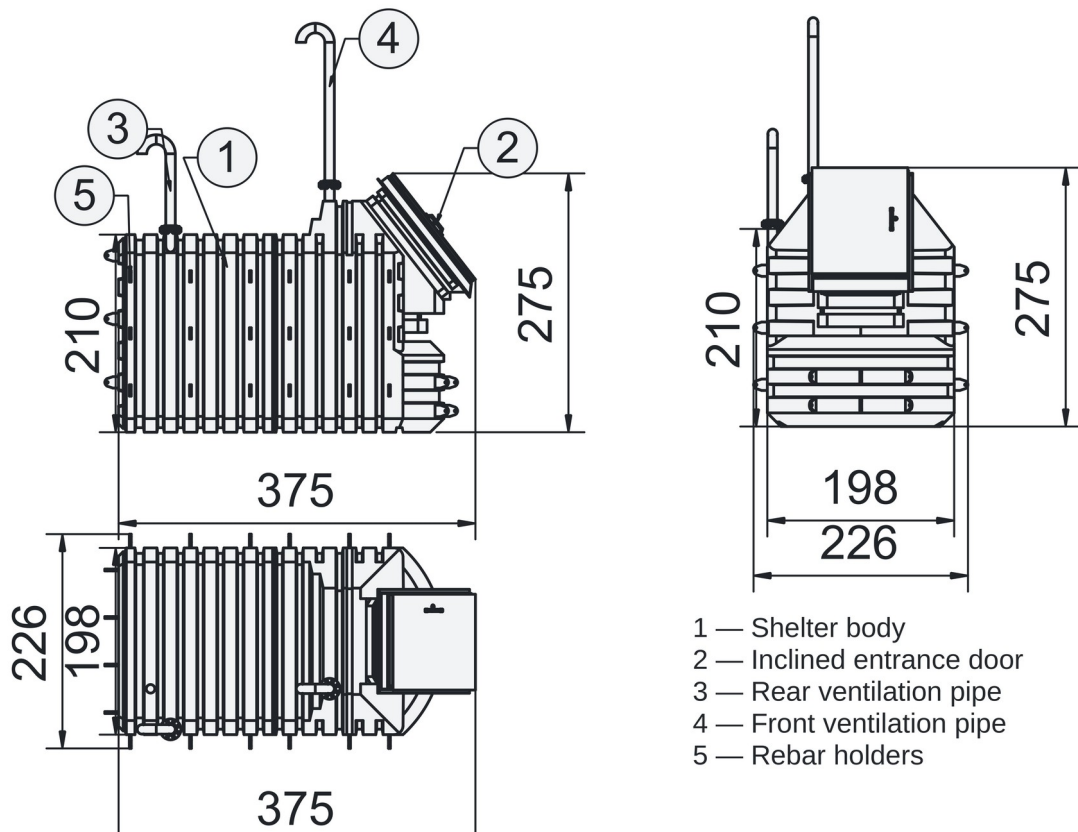
Category S-0: pressure from 0.03 MPa (30 kPa) or a quasi-static load from 60 kN/m². This requires the body to be encased in ready-mixed concrete of strength class C20/25 in a layer of at least 20 cm, together with an entrance door certified for this shelter category.

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 door 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.

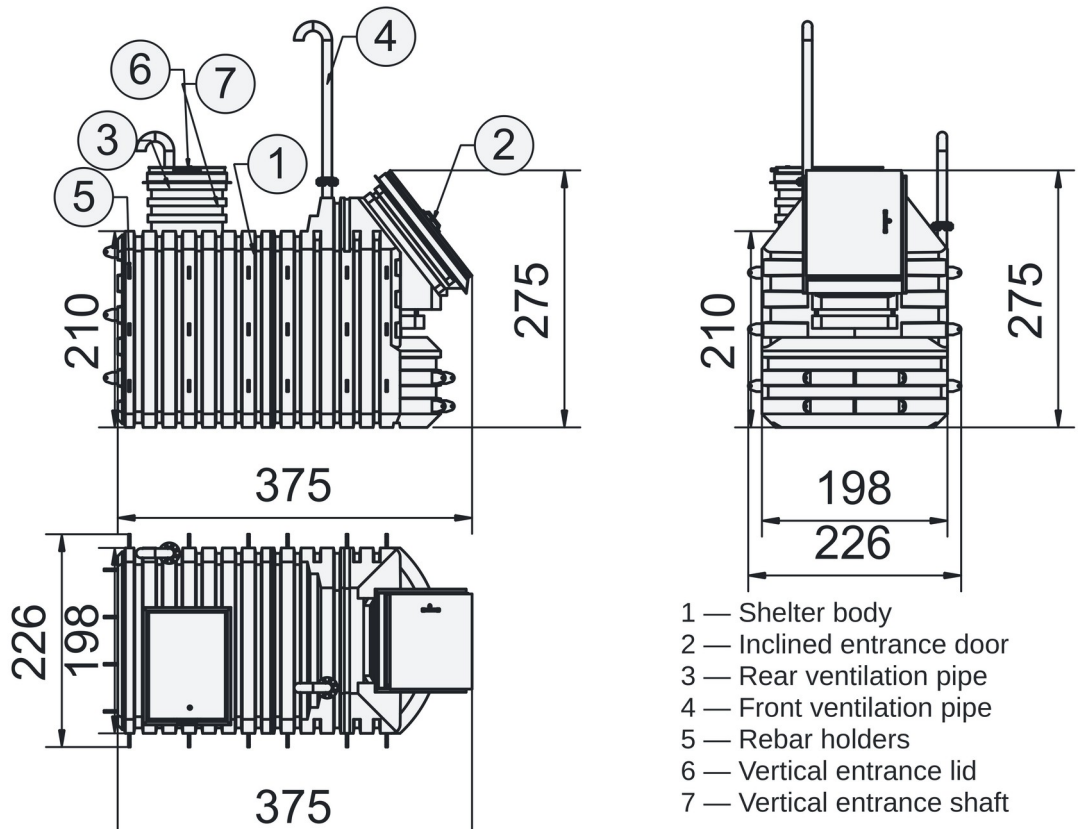
For an exact match to a protection category, order a structural calculation from a design office, taking into account the burial depth, the soil type and the groundwater level.

Dimensioned drawings



Shelter 350 with one entrance — three views, dimensions in centimetres

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

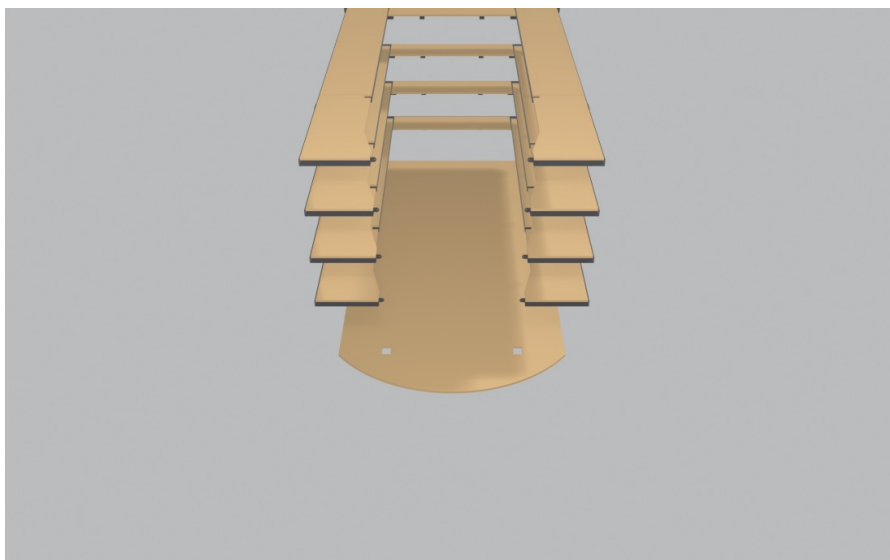


Shelter 350 with main and emergency entrance — three views, dimensions in centimetres

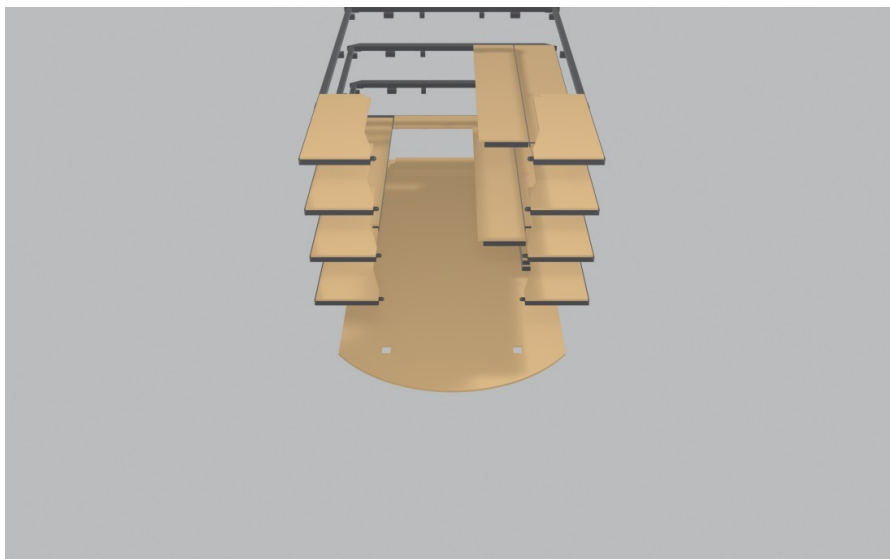
Actual dimensions may differ from those shown on the drawing by $\pm 3\%$ due to shrinkage of the polyethylene.

Shelf layout options

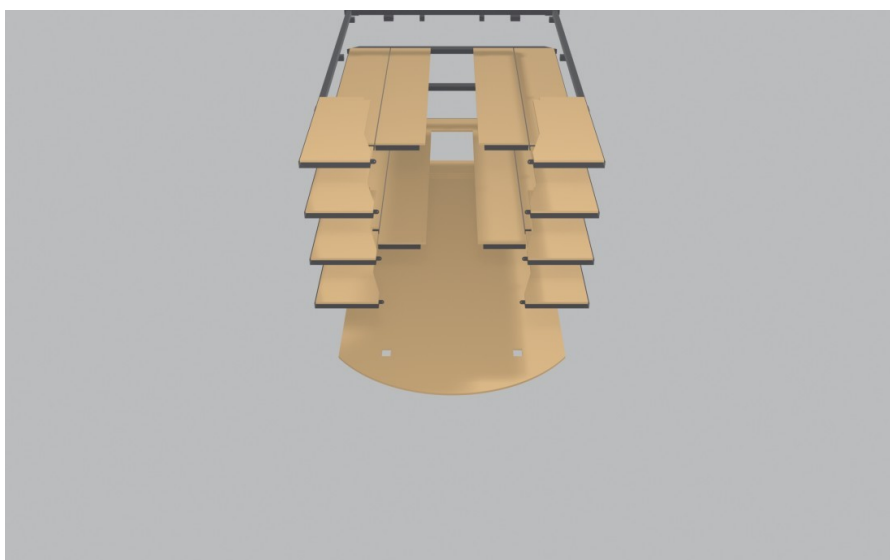
The shelves are rearranged without tools: the panel is lifted out together with its removable frame and placed on the chosen level of the opposite side. Notation: level number and side — L left, R right.



Basic layout: all four levels in place, no berths



Two berths: 4L → 3R and 2L → 1R



Four berths: 2R → 1L, 2L → 1R, 4R → 3L, 4L → 3R

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
- Steel door, 6 mm plate — 1 or 2 pcs, depending on the number of entrances
- Ventilation pipe Ø100 mm — 2 pcs
- Bolt M14 × 100 — 12 pcs
- Nut M14 — 12 pcs
- Washer — 12 pcs
- 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.

Anchors and ratchet straps for securing the body during concreting.

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

Mains cable 240 V and its supply to the installation site.

3. Electrical installation

The electrical system consists of two independent circuits.

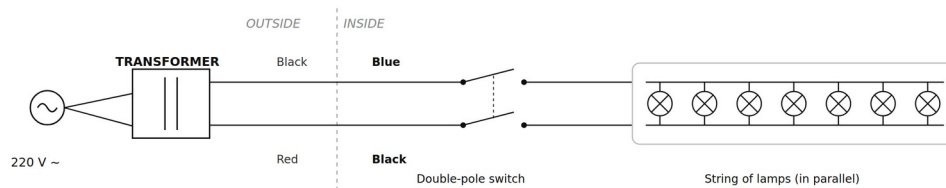
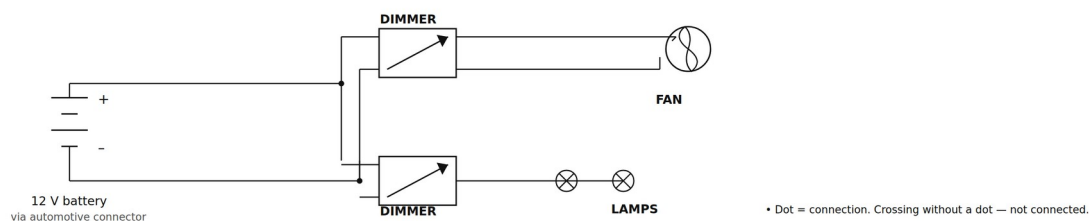
Circuit 1 — emergency

It is powered by a portable power station and runs the forced 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.

4. Installation and materials required

4.1. 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. Within the pit this method generally needs no formwork and rules out flotation of the body.

Ready-mixed concrete. Concrete of strength class C20/25 is used, consistence class S3, freeze-thaw resistance from XF1, watertight to exposure class XC4/XF1 practice. The placing height per operation is no more than 40 cm; each layer is left to harden before the next.

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.

4.2. Materials per unit

Material	Quantity
Excavated soil from the pit	17.0 m ³
Concrete for the base slab 400 × 250 × 15 cm	1.5 m ³
Concrete encasing the body, 20 cm layer	21.9 m ³
Concrete, total	23.4 m ³
Ø12 reinforcement for the base slab	99 m / 88 kg
Ø12 reinforcement for the cage around the body	446 m / 396 kg
Ø12 reinforcement, total	545 m / 484 kg
XPS 100 mm — top of the body and the raised section	4.7 m ² — 7 boards 0.6 × 1.2 m
XPS 70 mm — walls, shafts, entrance	18.7 m ² — 26 boards 0.6 × 1.2 m
Geotextile	approx. 30 m ²

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

4.3. Tools and safety

- Crane or loader crane with a capacity of at least 3 t, slings, ratchet straps
- Concrete mixer or a supply of ready-mixed concrete, poker vibrator or tamper
- Saw or knife for cutting XPS, tying wire and a rebar tying tool
- Personal protective equipment: helmet, gloves, goggles, safety boots

Safety

Check that the ground can carry the plant: the body with its pre-fitted reinforcement weighs about 2.4 t.

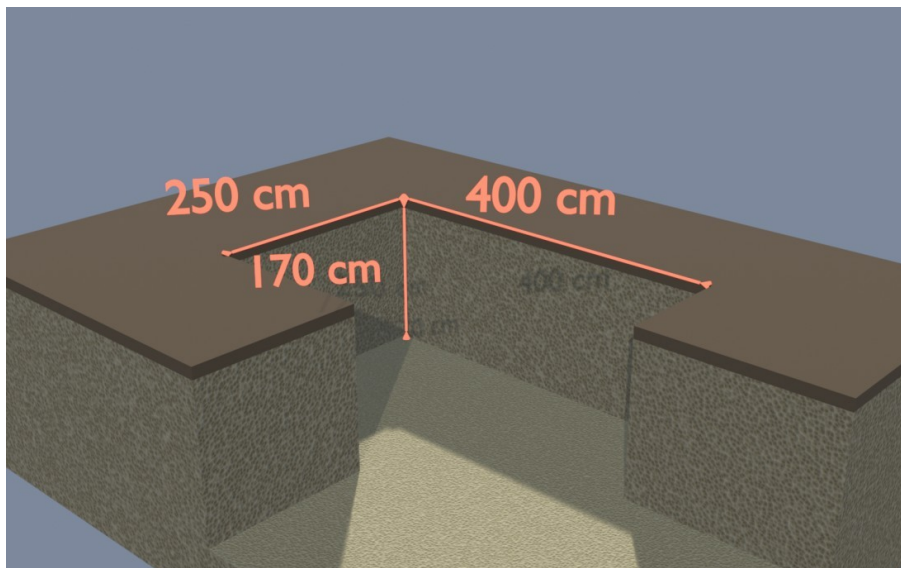
Do not stand under the suspended body and keep away from the walls of an unsupported pit.

Move the body slowly: its inertia is considerable, and once lowered it cannot be shifted on the slab.

4.4. Installation steps

Step 1. Pit

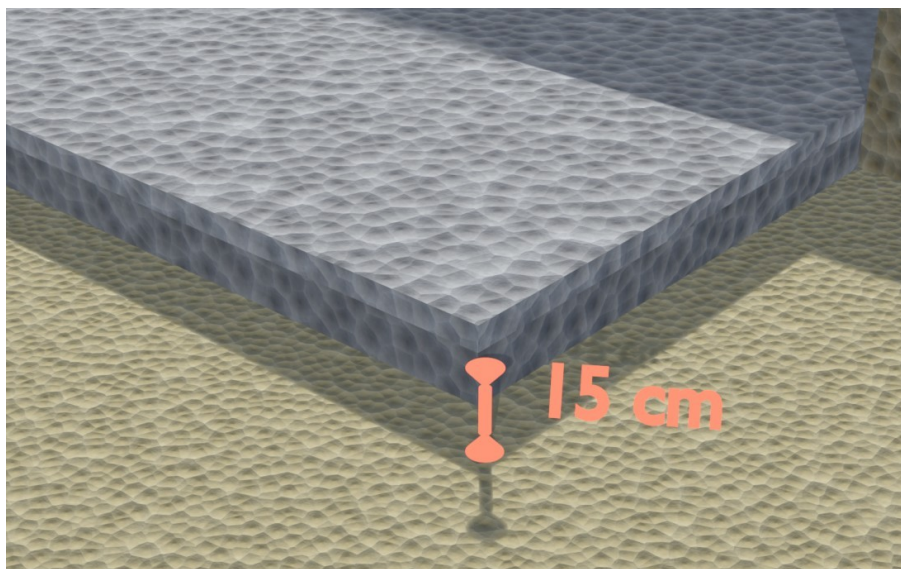
Earthworks should not start until the product has been delivered to site. The pit measures 400 × 250 cm at the bottom, 30 cm larger than the body on every side, with a depth of 170 cm from ground level to the formation. The volume of excavated soil is about 17 m³.



Step 1. Pit 400 × 250 cm, depth 170 cm, shown in section

Step 2. Base slab

A reinforced concrete slab 400 × 250 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: 1.5 m³.

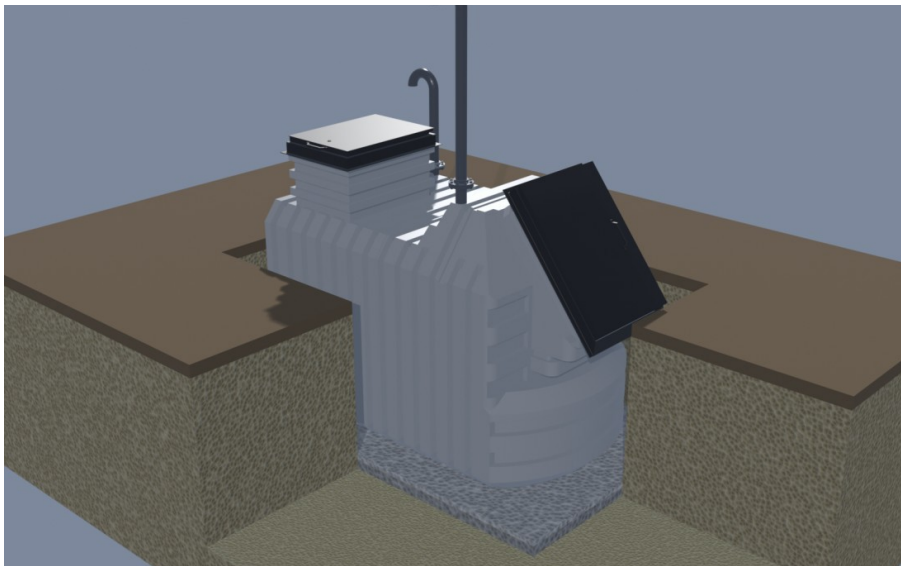


Step 2. Finished base slab, 15 cm thick

A mat of Ø12 mm bar with a 200 × 200 mm mesh is laid between the concrete layers — 99 m of bar, 88 kg. Provide anchors in the slab for the ratchet straps.

Step 3. Setting the body

The body is lowered onto the finished slab by crane or loader crane and secured to the anchors with ratchet straps. Before lowering it is advisable to fit the reinforcement bars into the holders on the body.



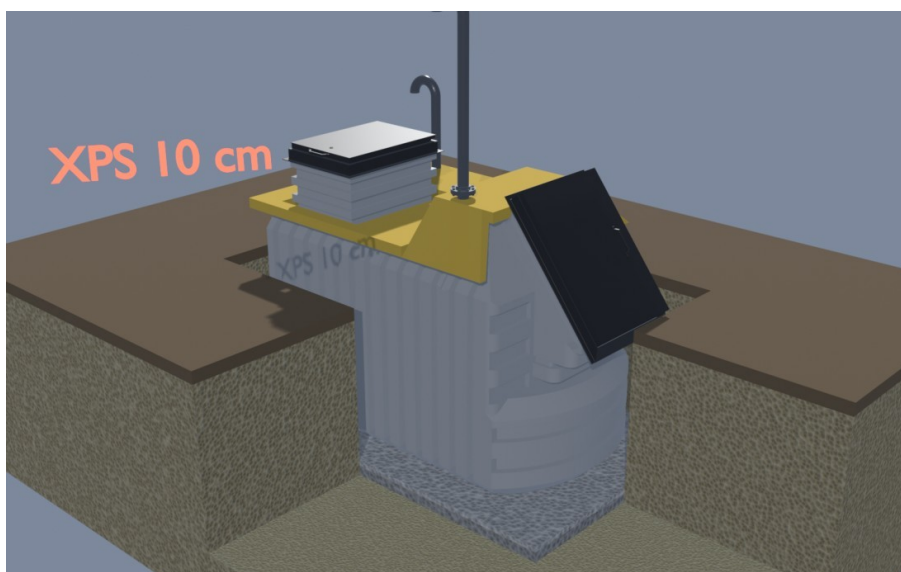
Step 3. Body set on the base slab

Step 4. Ventilation

Fit both Ø100 mm pipes before any concreting starts. Place the pipe with its seal, insert the bolts and tighten them crosswise, in opposite pairs, over several passes. If a nut starts to turn with the bolt, hold the bolt with a second spanner.

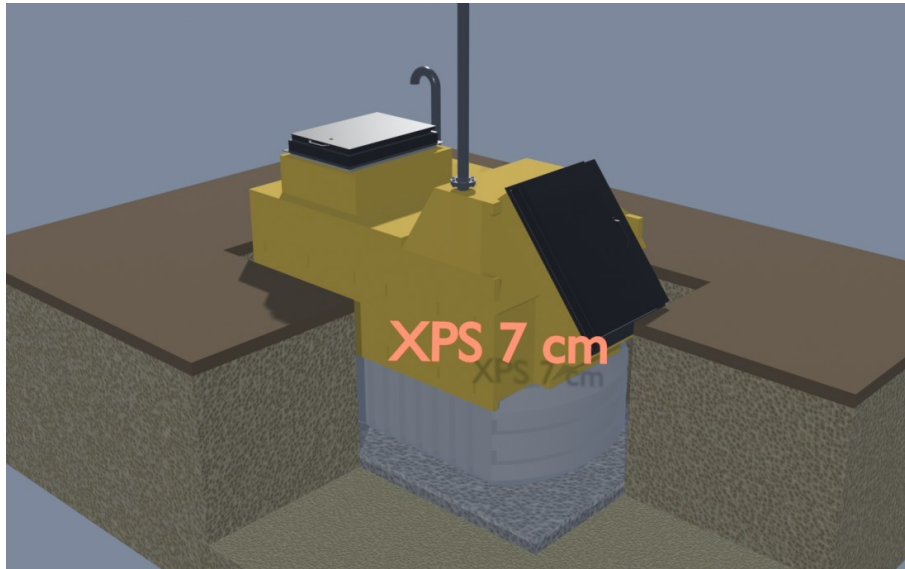
Step 5. Insulation

The top surface of the body, the platform of the raised section and its slopes are insulated with 100 mm XPS boards — 4.7 m², 7 boards.



Step 5. Insulation of the top surface and the raised section, XPS 10 cm

The side and rear walls, the front part, the shaft collars, the inclined corridor and the entrance step are insulated with 70 mm boards — 18.7 m², 26 boards. On the walls the insulation runs 120 cm down from the top surface. Lay the boards tight against each other and stagger the joints at the corners. Cover the insulation with geotextile.

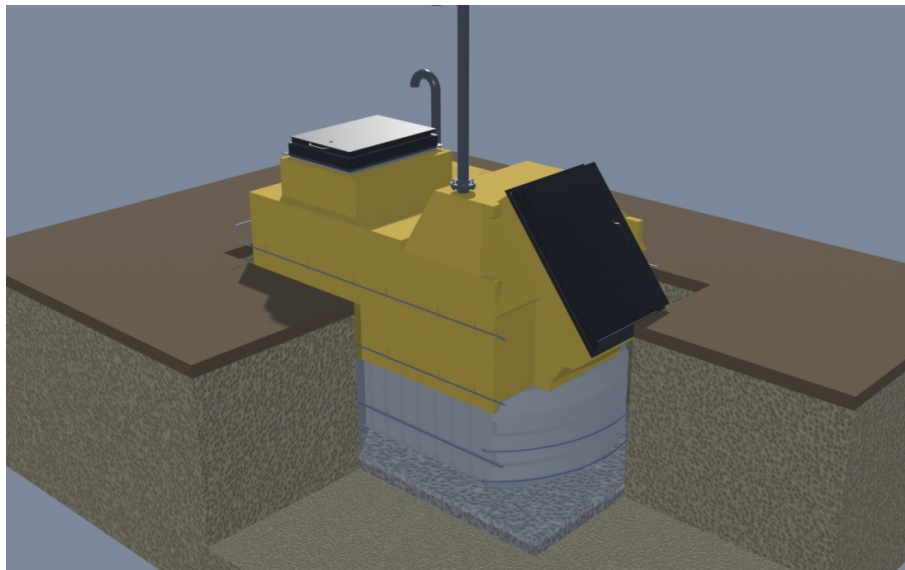


Step 5. Insulation of walls, shafts and entrance, XPS 7 cm

Step 6. Reinforcement

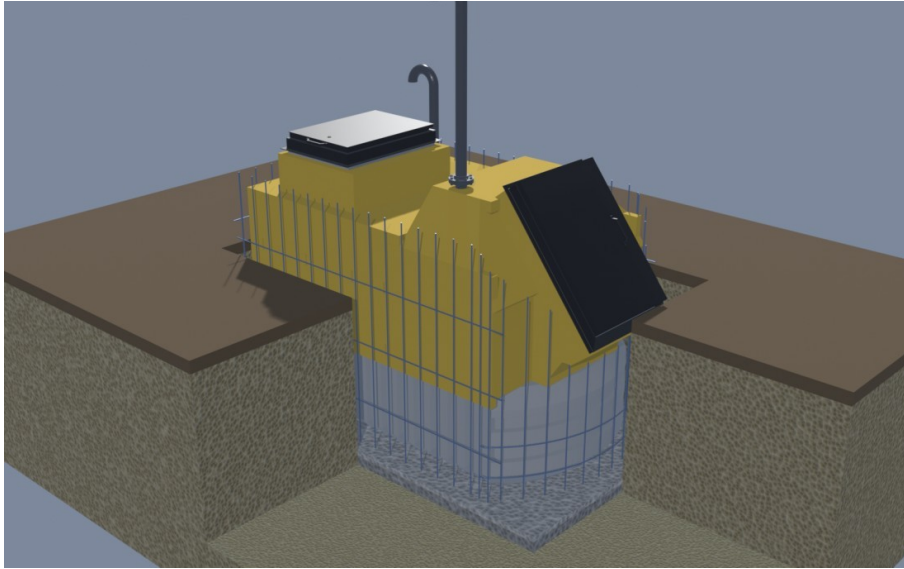
A reinforcement mat with a 200×200 mm mesh of $\varnothing 12$ mm bar is built around the body. The mat is held 50 mm clear of the insulation and bars lap 100 mm at joints. Reinforcement is provided on all sides.

Stage 1. Holders are welded to the side and rear faces of the body. Fit the longitudinal and transverse bars into them and, at the nose, a bent bar passing through all the nose holders. Quantity: 27.8 m.



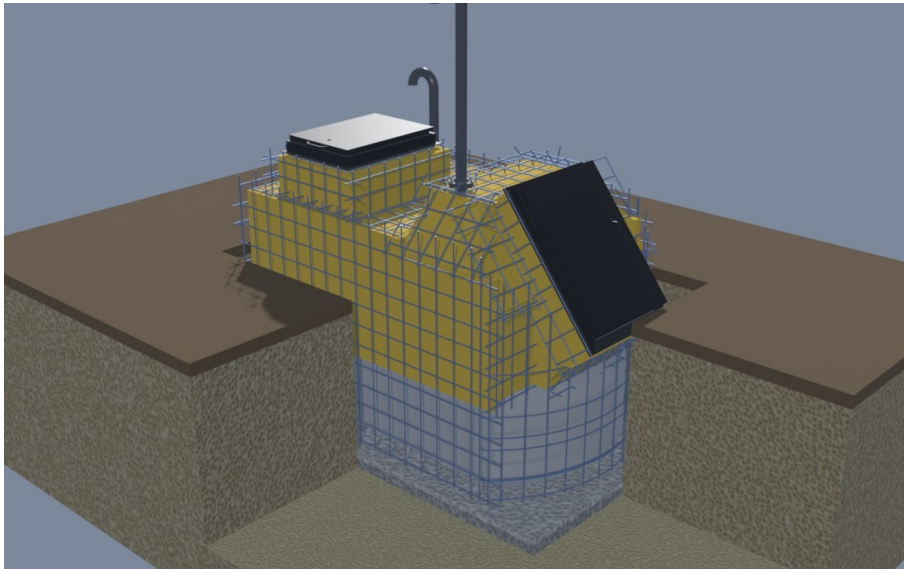
Step 6, stage 1. Bars fitted into the holders on the body

Stage 2. Tie vertical bars to the horizontal ones at 200 mm centres along the sides, the rear wall and the curve of the nose. The tops of the vertical bars run into the upper mat with a 100 mm lap. Quantity: 130.8 m.



Step 6, stage 2. Vertical bars at 20 cm centres

Stage 3. Add the missing horizontal bars between the holders and build the mat over the top surface, the raised section and its slopes, the front part, the triangles at the entrance, around the inclined corridor, the vertical shaft and beneath the entrance. Quantity: 287.3 m.



Step 6, stage 3. Reinforcement mat around the complete body

For category S-1

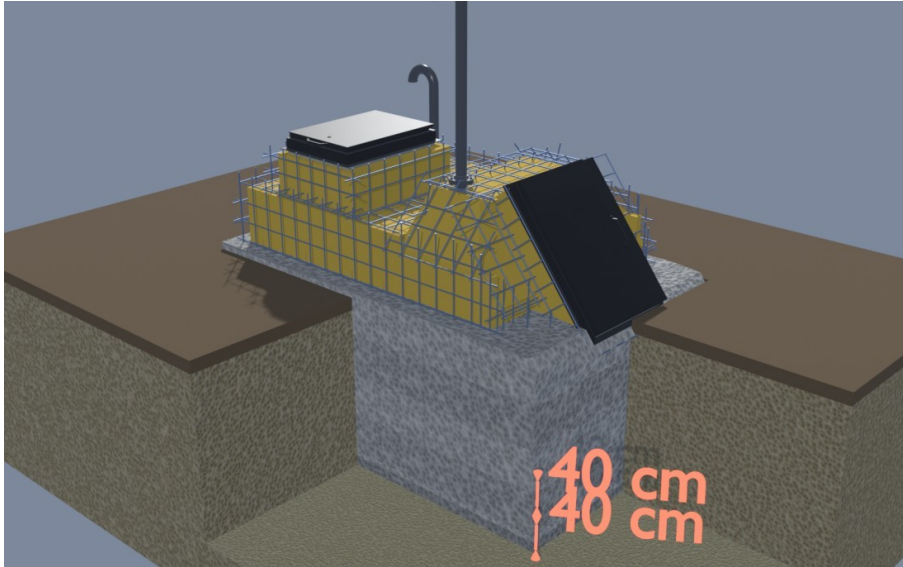
The reinforcement is built in two layers, 100–120 mm apart.

Concrete cover to the outer faces: at least 40 mm.

The concrete thickness increases to 30 cm.

Step 7. 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; below the level of the insulation the layer measured from the body is 27 cm. Concrete required for the encasement: 21.9 m³.

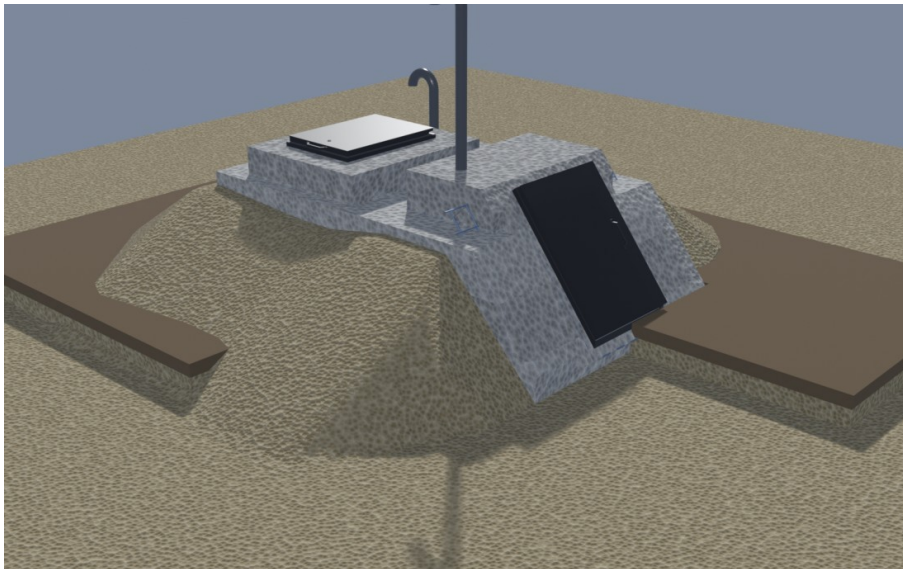


Step 7. Concreting in 40 cm lifts

When concreting inside the pit, make sure that soil from the walls does not fall into the concrete: this lowers its quality and causes microcracks and porosity. Above ground, make the formwork secure; the horizontal board at the bottom is essential — it takes the pressure, and without it the base of the formwork breaks out.

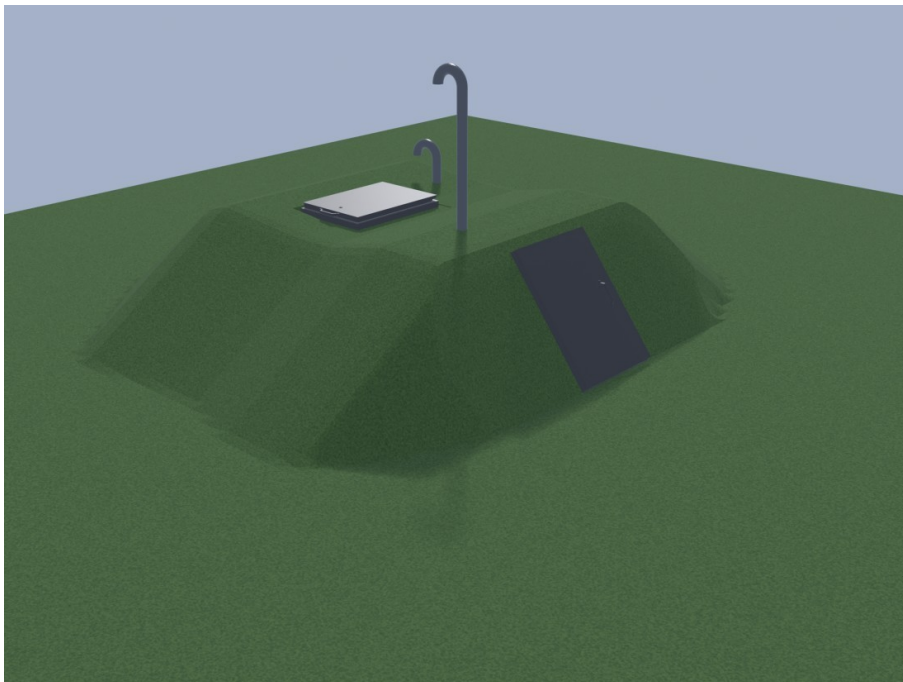
Step 8. Earth cover

Once the concrete has gained strength, the working space is backfilled with soil compacted in layers, and the mound is then shaped. A soil layer of at least 5 cm remains over the concrete at the entrance and 50 cm or more over the body.



Step 8. Earth backfill and shaping of the mound

Only the vertical exit shaft with its lid, the inclined entrance with its hatch and the two ventilation pipes remain above ground.



The finished shelter after earth covering

5. 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
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