Draft — Notification

REGULATION

OF THE MINISTER FOR INTERNAL AFFAIRS AND ADMINISTRATION[1)]

dated <date of issuing the act>

on the technical conditions for protective structures and the technical conditions for their use[2)]

Pursuant to Article 7(2)(2) and (3)(2) of the Construction Law Act of 7 July 1994 (Journal of Laws of 2024, items 725 and 834), the following shall be ordered:

Chapter 1

General provisions

§ 1. 1. The Regulation lays down the technical conditions for protective structures and location thereof, and the technical conditions for the use of these structures.

2. The provisions of the Regulation shall apply to the design, construction, maintenance, and alteration of protective structures as well as to associated construction equipment.

3. A protective structure or room performing the function of a protective structure, planned and designed as an additional function in a building or part of a building, shall meet both the requirements of the technical and construction regulations issued on the basis of Article 7(2)(1) of the Construction Law Act of 7 July 1994 as well as the additional requirements arising from this Regulation.

§ 2. For the purposes of this Regulation, the following definitions shall apply:

1) protective structure — shall be understood to mean a building structure or part thereof designated to protect people, equipment, supplies of materials, or other tangible goods

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1)The Minister for Internal Affairs and Administration manages the government administration department for internal affairs pursuant to § 1(2)(2) of the Regulation of the Prime Minister for 16 May 2024 on the detailed scope of activities of the Minister for Internal Affairs and Administration (Journal of Laws, item 738).

2)This Regulation was notified to the European Commission on … under number … pursuant to § 4 of the Cabinet Regulation of 23 December 2002 on the functioning of the national system for notification of standards and legal acts (Journal of Laws, item 2039; and Journal of Laws of 2004, item 597) which implements Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (codification) (OJ EU L 241, 17.9.2015, p. 1).

against the effects of hazards specified in line with the intended use of the building structure;

2) shelter — shall be understood to mean a protective structure of closed and hermetic construction, a specific resistance category, equipped with filter-ventilation devices designed to protect against hazards arising from natural disasters, terrorist incidents, or war;

3) hiding place — shall be understood to mean a protective structure of non-hermetic construction, a specific resistance category, designed to protect against hazards arising from natural disasters, terrorist incidents, or war;

4) provisional shelter — shall be understood to mean building structures other than shelters or hiding places prepared on an ad-hoc basis for the temporary concealment of people, including underground garages and buildings, tunnels, earthwork constructions, excavations, protective covers, and free-standing temporary places used when protection cannot be provided in protective structures.

Chapter 2

Categories of protective structures

§ 3. 1. The following categories of resistance of protective structures shall be distinguished:

1) P-category shelters with basic resistance — protecting against:
   a) air shock wave overpressure of 0.1 MPa > $\Delta p_m \geq 0.03$ MPa,
   b) loads due to rubble and falling elements of building construction,
   c) bomb and shell shrapnel,
   d) gamma-transmitted radiation from radioactive fallout, ensuring a gamma-transmitted radiation attenuation factor $K \geq 100$,
   e) impact of fires within the building where the shelter is located and of prolonged fires in the area where the shelter is located,
   f) poisonous warfare agents, biological warfare agents, radiological warfare agents, and toxic industrial substances;

2) increased resistance A-category shelters — meeting the requirements specified for P-category shelters and in addition protecting against air shock wave overpressure of the maximum value of $\Delta p_m \geq 0.1$ MPa, shock affecting the structure and equipment or additionally the effect of other assumed factors of destruction;

3) category 3 hiding places, i.e. anti-shrapnel — protecting mainly against the effects of conventional means of destruction, in particular against stresses caused by rubble and falling parts of building structure, and by bomb and shell shrapnel;

4) category 2 hiding places — meeting the requirements specified for category 3 hiding places and, in addition, protecting against gamma-transmitted radiation from radioactive fallout, ensuring a gamma-transmitted radiation attenuation factor $K \geq 100$;

5) category 2 hiding places — meeting the requirements specified for categories 3 and 2 hiding places, and, in addition, protecting against air shock wave overpressure of a maximum value of $\Delta p_m \geq 0.03$ MPa.

2. In addition to their protective function for the population, protective structures can be used to secure the operation of public administration bodies, stationary technical equipment intended for uninterrupted operation in emergency and crisis situations, strategic material reserves, movable monuments, valuable documentation and film, radio and television archives.

3. The detailed technical conditions for each category of protective structures are laid down in Annex 1 to the Regulation.

Chapter 3

General safety requirements for protective structures

§ 4. 1. Protective structures may be shared by groups of buildings if the distance to a building with rooms designed for permanent human habitation does not exceed 500 m.

2. Protective structures are planned, designed, and carried out as follows:

1) in buildings or other construction structures, at their lowest floor;

2) in the form of structures directly adjacent to buildings or other construction structures;

3) in the form of free standing structures.

3. A complete depression in the ground of protective structures is required and if it is technically difficult to fulfil this condition, protective structures partly depressed in the ground and shredded out with a thickness of at least 70 cm are permitted.

4. The above-ground construction shall be allowed when hydrogeological or flood conditions do not allow or make it more difficult to sink the protective structure in the ground provided that the assumed mechanical strength of the structure, its thermal insulation, and the assumed gamma-transmitted radiation attenuation factor shall be maintained.

5. The above-ground construction shall also be permitted in the case of protective structures with a capacity of up to 25 people, existing facilities or facilities assembled of finished components if the technology used so provides provided that the assumed mechanical strength of the structure, its thermal insulation, and the assumed gamma-transmitted radiation from radioactive fallout factor shall be maintained.

6. Protective structures shall be protected against flooding in areas of possible flooding, including in the event of heavy precipitation and flooding, and shall be located outside the area which may be flooded as a result of the destruction of or damage to water-inflating hydrotechnical equipment.

7. The premises of the protective structures shall not contain:

1) gas systems;
2) fuel systems, systems of process steam or compressed gases and liquids with the exception of internal systems of protective structures;
3) passing-through systems supplying other premises, plumbing, central heating, or hot water systems.

8. The location of internal systems of the building the routing of which outside the contour of the hiding place shall be technically difficult shall be exceptionally allowed in hiding places with the exception of gas systems.

9. The minimum distances of protective structures from tanks used for the storage of petroleum products, process tanks and pipelines at liquid fuel stations, tanks containing liquefied petroleum gas, pipelines in the ground, water supply, sewerage, heating and power lines shall be set out in Annex 2 to the Regulation.

10. Protective structures shall be protected against water and moisture from precipitation and against groundwater by:

1) forming the land above and in the vicinity of the protective structure in a manner allowing water to flow to flow to lower areas;
2) placing the bottom of the slab or foundation bench at least 0.75 m above the maximum level of groundwater table unless adequate waterproofing is provided;
3) if necessary, waterproofing or drainage system shall be designed.

11. Waterproofing shall meet the protective requirements:

1) under conditions where a dynamic load is applied to the protective structure;
2) under conditions of groundwater contamination by salt and other aggressive chemicals;
3) in protective structures planted partially in groundwater or located in a zone of possible flooding — while maintaining their protective properties with the occurrence of permissible scratches of protective structure construction elements with crack opening up to 1 mm.

12. Building envelopes backfilled with soil shall be heated and insulated in such a manner as to prevent moisture and condensation of steam on walls and ceilings. This requirement shall not apply to hiding places.

Chapter 4

Capacity and area requirements for protective structures

§ 5. 1. The capacity of a protective structure, meaning the maximum number of people likely to be present in the protective structure, shall be determined taking into account safety conditions, and technical and economic considerations according to the area of the protective structure and the number of seating and lying places.

2. Protective structures shall be designed:

1) within the limits of the building's footprint — with a capacity to provide protection for the users of the building or group of buildings;
2) outside the limits of the building's footprint — with a capacity to provide protection for the users of the area for which protective places have been provided.

3. The usable area per person in a protective structure shall ensure safe accommodation and mobility of people in that protective structure taking into account the intended number of seating and lying places and shall not be less than:

1) 0.6 m² for each seating place — when using mechanical ventilation,
2) 1.0 m² for each seating place — when using gravity ventilation

— and in the case of separate lying places, the additional space required to fit the planned number of beds is taken into account.

4. Protective structures for the protection of equipment, supplies or material goods meet the protective and functional-utility requirements according to their purpose taking into account the type of protected items.

Chapter 5

Resistance requirements for protective structures

§ 6. Protective structures shall be designed and constructed in such a way that the loads that may act on them during construction and use do not lead to:

1) destruction of the entire structure or its part;
2) movements and deformations of unacceptable size;

3) damage to parts of the structure, connections, or installed equipment as a result of significant movements of structural elements;
4) destruction as a result of an accident to an extent disproportionate to its cause.

§ 7. 1. The design of the protective structure shall meet the conditions that ensure that the load-bearing ultimate limit states and serviceability limit states are not exceeded in any of its elements and in the entire structure.

2. Safety conditions of the design as referred to in paragraph 1 shall be fulfilled if the design meets at least the Polish design and calculation standards and the requirements of this Regulation.

3. Standards other than those referred to in paragraph 2 may be used provided that the requirements set out in paragraphs 4-7 are met.

4. The load-bearing ultimate limit states shall be deemed to be exceeded if the structure causes a threat to the safety of people in and around the protective structure, as well as damage to equipment or stored property.

5. The serviceability limit states shall be deemed to be exceeded if the performance requirements for the design are not met. This means that the following may not occur in the structure's design:
1) local damage, including cracks which may adversely affect the serviceability, durability and appearance of the structure, its parts and of adjacent non-design parts of the structure;
2) deformations or displacements that adversely affect the appearance of the structure and its serviceability, including the functioning of machinery and equipment, as well as damage to non-design parts of the structure and finishing elements;
3) vibrations that are annoying to people or cause damage to the structure, its equipment and stored items as well as limit its use for intended purpose.

6. As regards the serviceability limit states of protective structures in areas subject to the influence of mining operations, the requirements of paragraph 5 shall not apply to those deformations, damages, and vibrations of the structure that result from the impacts caused by mining operations.

7. In areas subject to the influence of mining operations, design safeguards shall be applied appropriate to the state of danger resulting from the forecast impacts caused by

mining operations which shall be understood to mean forced displacement and deformation as well as ground vibrations.

§ 8. The construction of a protective structure in the immediate vicinity of a building structure must not pose threat to the safety of users of the building structure or impair its suitability for use.

§ 9. 1. The calculation of the design elements of protective structures in terms of loads shall be carried out in accordance with Polish Standards, and the application of other standards shall be possible provided that the requirements laid down in § 7(4)-(7) are met.

2. Permanent deflection of ceiling and foundation slabs is permitted, while no such deflection shall be allowed for columns and load-bearing walls.

§ 10. 1. The load-bearing structures of the designed protective structures shall be calculated for the following loads:

1) permanent;
2) variable, partially long-lasting;
3) exceptional, including those from the air shock wave overpressure, falling items, and structural elements such as beams, and rubble from nearby buildings.

2. The detailed requirements for the calculation of the structure and the resistance of protective structures are set out in Annex 3 to the Regulation.

Chapter 6

Fire-fighting requirements for protective structures

§ 11. Protective structures shall be designed and constructed in such a manner as to limit the possibility of a fire and, should it occur, to ensure:

1) the load-bearing capacity of the structure is maintained for a given time;
2) the spread of fire and smoke inside the facility is limited;
3) the spread of the fire to neighbouring facilities is limited;
4) it is possible to evacuate people or otherwise save them;
5) the security of emergency services is taken into account.

§ 12. 1. The protective structure is a separate fire zone.

2. The fire load density of the protective structure space with all installed elements of technical and utility equipment shall not exceed 500 MJ/m².

3. Floors, walls, and ceilings shall be made of non-combustible materials with a reaction-to-fire class of at least A2-s2, d0 as defined in the Polish Standards.

4. Wooden elements of at least 10 cm in diameter may be used in hiding places for construction or reinforcement of their structure involving the substructure of the ceiling. The characteristics and parameters of these elements shall at least comply with the relevant Polish Standards.

5. The use of flammable materials and products whose thermal decomposition products are highly toxic or intensely smoky as defined by the Polish Standard for interior finishing shall be prohibited.

6. The use of the following shall be prohibited:

1) carpets, liners, and loosely hanging trimmings;
2) materials emitting very toxic gases — combustion products — during a fire within the meaning of the Polish Standard, e.g. polyurethane foams, polyvinyl chloride;
3) suspended ceilings and floors raised above electrical systems;
4) gas installations and appliances;
5) flammable gas tanks.

§ 13. 1. In the case of newly constructed or reconstructed protective structures, the additional fire-fighting requirements set out in paragraphs 2-9 shall be ensured.

2. A shelter located under the building or adjacent to the building shall have fire separation elements with a fire resistance rating of REI 240 at the point of possible fire impact subject to paragraph 4.

3. The hiding place below or adjacent to the building shall have elements of fire separation of the REI 120 fire resistance class at the location of the possible impact of the fire subject to paragraph 4.

4. Should the capacity of a protective structure exceeds 300 people, separate smaller fire protection zones with a capacity not exceeding 300 people shall be used, bounded by a concrete structural partition not less than 40 cm thick and by a double protective-hermetic door, to prevent the spread of fire and the agents of destruction in the event of failure or damage to the protection layer within one of the zones, but this requirement shall not apply to subway stations and tunnels, protective structures sheltered by at least a 10-meter layer of soil or those over which there are at least 8 storeys of building directly.

5. Storage and technical rooms with a fire load density exceeding 500 MJ/m² shall be separated from the remaining part of the building intended for human occupancy by partitions with a fire resistance class of at least REI 120.

6. Emergency lighting powered by battery rooms or batteries built into light fixtures shall be installed on escape routes.

7. In a reinforced concrete construction, the concrete lagging layer of exterior walls and unlined floors that provides protection from the outside against excessive heating of the load-bearing reinforcement in the event of fires in the external environment of the protective structure shall be 40 mm thick.

8. Electrical system circuits shall be arranged in such a manner as to ensure that their failure in one fire zone shall not cause a power failure in another fire zone.

9. Installation culverts in vestibules and other partitions shall have the mechanical resistance required for these components, adapted to the resistance of the protective structure.

10. Installation culverts in the fire separation components shall have the fire resistance class EI required for these elements and mechanical resistance adapted to the resistance of the protective structure.

11. Installation culverts with a diameter greater than 0.04 m in the walls of a room for which the required fire resistance class is not less than EI 60 or REI 60, and which are not components of fire separation shall have the fire resistance class EI of the walls of that space.

§ 14. 1. Shelters equipped with power generators or battery rooms shall comply with the additional requirements set out in paragraphs 2-14.

2. Technical rooms containing power generators, fuel tanks, or battery rooms shall constitute separate fire zones.

3. There shall be no explosive rooms in a fire zone of a protective structure intended for human occupancy.

4. Electrical systems and equipment in a room with the fuel tank and fuel pumps shall be used in explosion-proof design if it is expected that fuels that can produce explosive mixtures shall be used in them.

5. In battery rooms equipped with hydrogen boosters or having battery rooms that do not emit hydrogen, the electrical system may be performed as in a non-explosive room.

6. The fuel tank fittings shall allow fuel to be drawn under fire conditions on the surface, and the breathing valve shall be equipped to prevent fire from entering the gas zone of the tanks.

7. A shut-off valve shall be fitted on the fuel line inside the shelter.

8. Fuel pipes shall not be installed on escape routes or in intakes.

9. The fuel retention tank shall be placed on the power generator if no intermediate fuel tank is made in a separate room.

10. In the intermediate fuel tank room, a threshold of at least 15 cm high and a cavity in the floor to collect the spilled fuel shall be made.

11. The intermediate fuel tank shall be equipped with a fuel level indicator.

12. The intermediate fuel tank shall be performed as hermetic with venting to an external tank or air ejector — with explosion protection when using liquid fuels with a flash point below 55 °C or when explosive atmosphere zones are present.

13. Fuel pumps shall be designed explosion-proof design in case of use of liquid fuels with a flash point below 55 °C or when explosive atmosphere zones are present.

14. The fuel pipeline shall not pass through other shelter spaces other than those of the fuel pump and power generator.

§ 15. 1. Should the vestibule leading to the protective structure be fitted with an external and internal door of the protective and hermetic type made of ≥ 8 mm thick steel sheet which complies with the requirements specified in these technical conditions or were provided for use on the basis of previously applicable catalogues of equipment and devices used in civil defence, and the distance between these doors is at least 100 cm, the protective structure shall constitute a separate fire zone and no additional fire doors shall be required.

2. In shelters of closed and hermetic construction, technical and construction solutions for smoke removal shall not be required if the use thereof breaks the continuity of the hermeticity layer or reduce the resistance of the protective structure to the air shock wave overpressure.

Chapter 7

Requirements for entrances and traffic routes in a protective structure

§ 16. 1. Entrances to the protective structure shall be designed to avoid rubble zones and other threats blocking the efficiency of the entrance in such a manner as to prevent the

destruction of two entrances by a single action of the assumed agent of destruction taking into account the possibility of using the entrance by persons with special needs as referred to in the Act of 19 July 2019 on Ensuring Accessibility to Persons with Special Needs (Journal of Laws of 2022, item 2240).

2. The entrances to the protective structure shall consist of the following elements:

1) protected entrance;
2) vestibule;
3) shelter door.

3. In order to provide access to the protective structure, fixed stairs shall be used — with a minimum usable width of the flight and landing of 1.20 m and a maximum step height of 0.175 m, with the number of steps in one flight of stairs not exceeding 17.

4. The width of the fixed steps shall be as per the following formula: 2h + s = 0.6 to 0.65 m where ‘h’ stands for the height of the step and ‘s’ for its width.

5. In protective structures with a capacity of up to 50 people, it is permissible to:

1) fixed stairs — with a minimum usable width of the flight and landing of 0.80 m, and a maximum step height of 0.20 m, with the number of steps in one flight of stairs not exceeding 20;
2) fan-shaped, interlocking or winding stairs — with a minimum usable width of the flight and landing of 0.8 m, and a maximum step height of 0.2 m.

6. The width of fan-shaped steps shall be at least 0.25 m, whereas such width of interlocking or winding stairs shall be provided at the distance not exceeding 0.4 m from the handrail of the internal balustrade or the column constituting the concentric structure of the stairs.

7. In protective structures designed for more than 50 people, the overall usable width of flights and the combined usable width of landings in stairways constituting the entrance route where the greatest number of people is expected to be present shall be calculated in proportion to the number of people likely to be present at the same time in the protective structure, providing at least 0.6 m width per 100 people but not less than what is specified in paragraph 3.

8. En entry to a protective structure in the form of a shaft or slide shall not be allowed.

9. Lifting devices or other technical devices enabling the vertical transport of disabled people may be used outdoors in the access area of the protective structure. Installation of such installations shall not exempt the use of staircases.

§ 17. 1. A protected entrance is a space enclosed on all sides consisting of a concrete ceiling, walls, and foundation, adjacent directly to the external doors of the protective structure and shielding the entrance opening from the direct effects of mechanical-type damage factors, inflammable agents and gamma-transmitted radiation.

2. It is designed in corridor axes, tunnels, car ramps or at the end of a flight of stairs as their reinforced section.

3. The protected entrance shall meet the following requirements:

1) resistance to air shock wave overpressure shall be at least 70 % of the assumed resistance of the protective structure;
2) the ceiling and walls of the protected entrance shall be at least 30 cm thick;
3) the length of the protected entrance shall correspond to the width of the entrance opening and additionally $\geq$ 1.5 of the width of the entrance opening on each side of the entrance opening;
4) the width of the protected entrance shall be $\leq$ 1.5 of the width of the entrance opening, but not less than 120 cm for main entrances and not less than 90 cm for back-up exits and in a protective structure with a capacity not exceeding 25 people;
5) the use of a wider protected entrance with a corresponding increase in length shall be permitted in such a manner as to protect the entrance opening from direct action of agents of destruction on all sides.

4. A semi-protected entrance is a type of protected entrance ended with dead-end space to be used when the use of a protected entrance open on two sides is difficult for technical or functional reasons.

5. In protective structures, excluding category 3 hiding places, in order the following shall be used to provide protection against gamma-transmitted radiation from radioactive fallout:

1) two right-angle road breaks between the open space outside the facility at the entrance and the room intended for human occupancy, or
2) one right-angle road break using doors that provide a gamma-transmitted radiation attenuation factor of $K \geq 10$.

6. In multi-space garages and underground traffic facilities with a protective structure function, entrances without a protective structure or semi-protective structure shall be permitted provided that the ramp, the ceiling above the ramp, and the adjacent area are shaped in such a manner that the entrance gate is shielded on all sides from the direct action of shrapnel and other agents of destruction and is located at the right angle to the axis of the ramp or entrance tunnel.

7. If it is not possible in multi-space garages and underground traffic facilities with a protective structure function to shield the entrance gate as per paragraph 6, a protective area may be set aside in a part of the garage room marked as per paragraph 8 which is shielded from the direct external agents of destruction, including detached elements of the gate structure in the event of its mechanical damage.

8. In multi-space garages and underground traffic facilities with a hiding place function, the hiding place is provided for in a part of the facility, the boundaries of the planned protection zone shall be separated from the rest of the unprotected part of the building structure by two 8 to 10 cm wide horizontal lines equal to the width of a single line on the side of:

1) protection zone — a green line,
2) other unprotected part of the building — an orange line

— the marking shall be made using floor paint for concrete or by other means that ensure durability.

§ 18. 1. The vestibule is a space directly adjacent to the protected entrance; it increases the hermeticity of the entrance, enables the presumed mechanical resistance, provides thermal insulation under conditions of fire occurrence and weakens the gamma-transmitted radiation.

2. The external door of the vestibule shall open outwards and shall be located perpendicular to the axis of the corridor, stairs, or protected entrance.

3. The internal door of the vestibule shall not be located directly opposite the external door.

4. If entry or exit is planned during the direct action of the assumed mechanical and contamination agents, depending on the assumed resistance, one or more vestibules equipped with external and internal doors of the protection-hermetic type, i.e. locks, shall be used.

5. If a sanitation point is provided for in a protective structure, at least two vestibules shall be used with an entrance from the internal vestibule to the clean area and a separate entrance to the decontamination unit and then to the clean area.

§ 19. 1. The door leading to the protective structure, including the internal door of the vestibule and the back-up exit door, shall be at least as follows in the clear opening of the door frame:

1) 0.9 m wide
2) 2.0 m high

2. The door to technical rooms and, in protective structures with a capacity of up to 50 people, the door leading to the protective structure, including the vestibule internal door, shall be at least as follows in the clear opening of the door frame:

1) 0.8 m wide and 1.8 m high — in the case of an entrance door;
2) 0.6 m wide and 1.2 m high — in the case of back-up exit doors and entrance to the expansion chamber, and in the case of the use of hatches at the back-up exit, the smallest dimension in the clear opening shall at least be 0.6 m.

3. In protective structures with a capacity of more than 50 people, the overall width of the doors in the clear opening of the frame of doors constituting entrances to the protective structure and exits from shelter chambers shall be calculated in proportion to the number of people who can be in there at the same time assuming the minimum width of 0.4 m per 100 people with the smallest width of the door in the clear opening of the door frame of 0.9 m.

4. The doors leading to the protective structure, including the internal doors of the vestibule, shall opened outwards or slide, and the door frame structure shall be supported at its entire circumference and anchored by steel anchors in the load-bearing wall.

5. Protective structures shall feature a vestibule that constitutes a room separating the interior of the protective structure from the external environment and shall be equipped with access doors and internal doors adapted to the structure of the facility.

6. In categories 2 and 3 hiding places, a vestibule may be skipped and a steel or wooden door may be used without special protective requirements if the place for human occupancy is located in a part of the hiding place which is shielded from the direct action of external agents of destruction and from detached door elements in the event of their mechanical damage or falling inside the hiding place in result of an explosion.

7. The maximum height of the door threshold in protective structures shall be 0.2 m.

8. In multi-space garages and underground traffic facilities with a hiding place function, external gates of special design, i.e., protective and hermetic, shall not be required, if the protective zone is provided in a marked part of the garage room and is shielded from direct action of external agents of destruction including detached elements of the gate structure in the event of mechanical damage.

9. In multi-space garages with shelter function, entry gates shall meet the following cumulative requirements:

1) the external gates shall provide protection and strength prescribed for the safety door, using sheet-covered or reinforced concrete grating structures with the leaf pressed against the door frame supported and anchored in the shelter structure;
2) the internal gates separating the vestibule from the garage room shall be hermetic.

10. The requirements for doors, automatic explosion-proof valves and certain other devices in protective structures are set forth in Annex 4 to the Regulation.

§ 20. 1. Width of corridors in the protective structure:

1) shall be at least 120 cm for main traffic routes;
2) shall be at least 90 cm for other passages;
3) shall enable smooth and safe movement of people in the protective structure taking into account persons with special needs as referred to in the Act of 19 July 2019 on Ensuring Accessibility to Persons with Special Needs;
4) in the case of protective structures intended for the protection of equipment, material supplies or other material goods — it shall meet the requirements according to the purpose of the protective structure taking into account the type of equipment to be protected or the method of storage and transport of items.

2. The width of the main traffic routes shall be calculated in proportion to the number of people capable of using the corridor with a minimum of 0.6 m per 100 people, but not less than 1.2 m.

3. The height of the main traffic routes shall be at least 2.2 m, while the height of the local lowering shall be 2 m, with the length of the lowered pathway section not exceeding 1.5 m on each 10 m long section of the main traffic route.

4. The leaves of doors constituting the exit to the main traffic route shall not, when fully opened, reduce the required width of the corridor. The provision shall not apply to doors equipped with automatic closing devices.

5. For protective structures with a capacity of up to 50 people, corridors constituting the main traffic routes are 90 cm wide.

Chapter 8

Requirements for back-up exits in protective structures

§ 21. 1. In protective structures located under a building, a back-up exit leading outside the building shall be required taking into account the zone safe from rubble.

2. The method of calculating a zone safe from rubble is specified in Annex 5 to the Regulation

3. A back-up exit shall not be required where the following cumulative conditions are met:

1) the primary entrance is located outside the zone of the forecast rubble or other hazards;
2) the external wall of the protective structure does not exceed 10 m in length;
3) the capacity of the protective structure does not exceed 25 people.

4. The back-up exit from the protective structure shall be protected against rubble and shrapnel, provide cover from precipitation and rainwater penetration from the ground surface, and it shall be able to be opened manually by a single person without using hydraulic jacks.

5. All above-ground and underground elements of back-up exits shall have a mechanical resistance of not less than the construction of the protective structure with the exception of roofing over the stairs to protect against precipitation which may have a lightweight design.

6. In protective structures, the back-up exit shall consist of the following elements:

1) back-up exit vestibule;
2) back-up exit tunnel leading to rubble-free zone;
3) back-up exit shaft closed by the above-ground chimney or stairs leading to the ground surface.

7. In protective structures excluding category 3 hiding places, the following shall be used to provide protection against gamma-transmitted radiation from radioactive fallout:

1) two right-angle road breaks between the open space outside the facility at the back-up exit and the room intended for human occupancy, or
2) one right-angle road break using doors that provide a gamma-transmitted radiation attenuation factor of $K \geq 10$.

§ 22. 1. The back-up exit vestibule shall be the room that separates the interior of the protective structure from the external environment and shall have:

1) external and internal doors meeting the requirements adapted to the facility in accordance with Annex 4 to the Regulation opening outwards or sliding;
2) a threshold of 0.2 m to prevent water from entering the tunnel and the vestibule into the protective structure.

2. The back-up exit tunnel shall be used if the back-up exit vestibule is located outside the zone safe from rubble and it is necessary to move the back-up exit shaft to the zone safe from rubble.

3. The back-up exit tunnel shall comply with the following requirements:

1) it shall be ≥ 1.2 m wide and ≥ 2.0 m high in the clear opening;
2) it shall be separated, along with the vestibule, from the main structure of the shelter by an expansion joint. This requirement shall not apply to shelters founded in irrigated soils, if their length exceeds 3 m;
3) it shall be further separated from the shaft or stairs of the back-up exit by a structural partition with a protective-hermetic door and an automatic explosion-proof valve to form an enclosed space with a volume of at least 3.30 m^3 — if it also serves as an expansion chamber;
4) shall provide a floor slope of 2 % towards the back-up exit shaft.

4. The width of the back-up exit tunnels shall be calculated in proportion to the number of people capable of being present in the protective structure at the same time taking at least 0.4 m per 100 people, but not less than 1.2 m.

5. For protective structures with a capacity of up to 150 people, back-up exit tunnels shall be allowed with the following clear opening dimensions: ≥ 0.9 m wide and ≥ 1.2 m high, and in the case of circular sections — the inner diameter of ≥ 0.8 m.

6. The back-up exit shafts shall be designed in the form of stairways in accordance with the conditions laid down in § 16, whereby when calculating the total usable width of stair flights and the total usable width of landing in stairs, the width of at least 0.4 m per 100 people, but not less than 1.2 m shall be allowed.

7. In protective structures with a capacity of up to 150 people, a back-up exit shaft complying with the following requirements shall be permitted:

1) it shall be ≥ 0.9 m wide in the clear opening;

2) it shall be equipped with a ladder with steel brackets;

3) it shall be terminated with:

a) an above-ground chimney having grilles in the side walls of not less than 0.6× 0.6 m one of which shall open inwards and features a lock from inside, and the remaining grills shall not open;

b) a steel hatch without an above-ground chimney, and if it also serves as an air intake with such a termination — it shall be equipped with a steel pipe with a pipe-shaped end, bent towards the ground or made in a similar manner to supply air to the shaft or the end section of the back-up exit tunnel.

8. The back-up exit shaft shall be situated in a zone safe from rubble, and under difficult localisation conditions, e.g. compact building development; it shall be allowed to make a vertical shaft outside the zone safe from rubble in such a manner that the lower edge of the chimney exit opening shall be proportionally raised to the maximum height of the rubble taken as 1/4 of the height determined in accordance with Annex 5 to the Regulation but not more than 4.0 m.

9. In the case of a protective structure with a capacity of up to 150 people located under a building with a height of the upper façade not exceeding 16 m, it shall be permitted to locate the back-up exit shaft directly at the external wall of the building, with the lower edge of the chimney exit opening (grille) being at level 1/4 of the height of the building, and brackets for descending are installed on the exterior wall from a height of 180 cm.

10. In compact building development, emergency passages between basements of buildings shall be additionally provided for to be made in such a manner that the partition wall can be dismantled and the passage can be cleared using hand tools.

11. If stairs are provided for in the back-up exit solution instead of shafts, they shall terminate at ground level in a zone safe from rubble.

12. At the bottom of the back-up exit shaft — and in the case of stairs, in the lower slab of the tunnel leading to the back-up exit — individual drainage shall be provided in accordance with ground and water conditions which shall be protected against backflow flooding.

Chapter 9

Requirements for primary function rooms, technical zone, social rooms, and ventilation requirements in protective structures

§ 23. 1. The primary function rooms directly serve to fulfil the essential function of the protective structure and shall be prepared as:

1) rooms for sitting and resting — in the case of civil protection structures;
2) meeting the requirements according to the intended use of the protective structure taking into account the type of equipment protected or the manner in which materials are stored and transported — in the case of protective structures designed to protect equipment, material supplies, or other material goods.

2. Sitting and resting rooms shall be planned in the corridors of the common part, underground connections between buildings, or in separate rooms dedicated, outside the period of hazard, for example, for body-building gyms, rooms for strollers and bicycles, meeting rooms for tenants, garage rooms.

§ 24. The number of seats in protective structures for civil protection shall be set at 2/3 of the capacity of the protective structure and, in the absence of dedicated sleeping places — for all people present in the protective structure.

§ 25. Social rooms shall include:

1) bedrooms;
2) washrooms;
3) washing facilities;
4) optionally other rooms such as: kitchens, food storage rooms, dining rooms, dish washing rooms, medical offices, infirmaries, smoking rooms, isolation rooms, clothes drying rooms, waste and garbage storage rooms, radio and television rooms enabling the receiving of on-going communications and news — depending on the capacity and function of the protective structure.

§ 26. 1. In the case of protective structures designed to protect people, the number of sleeping places in protective structures shall be set for 1/3 + 4 % of the capacity of the protective structure.

2. Sleeping places shall not be required in hiding places provided for short-term stays of people.

3. Sleeping rooms shall be planned:

1) as far as possible from internal noise sources;
2) in separate rooms — with cubicles of four to six people — separated by light walls except for a security structure with a capacity of up to 25 people where it shall be permitted to arrange sleeping rooms in the same room as seating places.

§ 27. Washrooms shall feature:

1) in the case of protective structures for the protection of people — at least one washbasin for no more than 100 people, with newly designed shelters providing one washbasin for no more than 20 to 25 people, taking into account people with special needs, as referred to in the Act of 19 July 2019 on Ensuring Accessibility to Persons with Special Needs;
2) in the case of shelters within plants using toxic industrial substances and in the case of which it is assumed that the time of full implementation of the shelter function shall take a week or more — in addition, a sanitary treatment point with showers for flushing chemical substances or radioactive dust from people entering the shelter in a number appropriate to the purpose and capacity of the protective structure amounting to at least 1 shower for no more than 100 people.

§ 28. The sanitary treatment point, if any, shall be planned in the entrance zone as a sequentially connected vestibules:

1) dressing room with sealed containers for contaminated clothing;
2) decontamination shower;
3) hygienic shower;
4) dressing room with a passage to the medical checkpoint and further to the clean area, i.e. the main traffic route of the protective structure.

§ 29. Washing facilities shall comply with the following requirements:

1) at least one flush or dry toilette for no more than 75 people, with one toilette in newly designed shelters for 25 people, taking into account people with special needs, as referred to in the Act of 19 July 2019 on Ensuring Accessibility to Persons with Special Needs;
2) in case of a high risk of failure of the designed water supply or sewage system and the lack of a back-up source of water supply for sanitary purposes — back-up dry toilettes instead of hermetic containers;

3) are fully separated from the other rooms by a washroom that serves as an internal vestibule;
4) in a protective structure of more than 75 people — they are separate for men and women.

§ 30. Storage areas for water, food, medicines, cleaning products, hygiene and personal protective products shall be located in a seating room or separate rooms, and in shelters with a capacity of more than 25 people — in separate rooms.

§ 31. In shelters with a capacity of more than 300 people, the following rooms shall be provided, with a size proportional to the capacity of the shelter but not less than 6 to 8 m^2:
1) shelter service room;
2) medical centre;
3) isolation room for the sick;
4) storeroom for food provisions not requiring refrigerated storage, a point for heating meals, a dining room, and a lace for washing dishes;
5) trash storage area in garbage cans.

§ 32. 1. Technical zone rooms for securing the operation of protective structure equipment, depending on the purpose of the facility, are prepared for:
1) communication and IT systems equipment;
2) ventilation system equipment;
3) water and sewage facilities;
4) electricity supply facilities;
5) monitoring and fire suppression equipment;
6) other devices, if this is due to the specific function of the protective structure.

2. The technical zone rooms shall be functionally separated and designed in such a way so that the noise caused by technical equipment in the rooms intended for human occupancy shall not exceed the permissible values equal to at least the levels specified in the Polish Standard at the level provided for kitchens and sanitary rooms in apartments.

3. The conduits of systems leading to shelters and passing through the external building envelope shall be protected from shearing due to structural shocks by the use of flexible couplings, culverts, compensating manholes, or casing pipes.

4. The installation conduits, except for necessary culverts, shall not be routed inside the structure of walls, ceiling, and foundation slab.

5. The list of Polish Standards to which the technical conditions for protective structures referred to in the Regulation apply is set out in Annex 6 to the Regulation.

§ 33. 1. The protective structure shall have ventilation solutions adapted to the type, purpose, and capacity of the facility.

2. Ventilation in all types of protective structure shall meet the following requirements:

1) under conditions of an uncontaminated outdoor atmosphere — ensure the supply of clean air and removal of used air at least in accordance with the Polish Standard for hygienic requirements to allow the assumed number of people to stay for a non-normal period;
2) outside the period of occupancy of people in the protective structure — provides continuous ventilation of rooms by gravity or mechanical ventilation;
3) the relative humidity of the indoor air shall not exceed 80 % with the exception for a protective structure intended for short-term stay of people the specific nature of which excludes or hinders the maintenance of the assumed humidity such as an ad-hoc adapted underground transport facility, an anti-aircraft gap (slot);
4) the ventilation system shall be protected against infiltration of fire gases in the event of a building fire;
5) the building's chimney shall not be used as ducts for drawing outside air, but can be used as exhaust ducts for gravity ventilation provided that the possibility of immediate air shut-off with manual dampers or guillotine gates shall be provided.

Chapter 10

Specific requirements for ventilation in a hiding place

§ 34. 1. The following shall be used in hiding places:

1) gravity ventilation;
2) mechanical ventilation and additionally gravity ventilation as emergency.

2. The gravity ventilation in a hiding place shall meet the additional requirements set out in paragraphs 3-10.

3. The air intake openings shall be placed on the external wall of the building where the distance of the bottom edge of the air intake opening from the ground level being 200 cm and may be reduced in technically justified cases.

4. There shall be no combustible elements of the construction or finish of the building in the immediate vicinity of the air intake openings.

5. Metal air intake opening grilles shall be used. Plastic components shall not be used.

6. Air supply ducts may take the form of steel pipes attached to the external wall of the building or may be located inside the wall.

7. Supply and exhaust openings shall be secured by the combined use of:

1) double bends of ventilation ducts in the wall or double bends of ventilation ducts in the ground — to protect against gamma-transmitted radiation from radioactive fallout;
2) manual gates (dampers) for ventilation in the premises, ensuring the ability to immediately cut off from the external atmosphere in the event of fire or contamination, and leakage class D taking into account the Polish Standards on the strength and tightness of ducts;
3) in category 1 hiding places — automatic explosion-proof valves located outside in manholes or inspection boxes — to protect against the entry of an air shock wave overpressure.

8. The supply openings in the room shall be placed in the wall at a height of no more than 50 cm from the floor.

9. The exhaust in the room shall be placed in the wall at a height of no less than 50 cm from the ceiling.

10. Exhaust ducts of used air shall be routed through separate channels, and their outlet shall be placed as high as possible above the roof of the building structure.

§ 35. 1. Mechanical ventilation — without filter-ventilation — in hiding places shall meet the additional requirement specified in paragraphs 2-4.

2. Air intakes and air supply channels shall prevent the penetration of fire gases in the event of a fire inside the building in which the hiding place is located, and shall be located at a distance of not less than 8 m from:

1) exhaust gas ejectors from power-generating units, solid waste collection sites, liquid waste tanks, sewage vents, and other similar sanitary-household equipment capable of causing unpleasant odour or air pollution;
2) flammable, smoke-intensive stored materials, structural elements or building finishes, understood as corresponding to classes of reaction to fire at least as specified in the Polish Standards.

3. The hiding place room shall be fitted with dampers or hermetic valves capable of being immediately cut off from the outside atmosphere in the event of fire or contamination and leakage class D taking into account the Polish Standards on the strength and tightness of ducts.

4. In category 1 hiding places where mechanical ventilation supply and exhaust ducts pass through external walls, automatic explosion-proof valves placed in inspection well or boxes shall be used on the external side — to protect against the passage of air shock wave overpressure.

Chapter 11

Specific requirements for ventilation in shelters

§ 36. 1. In shelters, the following shall be used:

1) mechanical ventilation with filter-ventilation feature, equipped with a back-up manual fan drive or back-up fan power source;
2) mechanical filter-ventilation followed by gravity ventilation as an emergency solution, with the possibility of instant hermetic cut-off by means of manual valves or cut-off dampers.

2. gravity ventilation in shelters shall comply with the requirements laid down in § 34(3)-(10), respectively, as in category 1 hiding places.

3. In the mechanical ventilation system in shelters, the air intake shall be placed in the zone safe from rubble with air supply through the back-up exit tunnel in such a manner as to prevent the penetration of fire gases in the event of a fire in the building where the shelter is located, and at a distance of not less than 8 m from:

1) exhaust gas ejectors from power-generating units, solid waste collection sites, liquid waste tanks, sewage vents, and other similar sanitary-household equipment capable of causing unpleasant odour or air pollution;
2) flammable, smoke-intensive stored materials, structural elements or building finishes, understood as corresponding at least to the classes of reaction to fire in accordance with the Polish Standards.

4. In shelters with a capacity of more than 300 people, an additional back-up air intake shall be provided at a distance as large as possible from the main air intake.

5. The air intake opening in the back-up exit tunnel or manhole shall be protected from the outside by an automatic explosion-proof valve, and the air shall be supplied through a channel into the room of the expansion chamber of the following volume:

1) at least 3.30 m^3 — in shelters with a capacity of up to 25 people;
2) at least 6.60 m^3 — in shelters with a capacity of more than 25 people.

6. In shelters with a capacity of more than 25 people located within the administrative boundaries of cities, a stone embankment filter shall be provided to cool down the air drawn during the period of filter-ventilation during fires. The filter shall be located on a steel grate constituting a load-bearing structure of the bed in a manner that provides air exhaust with gabion-type filter housings allowed.

7. The filter bed shall consist of the following main layers:

1) superstructure layer holding the proper bed consisting of stones with a size of 60 to 100 mm and sharp-edged gravel with a grain size of 10 to 20 mm and a height of at least 50 mm on the grate;
2) specific layer, providing the assumed filtration capacity and consisting of aggregate with grain size of 5 to 10 mm and a height of 1,000 mm;
3) top layer — consisting of aggregate with grain sizes from 20 to 30 mm and a height of 50 mm.

8. The filter volume increases according to the amount of supplied air and is 2 m^3 of the filtering deposit for each 300 m^3 the air supplied. At high fire risk in industrial plants, a value of 6 m^3 of filtering deposit for every 300 m^3 of air is assumed.

9. The air from the expansion chamber is supplied to the filter-ventilation device through a stone filter by a steel pipe whose individual sections are welded.

10. The dimensions of the filter-ventilation chamber shall enable installation and operation of the specified model of filter-ventilation device, however, in shelters with a capacity of more than 100 people, the dimensions of the chamber shall be not less than:

1) width — 300 cm,
2) length — 500 cm,
3) height — 240 cm

11. Filter-ventilation shall be provided to enable the assumed number of people to stay, in the case of contamination of external atmosphere, for a period of 14 days when filter

absorbers shall be used to provide protection in the event of contamination of atmosphere with toxic industrial substances used in industrial plants, especially ammonia.

12. Air supply ducts from the filter-ventilation device to the rooms shall be made of galvanized steel sheet or 316L grade stainless steel.

13. The assumed overpressure of 100-200 Pa shall be assumed in the rooms through the use of a positive pressure supply ventilation system or positive pressure supply/exhaust ventilation system to prevent penetration of contaminated air into the shelter.

14. During the periods referred to in § 37(4):

1) during period 1 — clean ventilation, not less than 20 m^3 of air per hour per person shall be supplied;
2) during period 2 — filter-ventilation, not less than 3.5 m^3 of air per hour per person shall be supplied.

15. The flow of air from the clean zone through the conventionally clean zone to the conventionally dirty zone and the dirty zone referred to in § 38(1) shall be provided, whereby the shelter's exhaust overpressure dampers for the ejection of used air shall be placed in such a position that the used air shall flow outside through the entrance vestibules.

16. Regardless of the air flow through the entrance vestibules, air flow from rooms where life-threatening concentrations of chemicals or unpleasant odours may occur shall also be provided through exhaust overpressure dampers and automatic explosion-proof valves to the outside.

17. The air ejector shall be protected from being directly covered by rubble by being located in the corridor of the protected entrance in the wall of which an automatic explosion-proof valve shall be placed to protect the air exhaust against the shock wave.

18. It shall be possible to temporarily cut off from the external environment and to cease the supply of outside air in the event of fire.

19. In the case of shelters located in particularly unfavourable conditions due to the threat of fires or chemical contamination, e.g. within petrochemical plants, the possibility of regeneration of internal air or supplementation of breathing air from the storage system in cylinders or tanks with compressed air shall be provided.

20. Hermetic valves shall be used in ventilation duct passages through building partitions constituting layers of protection and hermeticity, also in the supply and exhaust openings of gravity ventilation, whereby the use of shut-off dampers applied in water supply

networks or industrial valves other than shelter valves shall be permissible if they provide the possibility of immediate hermetic shut-off.

21. Fire dampers shall be used for ventilation channel passages through building partitions separating fire zones.

22. The ducts for the supply of air from outside to the filter-ventilation device shall be yellow in colour.

23. The ducts distributing clean air in rooms shall be marked in light blue at the air diffuser outlets.

24. The scheme for the solution of ventilation in protective structures and the nominal air flows through the stone filter beds shall be specified in Annex 7 to the Regulation.

§ 37. 1. Ventilation systems and filter-ventilation devices to be installed in shelters, depending on the purpose of the facility, the assumed resistance, and the solutions to be used shall consist of the following devices:

1) an air intake protected by an automatic explosion-proof valve and expansion chamber;
2) rough de-dusting filter;
3) pre-filter;
4) filter absorbers;
5) cut-off dampers;
6) flow meter with a control-measurement panel;
7) fan with a hand-electric or purely electric drive in shelters equipped with their own power source;
8) air supply ducts for the distribution of clean air;
9) shelter's exhaust overpressure dampers;
10) air ejector protected by an automatic explosion-proof valve located at protected entrance;
11) additional equipment, e.g. for air regeneration, heat recovery, air conditioning.

2. The filter-ventilation devices referred to in paragraph 1, intended for civilian protective structures shall not constitute technology for military or police purposes within the meaning of the Act of 13 June 2019 on the performance of economic activities in the field of manufacture and trade in explosives, weapons, ammunition, and goods and technology for military or police purposes (Journal of Laws of 2023, item 1743).

3. Electronic control circuits for filter-ventilation devices, if used, shall be placed in shielded boxes using a well-conductive or ferromagnetic material to protect the integrated circuits from destruction in the event of an electromagnetic pulse.

4. Filter-ventilation devices in shelters shall provide conditions for people to stay and work there during the three main periods of operation:

1) Period 1 — known as the clean ventilation period, where there is no risk of contamination outside of the shelter and the air is supplied without filter absorbers;
2) Period 2 — known as the filter-ventilation period when there is a risk of contamination outside the shelter and the air is supplied through filter-ventilation devices maintaining overpressure of at least 100 Pa in the shelter;
3) Period 3 — known as isolation period when the shelter needs to be temporarily cut off from outside atmosphere whereby if the shelter provides for the use of compressed air storage, the air overpressure of 10– 20 Pa is maintained.

5. In shelters designed to operate autonomously under insulation conditions, the following two sub-periods shall be distinguished during the third ventilation period:

1) a pre-regenerative sub-period — when the crew can survive without the need to activate air regeneration devices;
2) regeneration sub-period — when, for the survival of the crew, air regeneration devices or equipment for breathing air supply from a in cylinder or compressed air tank storage system shall be activated.

§ 38. 1. Adequate clean zones, understood as rooms or sets of rooms with the same or similar physical and chemical and bacteriological composition of the microclimate, shall be provided in shelters:

1) clean zone — supplied with treated fresh air from air supply ducts where microclimate comfort and air overpressure shall be maintained;
2) supposedly clean zone – for ventilation of which air after ventilation of the clean zone shall be used;
3) supposedly dirty zone — where air pollution may occur to an extent that is not life-threatening, or conditions that prevent people from staying there as the comfort level is exceeded in relation to, for example, temperature, noise, hydrogen, or acid concentrations in the battery room;

4) dirty zone — where life-threatening concentrations of toxic, radioactive and biological warfare agents may be present, it requires the use of personal protective equipment against contamination.

2. The clean zone shall include:

1) shelter chambers for human occupancy;
2) rooms for work and rest;
3) operating rooms, treatment rooms, medical rooms, etc.;
4) storage rooms for: water, food, medicines, etc.

3. The supposedly clean zone shall include:

1) washing facilities and washrooms;
2) kitchen and canteen;
3) storage facilities for equipment, spare parts, compressed air, etc.;
4) technical rooms where no harmful substances shall be emitted, such as the main fan room, electrical switchgears.

4. The supposedly dirty zone shall:

1) isolation room for the sick;
2) technical rooms where substances harmful to health may be emitted, e.g. battery room, room for intermediate fuel tank, sewage pumping station, etc.;
3) utility rooms;
4) dry toilettes;
5) filter-ventilation chambers;
6) power-generating unit rooms.

5. The dirty zone shall include:

1) entry and exit vestibules;
2) vestibules of the decontamination node for hygienic showers;
3) contaminated clothing storage room;
4) expansion chambers, silencer chamber of the mineral filter;
5) kitchen waste disposal site.

6. Rooms with the same or similar microclimate characteristics shall, where possible, be grouped appropriately into functional units.

7. A vestibule featuring hermetic or protective hermetic doors shall be made at the passage to the dirty zone.

§ 39. 1. Ventilation of the power generator room and other rooms of the power generator unit shall be designed taking into account the requirements of paragraphs 2-8.

2. Mechanical supply and exhaust ventilation shall be used in the rooms of power-generating units.

3. The amount of air supplied shall meet the needs of ventilation and combustion, however, the amount of air for ventilation of the power-generating unit room shall not be less than 1.5 m^3/kW of installed power per hour.

4. The secondary air from the protective structure shall be used for ventilation of the power generator room in the period 1 — clean ventilation — and the period 2 — filter-ventilation — with the use of shelter's exhaust dampers to prevent backflow of air, and the use of supply and exhaust fans activated automatically when the power generator unit is switched on.

5. During the period 3 — isolation — no ventilation of the power-generating unit room is foreseen.

6. The air for combustion engine of the generator unit shall be supplied from an external air intake independent of the air intake used for the shelter ventilation system, using welded steel pipes and connections to ensure tightness.

7. Exhaust pipes from the generator unit shall be made of welded steel pipes, and the pipes are thermally insulated to reduce heat gain in the generator unit rooms.

8. Combustion engine combustion air intakes, exhaust and air ejectors from power generator rooms shall be protected from outside by automatic explosion-proof valves or expansion chambers with stone filters at least 2 m^3 filled with 0.03-0.06 m diameter aggregate, designed in accordance with Annex 7 to the Regulation.

Chapter 12

R Requirements for water supply for human consumption and sewage disposal in protective structures

§ 40. 1. Protective structures shall be provided with water intended for human consumption in the minimum amount of 9 dm^3 per person per day, and in the case of flushing washing facilities — the minimum of 30 dm^3 per person per day.

2. Irrespective of the supply of water from the mains, shelters and category 1 hiding places with a capacity exceeding 300 people, a back-up water intake shall be provided using a

drilled well equipped with a submersible pump located in a separate room inside the protective-hermetic layer of the protective structure or in the vicinity of the protective structure.

3. Inspection well and other technical elements of the back-up water intake located outside the protective-hermetic layer of the protective structure shall have a mechanical resistance of the structure not weaker than that of the protective structure, and inspection manholes shall have such resistance as the protective-hermetic doors listed in Annex 4 to the Regulation.

4. Hydrophore tanks and control equipment shall be designed in technical rooms within the protective-hermetic layer of the protective structure.

5. Should the protective structure be equipped with a back-up water intake and an emergency power source to operate the distribution equipment in the absence of external supply, stocking water in tanks or containers shall not be required.

§ 41. 1. The water supply systems shall be designed to ensure the supply of water to the protective structure in accordance with its intended use at least in accordance with the requirements of the Polish Standard and paragraphs 2-12.

2. The water supply systems shall be installed on the surface of walls or ceilings and shall be fitted with shut-off valves installed in readily accessible spaces in the room at the entrance point of the system to the protective structure.

3. The water supply systems shall not be routed through ceilings, expansion chambers, air pre-cleaning chambers, power generator rooms, and fuel tanks.

4. Ducts through protection layers, hermeticity lines or between fire zones shall be carried out using fire-resistant and tight culverts.

5. In shelters with air shock wave overpressure resistance of $\Delta \geq 0.05$ MPa, the connection to the external water supply system allows mutual movement of pipes by 15.0 cm vertically and by 3.0 cm horizontally without destroying the connection.

6. The water supply system shall be equipped with drain and vent valves, allowing complete draining of water from the system in case of not using water for more than a week.

7. In protective structures under buildings, the constant flow or circulation of water in the water supply system of the protective structure shall be ensured through an appropriate connection to the building system.

8. Provision of domestic hot water, if provided for, shall be possible by using:

1) heating device mounted directly at the tap point;

2) connection to a hot water system meeting the requirements set forth in paragraph 2.

9. The hot water distribution system shall enable water to be obtained at tap points in a temperature of not less than 55 °C and not more than 60 °C, and shall allow disinfection using chemical or physical method, including the periodic application of the heat disinfection method without compromising the durability of the system and the devices used therein.

10. In order to carry out the heat disinfection referred to in paragraph 9, it is necessary to ensure that the water temperature at tap points shall not be lower than 70 °C and not higher than 80 °C.

11. The water supply system shall be marked:

1) in the case of cold water system — in green;

2) in the case of hot water system — red.

12. Protective structures shall be equipped with drainage systems in case of a water supply failure or flooding.

§ 42. 1. The sewage system in protective structures shall meet the requirements set forth at least in the Polish Standards for such systems and the conditions contained in this chapter.

2. Separate sewerage systems for municipal wastewater, heated process water and special sanitary treatment node unconnected within the contour of the protective structure shall be used.

3. Domestic wastewater shall be discharged to sewage facilities, and in the absence of such facilities — to non-drainage tanks located outside the protective structure.

4. Sewer outlets in new, reconstructed, or renovated protective structures shall be equipped with a protection against backflow of domestic sewage to protect the rooms from flooding and they shall be located in the inspection well and meeting at least the requirements of the Polish Standard.

5. Flaps in the protection against backflow of domestic sewage shall be made of stainless steel to be protected against rodents.

6. In the immediate vicinity of the protection against backflow of domestic sewage, a collective trap shall be used in the inspection well.

7. Dry traps shall be used for floor drains in sanitary rooms and shower trays.

8. Sewage systems shall not be routed through ceilings, expansion chambers, air pre-cleaning chambers, power generator rooms, and fuel tanks.

9. In the passage of sewage pipes through building partitions that constitute layers of protection and hermeticity, and fire separation, culverts shall be used to ensure hermeticity and fire resistance.

10. The vent pipes of the sewage system shall be routed to:

1) the sanitary room of the protective structure — terminated with a carbon filter for venting the sewage system;
2) outside the protective structure — through a culvert in the external wall, an automatic explosion-proof valve, a connection box, and a ventilation duct terminating above ground level over the protective structure at a horizontal distance of not less than 8 m from the nearest air intake.

11. Individual drainage shall be provided at the back-up entrance and exit, according to soil and water conditions, protected from backflow.

12. The sewerage system may be carried out in protective structures where gravity flow of sewage is not possible for a short period of time provided that a sewage pumping station shall be installed at least in accordance with the requirements of the Polish Standard for the design of sewage pumping stations in gravity sewage systems inside buildings.

13. In A-category shelters, sewer system connections shall be additionally protected by a sewer system automatic explosion-proof valve or three expansion manholes connected in series, located outside the shelter and protecting the installation inside the shelter from the air shock wave.

14. Manholes, referred to in paragraph 13, shall feature an internal diameter of $\geq$ 1 m, reinforced concrete covers, and explosion-proof inspection manholes whereby sewer system manholes with a strength of $\geq$ 200 kN/m^2 protected from the top with concrete plates shall be permitted.

15. The design of the manholes referred to in paragraph 13 and their cover shall feature mechanical strength adapted to the assumed resistance of the shelter to the overpressure of the air shock wave overpressure.

Chapter 13

Requirements for the power supply of protective structures

§ 43. 1. Protective structures shall be equipped with an electrical system that shall meet at least the requirements specified in the Polish Standards for such systems and the conditions contained in this chapter.

2. The following shall be used in the electrical system:

1) electrical system connectors that allow disconnection from the mains and located in an accessible place and protected from damage, atmospheric influences, interference by unauthorised people as well as the effect of bomb and shell shrapnel;
2) separate protective and neutral conductor in distribution and consumer circuits;
3) residual current protective devices supplementing the basic protection against electric shock and protection against the occurrence of fire, causing under fault conditions the automatic shutdown of the power supply;
4) overcurrent circuit breakers in reception circuits;
5) the principle of security selectivity;
6) the principle of routing electrical wiring in straight lines, parallel to the edges of walls and ceilings;
7) electrical wiring featuring conductors made exclusively of copper, if their cross-section does not exceed 0.01^2;
8) surge protection devices;
9) separated circuits for: lighting, general-purpose sockets, fans, heating equipment, IT equipment, circuits for receiving devices that require individual protection, a circuit for external systems in the access area to the external door.

3. Electrical installations shall be laid on the surface of walls or ceilings.

4. Electrical wiring, except for the necessary conduits, shall not be routed inside the structure of the walls, ceiling and foundation slab.

5. Conduits of systems passing through the external building partitions shall be protected from shearing due to shocks to the structure by the use of flexible couplings, culverts, compensating manholes, or shield pipes enabling mutual movement of the facility body in relation to the system in the ground without destroying the connection.

6. The provision in paragraph 5 may not be used to hiding places.

7. Installation culverts in exterior walls and ceilings shall be shielded from the direct effects of the agents of destruction, in particular, shrapnel, air shock wave, and gamma-transmitted radiation from radioactive fallout using a protective soil layer or at least two right-angled path bends.

8. Emergency lighting or other solution to provide electrical lighting in the event of a primary power outage should be provided as a back-up in case of an emergency.

9. Lighting systems in protective structures shall be designed and constructed at least in accordance with the requirements laid down in the Polish General and Emergency Lighting Standards.

10. The provisions of paragraph 8 and 9 may not be used for hiding places intended for short stays of people.

§ 44. 1. In newly erected shelters with a capacity of more than 150 people, back-up power shall be provided from power generator units located in the power generator room.

2. The power of the power generator shall ensure operation of all equipment necessary for the functioning of the protective structure.

3. Power generator rooms shall be designed as follows:

1) inside the protective layer, separated from the remaining part of the protective structure by walls and ceiling with a fire resistance class of REI 120, a vestibule closed by a door with a fire resistance class of EI 60 and a smoke-proof class of S 200;
2) in a separate protective structure for a power generator that supplies one or more protective structures with power.

4. The power generator shall be placed in a room separated from the rest of the shelter or hiding place by walls and ceiling with fire resistance class REI 120 and a lockable door with fire resistance class El 60 and smoke-proof class S 200.

5. Ventilation of the power generator room and other rooms of the power generator unit shall be designed taking into account the conditions specified in § 39.

6. In a room where an internal fuel tank or fuel pumps are used, electrical systems and equipment shall be used in explosion-proof design.

7. If an external fuel tank or external fuel pump is used, their design shall allow fuel to be drawn under fire conditions on the surface by using:

1) fuel tank or pump sump completely sunk into the ground, with a minimum 1.5 m thick layer of soil fill;

2) inspection manhole to the fuel tank or pump sump having resistance such as the protective-hermetic door listed in Annex 4 to the Regulation;
3) breathing valve of the fuel tank protected by a metal basket filled with aggregate with a diameter of 0.03-0.06 m.

8. A shut-off valve located in an easily accessible place in the power generator room shall be installed on the fuel line.

9. Fuel pumps are used in explosion-proof design.

10. The fuel system may not pass through other rooms of the protective structure except for rooms where fuel pumps or a generator are located.

11. Power generator units installed in protective structures shall meet the following conditions:

1) shall be designed for trouble-free operation in ambient temperatures from 5 °C to 50 °C;
2) shall have a high degree of gas tightness, i.e. shall not emit exhaust into the room and do not use ambient air;
3) the volume of the unit's operation shall not exceed 110 dB(A) at a distance of 1 m from the unit;
4) shall be suitable for cooling during the period 3 — insulation;
5) shall be adapted for connection to flexible supply, water, and air discharge lines in such a manner as to provide protection against the effects of sudden movements of the shelter in the ground.

12. Water from the proprietary water intake or other solutions shall be used to cool power generator units installed in protective structures provided that the impenetrability of contaminated air and air shock wave overpressure from outside into the protective structure shall be ensured.

13. The parallel connection of a protective structure to the installation and micro-installation of photovoltaic cells and small wind turbines, located either on buildings as per § 43 (1) or directly in the ground, shall be permitted.

Chapter 14

Heating requirements for protective structures

§ 45. 1. Heating shall be provided in protective structures to assure the following conditions in rooms:

1) required air temperature — 16 °C to 26 °C;
2) required air humidity — not exceeding 80 %, also outside the periods of using protective structures.

2. Maintaining the required temperature and humidity shall not be necessary in the case of such protective structures intended for the short-term stay of people whose specific features make it impossible or difficult to maintain the assumed temperature or humidity, such as air raid ditches, or ad hoc adapted underground facilities.

3. Protective structures may be heated:

1) electrically — by wall-mounted stoves, heaters in ventilation systems, and in facilities where it is difficult to maintain the set air temperature — by wall-mounted infrared heaters, i.e. quartz lamps;
2) by central heating from a heat substation, or an in-house or external boiler room;
3) by a system using heat pumps.

4. In the case of water heating, the following additional requirements shall apply:

1) shut-off valves shall be installed on the supply and return located in an easily accessible place inside the protective structure;
2) water heating systems shall be installed on the surface of the walls at a height not exceeding 0.5 m from the floor of the room or insulating layer of the floor;
3) water heating systems may not be routed through ceilings, expansion chambers, and air pre-treatment chambers.

Chapter 15

Requirements for control and measurement equipment in protective structures

§ 46. 1. Protective structures shall be equipped with control and measurement equipment to:

1) detect and measure concentrations of carbon monoxide and carbon dioxide in air — electronic signal;
2) measure air temperature and humidity — hygrograph with thermometer;

3) to listen to emergency communications as part of general warning and alerting — a radio receiver operating in the FM band of 87.5-108 MHz with the possibility of battery or rechargeable battery power supply and an antenna in the emergency exit shaft.

2. Protective structures may be optionally equipped with control and measurement equipment according to the needs arising from the specifics and purpose of the protective structure:

1) to measure the amount of supplied air — flow meters;
2) to measure radioactive contamination — dosimetric instruments;
3) to measure chemical contamination — chemical identification or signalling devices;
4) to measure air overpressure — differential manometers.

Chapter 16

Examples of protective solutions in single-family housing construction

§ 47. 1. In single-family buildings up to and including two floors above the ground, not including wooden attics, protection from the effects of windstorms, cyclones, and air vortices and military threats may be provided by the combined fulfilment of the following conditions:

1) planning a security room or rooms, without windows, completely sunk into the ground or shielded by an embankment;
2) planning an inward-opening escape window as an emergency exit outside the security room in the corridor or in the immediately adjacent room;
3) provision of gravity ventilation via guillotine-shut-off supply openings in walls and exhaust openings in separate chimney shafts, if mechanical ventilation is provided for in the building; gravity ventilation shall be used as a back-up in the event of a power failure;
4) as far as technically and economically feasible:
   a) the use of a ceiling with a strength of ≥ 10 kN/m over the safety room and the passage to the emergency exit,
   b) the use of reinforced walls, e.g., made of reinforced concrete or silicate blocks, in the safety room and the passage to the emergency exit, and the stiffening of the structural system,
   c) separation of a fire zone including a safety room and a passage to the emergency exit, separated from the rest of the basement or building by fire doors of EIS class 60 or higher.

2. In buildings without a basement, the function of a safety room may be performed by a windowless room separated by load-bearing walls located on the ground floor, such as a room for food supplies, directly connected to a room or vestibule equipped with an escape window,

whereby these rooms shall be separated from the remaining parts of the building by fire doors of EIS 60 class or higher.

3. The use of safety rooms, as referred to in paragraphs 1 and 2, shall not be mandatory unless the local zoning plan or zoning decision provides for such a requirement in a given area due to the location of the plot within the distance of 1,500 m from the boundaries of the closed area necessary for the defence and security of the state as referred to in Article 2(9) of the Geodetic and Cartographic Law Act of 17 May 1989 (Journal of Laws of 2023, items 1752, 1615, 1688, and 1762).

4. The methods of securing window openings at emergency shelter sites are specified in Annex 8 to the Regulation.

Chapter 17

Technical requirements for the adaptation of underground rail transport systems to function of a protective structure

§ 48. 1. Protective structures in underground rail transportation systems — which is meant to mean completely sunk facilities of subways, underground tramways, and underground railroads — shall meet the technical requirements specified for protective structures taking into account the specific technical requirements specified in this chapter.

2. The provisions of this Regulation shall not apply to technical requirements for underground rail transport systems with a shelter function as regards:

1) fire safety in rooms intended for the public;
2) protection against water and moisture from precipitation and groundwater;
3) safety of electrical systems.

3. With regard to the technical requirements specified in paragraph 2, separate provisions shall apply specifying the technical conditions to be met by building structures and their location.

4. Newly designed protective structures in underground rail transportation systems shall meet the requirements for A-category shelters subject to paragraph 6.

5. Existing facilities of underground rail transport systems adapted for shelter or hiding place functions shall meet the requirements for category 1 or A-category shelters subject to paragraph. 6.

6. It is permissible to install filter-ventilation devices without carbon absorbers in the protective structures referred to in paragraph 4 and 5 if the technical possibility of retrofitting these devices with carbon filters is provided.

7. Rooms for human occupancy shall be planned on platforms, voids of technological stations, and in tunnels.

8. Protective structures in underground rail transport systems shall consist of protective sectors understood as demarcated parts of the facility not exceeding 5 km in length and having no more than 3 stations.

9. The usable area per person shall ensure the safe stay and movement of people in the protective structure, taking into account the area occupied by transport vehicles in their maximum permissible number on the routes, and may not be less than:

1) in stations — 0.6 m² per person;
2) in tunnels — 1.5 m² per person.

10. Protective sectors are demarcated by sectoral protective-hermetic closures meeting the mechanical strength of the protective structures and its hermeticity, located in chambers in route tunnels or in chambers at the junction of the station and tunnel.

11. At sectoral protective-hermetic closures and closures located in rooms featuring drainage, solutions to allow the flow of drainage water under the protective-hermetic closure shall be envisaged with the possibility to tightly block the flow with a remote-controlled device that meets the assumptions of the mechanical strength of the shelter and its hermeticity and has a locked state indication.

12. Passages of cables through the plane of the sector closure shall be carried out using fireproof and airtight culverts that shall meet the assumptions of the mechanical strength of the shelter and its hermeticity.

13. Entrances to protective sectors shall be made without protected entrance and shall be equipped with the following:

1) a single protective-hermetic closure meeting the requirements for protective-hermetic doors, featuring electromechanical drive, remote control, and locked state signal, protecting passenger entrances, fan rooms, and tunnel entry portals;
2) a vestibule equipped with a protective-hermetic door, designed as a bypass of the protective-hermetic closure, allowing entry and exit from the protective structure when the passenger entrance is blocked, in the number of not less than 1 vestibule per station;

3) protective-hermetic door equipped with a locked state signal at the service and technical entrances leading to the part of the security constituting the security sector;

4) lifting equipment divided into:

   a) external equipment serving the access zone to the protective sector;
   b) internal equipment serving human occupancy rooms, located below ground level and inside the protection and hermeticity layer.

14. One emergency exit equipped with two protective-hermetic closures separated by a vestibule, located at the passenger entrance or tunnel portal, shall be used in each protective sector.

§ 49. 1. For each sector, the supply of potable and technical water shall be provided by two deep wells — a primary and a back-up, supplying the security structure independently of the external water supply network.

2. Distribution of drinking water shall be provided through taps in the number of 1 tap per 200 people that shall supply water:

1) in a tunnel — by means of a pipeline equipped with taps every 30 m;

2) in stations — by means of fixed taps or wells connected to a portable riser with a tap.

3. Pipelines passing through the sector closure layer shall feature manual valves placed on both sides of the closure.

4. The water supply system shall supply the fire-fighting system and power generator cooling system made separately or connected to the potable water supply system.

5. Toilettes for the public shall be placed inside the protective structure at distances not exceeding 500 m in the tunnel and one toilette per each station.

6. Washing facilities shall comply with the following requirements:

1) in tunnels — at least one flush toilette per 100 women and 200 men, and one urinal per 200 men;

2) at stations — at least one flush toilette per 75 women and 150 men, and one urinal per 150 men.

7. In toilettes, mechanical ventilation shall be provided to remove air from the toilette room into the tunnel through a gas absorber assuming that the volume of air removed from the toilette shall be 50 m^3/h per toilette.

8. A pump back-up power supply and a back-up pump shall be provided for the groundwater drainage and sewerage systems.

§ 50. 1. A set of power generators or individual generator units shall be provided at each station for each protection sector the total power of which shall ensure the operation of all equipment necessary for the functioning of the protection sector and shall meet the following location requirements:

1) in the case of using a centralised set of filter-ventilation devices — a set of power generators located between the route tracks instead of side tracks shall be planned;
2) in the case of using a decentralised set of filter-ventilation devices — single power generators at each station in chambers adjacent to the station between the route tunnels shall be planned;
3) for underground railroad and underground tramway — generators shall be planned in a separate technical protective structure connected by an underground link to the powered protective structure, meeting the same resistance and hermeticity requirements as the powered protective structure.

2. For each protection sector, sets of filter-ventilation devices made in a decentralised or centralised manner shall be planned depending on their location:

1) decentralised sets of filter-ventilation devices shall be placed in chambers at each metro station;
2) centralised sets of filter-ventilation devices shall be placed in technological voids above the side tracks;
3) for underground railroad and underground tramway — sets of filter-ventilation devices shall be planned in a separate technical protective structure connected by an underground link to the powered protective structure and meeting the same resistance and hermeticity requirements as the powered protective structure.

3. For the underground railroad and underground tramway, a separate technical protection structure can be made as shared by the centralised sets of filter-ventilation units and sets of power generators.

§ 51. 1. Power generator rooms shall consist of:

1) power generator rooms;
2) fuel storage;
3) fuel pumping station;
4) deep well room;
5) automatic fire suppression system room;

6) storage;

7) workshop;

8) switchboard;

9) fan room;

10) control room equipped with control and steering devices as far as possible away from the power generator room;

11) social room for service as far as possible away from the power generator room;

12) depending on the technology of the engines in power generators — compressor room or the battery room.

2. Water from a deep well shall be used to cool power generators and the power generator room.

3. For generators, an indirect cooling system with water discharge into the sewer system or using coolers shall be adopted whereby coolers require construction of an additional cooler chamber connected to the surface by a ventilation channel equipped with automatic explosion-proof valves.

4. The volume of the tank serving the cooling system of the generators shall be calculated taking into account the total capacity of cooling systems.

5. Supply lines, lines for the fluid, and the radiator motor shall be protected from mechanical and thermal damage.

6. The exhaust outlet of power generators must not be within 30 m from the air intake.

7. Air intakes and exhaust ejectors for power generators shall be protected by automatic explosion-proof valves and an expansion chamber.

8. Fixed fire-extinguishing equipment shall be used in the power generator room and shall be automatically activated at the early stage of a fire.

9. Main and emergency lighting shall be used in the protective sectors with the possibility of power supply from power generators.

§ 52. 1. Ventilation systems in underground rail transport systems with shelter function shall provide living and working conditions for people during the three main operating periods:

1) Period 1 — called the clean ventilation period, when there is no threat of contamination outside the shelter, and the air is supplied bypassing the filter absorbers through route, station, and local fan rooms;

2) Period 2 — known as the filter-ventilation period when there is a risk of contamination outside the shelter and the air is supplied through filter-ventilation devices maintaining overpressure of at least 100 Pa in the shelter;
3) Period 3 — known as isolation period when the shelter has to be temporarily cut off from the outside atmosphere until 5 % of the concentration of carbon dioxide in the air is exceeded.

2. Ventilation systems in underground rail transport systems with hiding place function shall provide living and working conditions for people during the two main operating periods:
1) Period 1 — called the clean ventilation period, when there is no threat of contamination outside the shelter, and the air is supplied through route, station, and local fan rooms;
2) Period 3 — known as isolation period when the shelter has to be temporarily cut off from the outside atmosphere until 5 % of the concentration of carbon dioxide in the air is exceeded.

3. Delivery of not less than 3.0 m^3 of air per hour per person shall be ensured during period 2 — filtration.

4. During period 1 — clean ventilation, and period 2 — filtration, the air velocity of at least 1 m/s and not more than 8 m/s shall be ensured.

5. In order to ensure even distribution of the air across the protective sector, additional electric fans located in the route tunnels shall be used to direct the air from the nearest set of filter-ventilation devices to the nearest air ejector.

6. A set of filter-ventilation devices shall consist of:
1) air intake;
2) protective-hermetic closure chamber — in centralised units;
3) remotely controlled protective-hermetic valve that meets the assumptions of the mechanical strength of the shelter and its hermeticity — in decentralised sets;
4) automatic explosion-proof valve chamber;
5) expansion chamber located behind the automatic explosion-proof valve chamber containing remotely operated protective and hermetic valves leading to the coarse dust filter chamber;
6) coarse dust filter chamber;
7) pre-filter chamber;
8) filter chamber;

9) fan chamber;

10) automatic fire suppression system room.

7. Air ejectors shall be protected by automatic explosion-proof valves and the expansion chamber.

8. In centralised sets of filter-ventilation devices, a control room connected to the social and technical rooms shall be designed.

9. Air shall be supplied to the process voids that shall be rooms for human occupancy from the tunnel or from the platform by means of separate ventilation ducts equipped with an electric fan or, if possible, directly through a ventilation duct from the set of filter-ventilation devices.

10. Remotely controlled protective-hermetic valves shall be provided for local station ventilation.

§ 53. 1. In protective structures in underground rail transport systems, a point for heating meals shall be designed and its role can be performed by social rooms for workers equipped with at least 4 sockets of 230 V connected by an emergency power supply network from a set of power generators.

2. At each station, a medical point shall be designed and its role of be performed by social rooms for workers unless equipped with at least 4 sockets of 230 V connected by an emergency power supply network from a set of power generators and a washbasin with a drain to the general sewage system.

3. At both ends of both platforms, folding staircases shall be envisaged to descend into the tunnels located outside the rail vehicle stopping zone.

4. In an independent security sector, a central sector control post shall be envisaged to provide:

1) control of all protective-hermetic devices and control of their closure;

2) starting up and control of water supply and sewage pumps;

3) starting up and control of the sets of filter-ventilation devices;

4) telephone communications with the duty room of each station and with control rooms of the sets of filter-ventilation and power-generating units as well as with each emergency telephone in the shelter part of the facility;

5) telephone communication with other protective structures, if required;

6) playing voice communications via a loud-speaking network.

5. In the self-contained security sector, emergency telephone communications powered by the emergency power supply network shall be used, and in the event of an emergency power outage, back-up batteries shall be used to allow the network to operate for at least 10 minutes.

6. In an independent security sector, an emergency power supply shall be provided from the emergency power supply for loud-speaking networks.

7. A manual control panel with the possibility of locking the local control with a key shall be provided for at each safety-hermetic closure and safety-hermetic valve, and a manual emergency drive shall be provided for at each safety-hermetic closure and safety-hermetic valve.

8. Protective structure tunnels in underground rail transport systems that run under the bottom of the river bed shall be isolated at both ends by means of protective-hermetic closures; in a manner that the isolated sections shall be out of use and shall be intended for hiding people.

Chapter 18

Technical requirements for the adaptation of existing buildings to be hiding places and for the preparation of hiding places in a free-standing form

§ 54. 1. In the event of the introduction of one of the states of emergency, in the absence of sufficient space in existing protective structures, hiding places shall be used by adapting building structures or by erecting hiding places in a free-standing form.

2. The location of hiding places prepared in existing building structures or in a free-standing form shall take into account the minimum distances from petroleum product storage tanks, tanks and process pipelines at liquid fuel stations, liquefied petroleum gas tanks, gas pipelines running in the ground, lines of water supply, sewage, heating, and electricity networks which are specified in Annex 2 to the Regulation.

3. Hiding places in a free-standing form shall comply with the following additional safety conditions:

1) land reserve ≥ 150 m² for every 50 persons for whom hiding place shall be planned with particular regard to public parks, squares, green belts, and areas of unpaved playing fields, playgrounds or courtyards located at local government nurseries and units of the

educational system run by local government units as referred to in Article 2 of the Education Law Act of 14 December 2016 (Journal of Laws of 2024, items 737 and 854);

2) distance from buildings not less than 1/3 of the height of buildings + 3 m outside the danger zone;

3) distance from power lines — not less than the height of the pole;

4) taking advantage of the natural decline of the land to drain rainwater;

5) distance from the trunks and branches of trees with a circumference of more than 90 cm — as large as possible, but not less than 5 m.

§ 55. 1. Should it be impossible to provide a sufficient number of protective places in adapted rooms of buildings, free-standing hiding places shall be used.

2. Hiding places in a free-standing form shall provide cover against certain agents of destruction, especially small-arms fire, bomb and shell shrapnel, air shock wave, and gamma-transmitted radiation from radioactive fallout.

3. Hiding places in a free-standing form shall be intended for short stays of up to a dozen hours unless they are equipped with additional facilities and systems, e.g. heating, water, and sewerage or dedicated sleeping areas.

4. The following types of hiding places in a free-standing form shall be distinguished:

1) air gaps — free-standing hiding places in the form of elongated, narrow, and covered trenches of a broken design, featuring a permanent casing made of reinforced concrete, concrete, composite, masonry, or similar materials;

2) trenches — free-standing hiding places in the form of elongated narrow excavations of a broken design, covered or not, featuring a temporary casing made of wooden formwork, sand-filled bags, or similar materials, possibly without casing, with an angle of natural slope;

3) dugouts — free-standing hiding places in the form of enclosed and earth-sheltered rooms with external walls not exceeding 10 m in length.

5. Depending on the technical and economic possibilities and the available construction materials, a suitable method of free-standing hiding place construction shall be chosen using commercially available prefabricated elements, in particular reinforced concrete frame culverts, large-diameter composite pipes, reinforced concrete circles used in the construction of water and sewerage systems, or gabion baskets filled with sand, gravel, or stones.

6. Anti-aircraft gaps and trenches shall have the following clear dimensions:

1) in the case of anti-aircraft gaps:
   a) height: 180-220 cm,
   b) width: 140-150 cm;
2) in the case of planked trenches:
   a) height: 180-220 cm,
   b) width at base: 80-100 cm,
   c) width at the height of the roofing: 100-120 cm;
3) in the case of trenches without planking or roofing, using the angle of the natural slope:
   a) height: 140 cm,
   b) width at base: 80 cm,
   c) width at ground level: 200 cm.

7. When using prefabricated elements with cross sections of circle, ellipse, trapezoid, square, or rectangle, internal dimensions similar to those specified in paragraph 6 shall be used.

8. Hiding places in the form of anti-aircraft gaps or trenches shall be composed of short sections with a broken design, adapted to the available area, in the form of:

1) zigzag where the length of the straight sections shall be from 5 to 10 m, the bends shall be directed alternately to the left and right, and the angle of the bend between the sections shall be 90-120 degrees;
2) a straight line with offsets where the length of the longitudinal sections along the axis of the hiding place shall be from 5 to 10 m, transverse sections shall be shortened to the maximum, the bends shall be directed to form a longitudinal meander, and the angle of the bend between the sections shall be 90-120 degrees;
3) a covered entrance where the tunnel shall be of a straight design and its length shall not exceed 15 m.

9. Various forms may be combined to adapt the design to the outline to the terrain.

10. The capacity of a hiding place in a free-standing form shall not exceed 300 people.

11. The distance between ditches located in parallel shall be as large as possible and conveniently usable whereby connecting ditches shall be allowed.

12. In the case of hiding places with a capacity not exceeding 25 people, the use of dugouts shall be allowed instead of anti-aircraft gaps or trenches.

13. Hiding places of above-ground structure backfilled with a soil embankment or constructed of gabion baskets filled with sand shall be used if, due to unfavourable terrain

conditions, the preparation of a hiding place sunk in the ground is difficult, especially in places of possible flooding or due to existing utilities in the area.

14. The free-standing hiding place shall be completely sunk into the ground where possible, or, if this is not possible — partially sunk into the ground and backfilled on all sides with a soil embankment.

15. The layer of the soil embankment covering the walls shall be at least 70 cm.

16. The layer of soil embankment covering the roof shall be at least 30 cm and, if the strength of the structure so permits, the thickness of the layer shall be increased to 60 cm or more.

17. The structure of the formwork and roofing shall take into account the rules of construction art and shall be resistant to static loads from the soil overburden.

18. Unless a reinforced concrete structure with a crushing strength of $\geq$ 10 kN is used, it shall be required for the hiding place be completely sunk into the ground in wooded areas with the roofing and the soil overburden above the roofing not protruding above ground level so that falling trees shall not destroy the hiding place structure.

19. Exits covered from direct action of agents of destruction shall be made at the opposite ends of the hiding place and shall be situated at the right angle to the axis of the final section of the trench in a form of a protected entrance with two flights, i.e. a descent, or a one-way descent.

20. If lateral exits are provided, they shall also be covered from the direct action of agents of destruction.

21. In hiding places that have been made in a slope and the their entrances are at one level with the ground surface, or when their ceiling has been elevated above the ground surface — a protective wall with a roof, covered with soil, or alternatively a cover of bags, i.e. gabion baskets, filled with sand, gravel, or stones at least 70 cm thick shall be made in front of the entrance door.

22. Light-type doors without a vestibule may be used in hiding places.

23. Hiding places shall be provided with gravity ventilation where fresh air enters the hiding place spontaneously through chimneys that pass through the ceiling and extend above the soil embankment, whereby at least 2 ventilation channels of 150-200 mm diameter for each section or zone with a capacity of up to 25 people.

24. In anti-aircraft gaps consisting of a maximum of two sections of 10 m or three 5 m sections, if the entrance openings have not been equipped with doors, natural ventilation of the interior through the entrance openings can be used instead of ventilation chimneys.

25. If a hermetically closed door is provided for in the entrance system of the hiding place in case of contamination, it shall be ensured that the ventilation ducts can be sealed tightly.

26. Toilette recesses up to 250 cm long shall be provided in the hiding places which are hermetically sealed containers and water supplies.

27. Should the floor of the hiding place be below ground level, a threshold at least 10 cm high and a sump for draining water, i.e. seeping it into the ground, shall be provided at the entrances to the hiding place.

28. Should the floor of the hiding place fail to be made of concrete, it shall be hardened with flagstones, paving stones, gravel, boards or any other available material.

29. If the technical and constructional possibilities allow it, a structurally closed and airtight enclosure and solutions for filter-ventilation shall be used in accordance with the principles set out in § 3 for shelters.

30. Examples of hiding place schemes in the form of trenches and anti-aircraft gaps shall be set out in Annex 9 to the Regulation.

Chapter 19

Shielding solutions to protect against the effects of extreme weather events

§ 56. 1. During extreme weather events such as windstorms, cyclones, and air vortices, the following shall be used to protect people from the effects of these phenomena:

1) rooms of existing buildings of reinforced concrete or masonry structure located on the lowest floor;
2) excavations without planking — with the angle of the natural slope shall be maintained in accordance with Annex 9 to the Regulation;
3) enclosed excavations — made in the standard form of DG-50 as defined in Annex 9 to the Regulation;
4) guards made of prefabricated elements — e.g. commercially available frame culverts, composite pipes, or reinforced concrete circles — provided they have a crushing strength of $\geq$ 10 kN and are sunk into the ground.

2. The excavations and guards referred to in paragraph 1(2)-(4) shall be marked by placing a board reading ‘TO HIDING PLACE’ in a well visible location with letters in black on a white background and an arrow indicating the entrance.

3. Enclosed excavations and shelters, referred to in paragraph 1(2)-(4) shall be used in particular on the territory of campgrounds, camping sites, and scout bases located in forests and wooded areas if it is not possible to provide a hiding place for the people staying there in brick buildings.

4. In the case referred to in paragraph 3, in areas managed by the State Forests National Forest Holding, the land user shall agree on the technical requirements for the preparation of shielding solutions with the forest inspectorate responsible for the area which shall indicate the appropriate location of the hiding place, the method of its construction, and type of materials to be used in accordance with the requirements of this Regulation taking into account environmental protection requirements and the need to ensure safe hiding in the indicated place.

Chapter 20

Degrees of preparation of protective structures

§ 57. 1. The partial preparation of protective structures shall include:

1) door installation;
2) construction of approaches and installation levels necessary for the operation of protective structures;
3) in protective structures equipped only with mechanical ventilation, without a back-up manual fan drive or back-up power source — provision of emergency gravity ventilation by making openings in the walls leading directly outside the building;
4) installation of the necessary shut-off valves in the installation systems;
5) provision of a back-up exit;
6) in newly designed shelters — installation of a complete filter-ventilation device;
7) in newly designed shelters — making tight passages of systems through external walls and ceilings.

2. Full preparation of protective structures shall include the activities as in the partial preparation and includes the following in addition:

1) ensuring the required functional layout of the rooms;

2) clearing and preparing the emergency exit for use;

3) equipping hermetic or protective-hermetic doors with gaskets;

4) implementation of all necessary systems and adaptation of the existing systems to current technical-construction requirements;

5) installation of other equipment, e.g. power generators, and room equipment such as washing facilities and benches;

6) providing a set of fire-fighting equipment:

   a) fire extinguishers with a fire performance of at least 21A and 144B per each started 100 m^2 of the protective structure area;

   b) fire-extinguishing blankets — 1 unit per each started 100 m^2 of the protective structure area;

7) marking the zones of approach to the shelter and hiding place inside the building;

8) appointment of a caretaker of the security structure from among the residents of the building or employees of the workplace;

9) in the case of shelters — checking and, if necessary, repairing or replacing the sets of filter-ventilation devices;

10) in the case of shelters — checking and, if necessary, repairing the tightness of system passages through external walls and ceilings.

3. The protective structure shall be ready to be operated after performing activities such as those in partial and full preparation and, in addition, after performing the following activities including:

1) preparing rooms to be immediately ready to receive people;

2) replacement of used or out-of-date filter absorbers in the sets of filter-ventilation devices;

3) equipping the protective structure with control and measuring instruments, logistic, rescue and fire-fighting equipment according to the arrangements in this regard contained in the planning documents for civil defence and taking into account the specific fire protection regulations for facilities intended for human occupancy;

4) equipping the protective structure with battery-operated flashlights;

5) equipping the security structure with a battery-operated transistor radio for receiving communications and announcements;

6) equipping toilettes with airtight containers per not more than 25 people as a back-up in case of water-sewerage system failure;

7) providing protective structures with lockable trash bins lined with plastic bags in a number sufficient to collect 1 dm^3 of waste per person per day, stored in a separate waste

room in the dirty area, or, if there is no such room — in vestibules of the decontamination unit for hygienic showers, the contaminated clothing store, or the entrance and exit vestibules;

8) in the case of shelters with a capacity exceeding 300 people, equipping the rooms with means of communication ensuring the possibility of communication in the external system and in the internal system — between the room of the shelter service and the work stations of this service and the shelter chambers, whereby communication in the shelter shall be organised on the basis of the existing communication by means of all available communication devices integrated into the network activated on an ad hoc basis as part of bringing the shelter to full technical and operational readiness;

9) in the case of shelters located within on the premises of the workplace — equipping the work rooms with communication means incorporated into the communication system existing within on the premises of the workplace as well as with a device for controlling the warning and alarm system for employees existing within on the premises of the workplace.

4. A model diagram of the functional layout of a shelter for 150 people is set forth in Annex 10 to the Regulation.

Chapter 21

Conditions for the use of protective structures

§ 58. 1. Depending on the intended function and use, the following types of protective structures shall be distinguished:

1) public — intended for the protection of people and public property, located on land administered by a body of local self-government, a government administration body, or an organisational unit subordinate to them, or on the basis of public-private partnership by another entity, a government administration body, or an organisational unit subordinate to them, or on the basis of public-private partnership by another entity;

2) non-public — intended to protect the occupants of a residential building or workplace to which the protective structure belongs.

2. Protective structures shall be used as multi-purpose facilities in such a way as to ensure that they are used in accordance with the needs of the owners or managers and do not

permanently deprive them of the possibility of restoring their protective function in the event of a threat to state security or an order from authorised bodies.

3. A protective structure in a housing community building shall be intended in the event of a threat to state security or an order from authorised authorities in the first instance for the protection of the residents of that building and it made be made available to people from other buildings in agreement with the housing community.

4. Outside the period of occupancy of the protective structure, constant ventilation of the rooms by gravity or mechanical ventilation shall be ensured, with a relative humidity of the air in the rooms not exceeding 80 % with the exception of protective structures intended for short-term occupancy the characteristics of which excludes or impedes the maintenance of the assumed humidity, e.g. ad hoc adapted underground communication facilities, anti-aircraft ditches.

5. Outside the period of occupancy in of the protective structure, manual gate valves on sewer drains shall be set in the ‘closed’ position — to protect against flooding in the event of backflow of domestic sewage.

6. A change in the use of a protective structure or part of it shall require agreement with the locally competent district governor and the district building inspector.

7. In protective structures it is permissible to dismantle non-serviceable filter-ventilation devices and other parts of the technical equipment of the protective structure, except for:

1) approaches and installation levels necessary to restore the function of the protective structure, including intakes and ducts supplying outside air;
2) back-up exits, including chimneys above back-up exits and air intakes;
3) protective layer elements, including shelter doors, shelter’s exhaust dampers, and explosion-proof valves.

8. If the mechanical ventilation equipment is dismantled, replacement gravity ventilation shall be provided in the rooms for safety reasons by making openings in the walls leading directly outside the building under which the protective structure is located. The building’s chimney ducts shall not be used as ducts for drawing outside air.

9. If a back-up exit from a protective structure, including a chimney above the back-up exit or air intake, interferes with the proposed road or technical infrastructure, the back-up exit shall be reconstructed in consultation with the competent district public administration body to be placed in another location that meets the requirements of this Regulation, or

alternatively, the shaft of the back-up exit shall be secured with an opening manhole or manhole cover while ensuring that the air intake in the wall of the building or other location shall be unobstructed.

10. Securing the back-up exit shaft referred to in paragraph 9 shall prevent the infiltration of rainwater and ensure that a back-up exit can be cleared and prepared in the event of a threat to state security or an order from authorised public bodies.

11. Maintenance and repair of back-up exits, including chimneys over air intakes that belong to the protective structure, shall be carried out in a manner consistent with the applicable building regulations, but in the case spare exits are located on the land owned by local government units, the maintenance and repair of the ground part shall be the responsibility of the relevant local government organisational units carrying out the tasks of maintenance of roads and greenery.

Chapter 22

Requirements for day-to-day maintenance and servicing of protective structures

§ 59. 1. The day-to-day maintenance of structures in operational readiness shall be carried out at least once a month, and for other protective structures — as necessary whereby the scope of day-to-day maintenance shall include:

1) checking the technical condition of the elements of the protective structure and its equipment, and qualifying these for replacement or repair;
2) periodic start-up of equipment, temperature and humidity measurements, checking the sanitary condition e.g. presence of rodents, and ventilation;
3) keeping a book of equipment maintenance — in the case of a protective structure maintained in operational readiness.

2. Activities falling within the scope of day-to-day maintenance shall be performed in accordance with principles of the art of construction and the factory instructions of the equipment in the protective structure.

§ 60. 1. Maintenance of the protective structure shall be carried out as necessary and shall include treatments aimed at delaying the rate of degradation of the facility, not affecting its technical parameters, in particular:

1) protection of building components, systems and equipment from excessive wear and corrosion;

2) performing minor repairs and troubleshooting;

3) periodic replacement of components of systems and equipment in accordance with operating instructions and factory documentation.

2. The scope of responsibilities of the protective structure's conservator shall be determined by the owner or manager of the protective structure.

3. In order to protect the protective structure from devastation and theft and from access by outsiders, it shall be provided with permanent locks.

4. The keys to the security structure shall be placed in a place marked with a notice on the entrance door, with a set of keys to be kept by:

1) owner or manager of the property;

2) the housekeeper or the facility manager, the caretaker or the conservator of the security structure, or other designated persons.

Chapter 23

Marking of the protective structure

§ 61. 1. In the case of non-public protective structures, the placement of the international civil protection identification mark shall be decided by the owner or manager.

2. The international civil protection identification mark used to mark a protective structure shall be affixed in the case of:

1) free-standing structures — in a visible place near the entrance;

2) buildings with protective structures underneath — in a visible position, on the front wall, to the right of the main entrance, at or above the upper edge of the entrance door, at a distance of not less than 50 cm from it and at the entrance door leading directly to the protective structure.

3. The international civil protection identification mark to marking a protective structure shall meet the following requirements together:

1) the width and height shall not be less than 20 cm;

2) the material of manufacture, including the print, shall be resistant to weather conditions, in particular water and ultraviolet radiation;

3) the mark shall be permanently affixed.

Chapter 24

Interim provisions and final provision

§ 62. Until adaptation of protective structures to the technical conditions laid down in this Regulation, the function of emergency shelters may be fulfilled by rooms sheltered by the soil which provide protection from shrapnel and attenuate gamma-transmitted radiation from radioactive fallout, in particular:

1) existing reinforced structures, especially anti-aircraft gaps or elements of former fortifications, after they have been cleaned and secured from unauthorised access — provided that the structure of these facilities shall not bear visible damage, especially cracks or scratches in the ceiling;
2) multi-space garages of reinforced concrete construction sunk at least partially into the ground;
3) underground pedestrian crossings under streets or railroad tracks;
4) basements of buildings made using the large-slab technology, implemented according to Unified Building Systems;
5) if there is no other shelter — basements in other buildings;
6) underground metro train stations unless they are classified as protective structures of other categories.

§ 63. 1. Wit regard to designing, construction, reconstruction, and change of use of a protective structure with protective functions for which the following has been done prior to the date of entry into force of the Regulation:

1) an application for the building permit has been submitted and a separate application for approval of a plot or land development design or architectural-and construction design;
2) a notification has been submitted for the construction or execution of other construction works or change of use of a building structure or a part thereof;
3) a public procurement procedure has been initiated for the development of the design or for the development of the design along with execution of construction works, or execution of these activities has otherwise been commissioned provided that the initiation of a public procurement procedure is not required;
4) an environmental decision has been issued;

— the provisions of the Regulation shall not apply.

2. The design, as referred to in paragraph 1(3), shall be understood to mean:

1) construction design — if a construction design is required for the construction or alteration of a building;

2) a technical and construction design, a plot or land development design or appropriate sketches or drawings — if a construction design is not required for the construction or reconstruction of a building.

3. At the request of the investor submitted to the competent authority of architectural and construction administration within 30 days from the date of entry into force of the Regulation, the provisions of the Regulation shall apply to the construction or reconstruction of a building referred to in paragraph 1.

4. In metro systems designed prior to the entry into force of this Regulation as protective structures in respect of which no final decision has been issued on an occupancy permit, it shall be permitted to construct the structure in accordance with the design previously approved by the architectural and construction authority in the decision on the building permit.

§ 64. This Regulation shall enter into force 14 days after its publication.

MINISTER FOR INTERNAL AFFAIRS
AND ADMINISTRATION

in agreement with the:
MINISTER FOR DEVELOPMENT
AND TECHNOLOGY

Annexes to the Regulation
of the Minister for Internal Affairs and Administration
dated …… (Journal of Laws, item ……)

Annex 1

SPECIFIC TECHNICAL CONDITIONS FOR SPECIFIC CATEGORIES OF PROTECTIVE STRUCTURES

Table 1. Shelters

No.	**Type of facility**	**Shelter**	
	Facility category	A (increased resistance)	P (basic resistance)
	Types of security features		
1.	Location of temporary stay during the risk of extreme weather events (windstorms, cyclones, and air vortices)	yes	yes
2.	Protection against rubble	yes	yes
3.	Back-up exit	yes	yes
4.	Protection against bomb and shell shrapnel	yes	yes
5.	Protection against gamma-transmitted radiation from radioactive fallout	K ≥ 100	K ≥ 100
6.	Resistance to air shock wave overpressure	≥ 0.1 MPa (overpressure duration ≥ 20 ms)	≥ 0.03 MPa (overpressure duration ≥ 20 ms)
7.	Protection against chemical and biological contamination	yes	yes
8.	Mechanical ventilation	yes	yes
9.	gravity ventilation	optional	optional
10.	Explosion-proof valves / protective-hermetic doors	required	required
11.	Construction types	reinforced concrete, prefabricated reinforced concrete, steel, composite	reinforced concrete, prefabricated reinforced concrete, steel, composite

Table 2. Hiding places

No.	**Type of facility:**	**Hiding place**		
	Facility category:	**Category 1**	**Category 2**	**Category 3**
	Types of security features:			
1.	Location of temporary stay during the risk of extreme weather events (windstorms, cyclones, and air vortices)	yes	yes	yes
2.	Protection against rubble	yes	yes	yes
3.	Back-up exit	yes	yes	yes
4.	Protection against bomb and shell shrapnel	yes	yes	yes
5.	Protection against gamma-transmitted radiation from radioactive fallout	$K \geq 100$	$K \geq 100$	no
6.	Resistance to air shock wave overpressure	≥ 0.03 MPa (overpressure duration ≥ 20 ms)	no	no
7.	Protection against chemical and biological contamination	no	no	no
8.	Mechanical ventilation	optional	optional	optional
9.	gravity ventilation	yes	yes	yes
10.	Explosion-proof valves / protective-hermetic doors	yes	no	no
11.	Construction types	reinforced concrete, prefabricated reinforced concrete, steel, composite	reinforced concrete, prefabricated reinforced concrete, steel, composite, wood, masonry	reinforced concrete, prefabricated reinforced concrete, steel, composite, wood, masonry

Annex 2

MINIMUM DISTANCES OF PROTECTIVE STRUCTURES FROM PETROLEUM PRODUCT STORAGE TANKS, TANKS AND PROCESS PIPELINES AT LIQUID FUEL STATIONS, LIQUEFIED PETROLEUM GAS TANKS, GAS PIPELINES LAID IN THE GROUND, CONDUITS OF WATER SUPPLY, SEWAGE, HEATING, AND ELECTRICITY NETWORKS

Table 1. Minimum distances of protective structures from tanks for storing petroleum products and from tanks and process pipelines at liquid fuel stations

No.	**Facility (tank or pipeline)**	**Distance of the protective structure from the facility [m]**	
		shelter	**hiding place**
1.	Floating roof ground tank for crude oil storage	100	150
2.	Solid roof ground tank for storage of class I and II petroleum products	60	80
3.	Floating roof ground tank for storage of class I and II petroleum products	30	40
4.	Above-ground tank with horizontal main axis for storage of class I and II petroleum products	15	25
5.	Solid roof ground tank designated for storage of class III petroleum products	15	20
6.	Above-ground tank with horizontal main axis for storage of class III petroleum products	10	15
7.	Underground tank with horizontal main axis for storage of class I and II petroleum products	15	15
8.	Processing tanks and pipelines at liquid fuel stations	10	10

Table 2. Minimum distance between the protective structure and the LPG container

No.	**Nominal tank capacity [m^3]**	**Distance of the protective structure to the liquefied gas tank depending on the location of the tank [m]**			
		shelter		**hiding place–**	
		above-ground tank	**underground tank**	**above-ground tank**	**underground tank**
1.	up to 3	3	1	10	10
2.	above 3 up to 5	5	2.5	10	10
3.	above 5 up to 7	7.5	3	10	10
4.	above 7 up to 10	10	5	20	10
5.	above 10 up to 40	20	10	40	10
6.	above 40 up to 65	30	15	60	15
7.	above 65 up to 100	40	20	80	20
8.	above 100 up to 250	60	30	100	30
9.	above 250 up to 500	100	35	150	35
10.	above 500 up to 1,000	150	35	200	45
11.	above 1,000 up to 3,000	200	35	300	50
12.	above 3,000	300	35	300	60

Table 3. The minimum distance of a protective structure from an underground gas pipeline (irrespective of the technology of pipeline construction)

Nominal pipeline pressure [MPa]								
Less than 0.4	**Above 0.4 up to 1.2**		**Above 1.2 up to 2.5**		**Over 2.5**			
Gas pipeline diameter [mm]								
-	up to 300	above 300	up to 300	above 300	up to 300	more than 300 to 500	more than 500 to 800	above 800
Distance [m] from A-category shelter								
1	15	20	20	25	20	35	50	50
Distance [m] from P-category shelter								
3	30	40	40	50	40	70	100	150
Distance [m] from hiding place-								
3	30	50	50	80	70	130	200	200

Table 4. Minimum distance between free-standing protective structure from the pipelines of water supply and sewage networks

No.	**Wire diameter [mm]**	**Distance between free-standing protective structure from water supply or sewage pipeline [m]**	
		free-standing shelter	**free-standing hiding place**
1.	up to 100	2.5	5
2.	above 100 up to 150	3	6
3.	above 150	5	10

Table 5. Minimum distance of free-standing protective structure from pipelines of district heating networks

No.	**Wire diameter [mm]**	**Distance of free-standing protective structure from district heating network pipeline [m]**	
		free-standing shelter	**free-standing hiding place**
1.	up to 200	5	10
2.	above 200	10	20

Table 6. Minimum distance of free-standing protective structure from power grid lines

No.	**Rated voltage [kV]**	**Distance of free-standing protective structure from electromagnetic network lines [m]**			
		free-standing shelter		**free-standing hiding place**	
		from overhead lines*	from earth cables	from overhead lines*	from earth cables
1.	1 or more, less than 15	7	1	7	1
2.	15 or more, less than 30	8	3	8	3
3.	30 or more, less than 110	8	3	8	3
4.	110 or more	10	5	10	5
*at a distance counted horizontally from extreme wires					

Annex 3

DETAILED REQUIREMENTS FOR CALCULATION OF CONSTRUCTION AND RESISTANCE OF PROTECTIVE STRUCTURES

I. Materials

1. In reinforced concrete structures, ceilings and exterior walls shall be reinforced in two layers, crosswise, with B500C steel bars of higher ductility class.

2. The following class of concrete shall at least be used:

1) C30/37 — in the case of shelters;

2) C25/30 — in the case of hiding places.

3. In the case of structures not covered by soil, external walls and ceilings, subject to paragraphs 4 and 5, shall be constructed of a reinforced concrete at least 0.4 m thick.

4. In protective structures, it shall be permitted to design reduced thickness of reinforced concrete exterior walls, ceilings, and reinforcement provided that the assumed mechanical resistance of the structure, thermal insulation, and the required attenuation coefficient of gamma-transmitted radiation from radioactive fallout are maintained using the shielding properties of the soil.

5. It is allowed to use the exterior walls and ceiling for construction:

1) in shelters and hiding places — prefabricated reinforced concrete, steel or composite elements;
2) in hiding places — wooden, masonry or other elements, provided that protective requirements are satisfied.

II. Air shock wave resistance

1. The maximum air shock wave overpressure (p) shall be taken to be:

(1) for A-category shelters: $p \geq 0.1$ MPa;

(2) for P-category shelters: $p \geq 0.03$ MPa and $p < 0.1$ MPa;

(3) for category 1 hiding places: $p \geq 0.03$ MPa;

(4) for category 2 and 3 hiding places — no specific requirements.

2. The assumed overpressure duration shall be ≥ 20 ms.

3. The magnitude of the dynamic load on the structure in the case of an air shock wave shall be taken as the value of the maximum overpressure indicated in paragraphs 1 and 2 increased or decreased by the appropriate coefficients specified in the following tables.

4. It is assumed that the dynamic load shall act once, on the entire structure, shall be uniformly distributed over the surface of an element, and shall be applied perpendicularly to the surface of an element.

Table 1. Dynamic loads of external walls in the ground

The horizontal dynamic load transmitted by the ground to the external wall elements shall be determined as the assumed overpressure at the shock wave front multiplied by the lateral thrust coefficient or the load increasing coefficient depending on the type of soil and foundation:		
No.	Type of soil	Lateral pressure coefficient
1.	sand of natural moisture content	0.4
2.	sandy loam of natural moisture content	0.6
3.	clay	0.7
4.	irrigated land	1.0
	Type of soil	Load increasing factor
5.	in the case of external walls protruding above the level of the adjacent ground and backfilled with soil embankment at a slope gradient of 1:2-1:4 (regardless of the type of soil)	1.5
6.	in the case of external walls or other elements of construction or technical equipment protruding above the level of the adjacent ground and not backfilled with soil (e.g. air intakes)	2.2

Table 2. Dynamic loads on exterior walls and doors in entrance areas

The horizontal dynamic load acting on the sections of external walls and protective-hermetic doors at the locations of entrances and spare exits shall be determined as the assumed overpressure at the shock wave front multiplied by an increasing coefficient depending on the conditions of the location of the entrance or back-up exit in relation to external infrastructure elements:		
No.	Location of entrance (back-up exit)	Load increasing factor
1.	entrance directly from the building's basement	1.3
2.	a back-up entrance or exit from the stairs leading directly from outside, covered by the ceiling and having a form of a covered entrance	1.8
3.	back-up entrance or exit from the stairs leading directly from outside, located at the end of a dead-end corridor	2.3
4.	back-up exit in the form of a tunnel ending with a shaft	1.8
Note: the magnitudes of the dynamic load acting on the inner walls of vestibules should be taken 20 % less than the magnitudes of the dynamic load acting on the outer walls of the entrances.		

Table 3. Equivalent static loads

When calculating the equivalent static loads, the dynamic loads from the air shock wave shall be taken, appropriately increased by coefficients specified in Tables 1 and 2 and multiplied by the dynamic coefficient specified below:		
No.	Application	Dynamic factor
1.	when checking the load-bearing ultimate limit state allowing plastic deformation of tensile reinforcement	1.3
2.	when determining the magnitude of the longitudinal force for eccentrically compressed floor elements	1.0
For vertical equivalent static loading in the calculation of axially and eccentrically compressed frame columns, pillars and interior walls:		
1.	for a protective structure founded in average ground conditions	1.3
2.	for a protective structure founded below the drilled groundwater table level	1.4
3.	for a protective structure founded on bedrock	1.8
The horizontal equivalent static load acting on eccentrically compressed reinforced concrete exterior walls shall be determined based on the dynamic loads from the air shock wave, appropriately increased by coefficients specified in Tables 1 and 2 and multiplied by the dynamic coefficient indicated below:		
No.	Location of walls	Dynamic factor
1.	for backfilled walls and walls adjacent to basement rooms not protected against the shock wave	1.0
2.	for walls not covered with soil, walls in entrance areas and walls located below the drilled level of the groundwater table	1.8
The vertical equivalent static load acting on the exterior walls, footings, and foundation slabs shall be determined as indicated below:		
1.	the vertical equivalent static load acting on the exterior walls due to the impact of the shock wave on the ceiling shall be defined as the pressure on the supports from the ceiling when an equivalent static load equal to 0.8× ‘p’ acts on it and is applied within the limits of the clear span of the walls. In addition, the load acting directly on the wall section equal to ‘p’ with a dynamic coefficient equal to 1.0 shall be taken into account.	
2.	the vertical equivalent static load acting on the footings shall be assumed to be the same as when determining the longitudinal forces in the corresponding walls, pillars, and poles of the frames.	
3.	the vertical equivalent static load acting on solid foundation slabs shall be assumed as equal to the dynamic load determined as the assumed overpressure at the shock wave front multiplied by the dynamic coefficient Kd=l.2.	

III. Resistance to rubble

The design of the protective structure when located outside the zone safe from rubble, as specified in Appendix 5, shall ensure the resistance of external structural elements to loads caused by rubble in the event of the collapse of the above-ground floors of buildings or the covering of the area where the protective structure was erected with rubble:

(1) for buildings of traditional masonry construction up to two floors in height, the rubble load shall be assumed to be equal to 10 kN/m²; for each subsequent floor, this load shall be increased by a value of 5 kN/m² but up to a total value of no more than 50 kN/m² (if the assumed load from air shock wave overpressure is higher than that of the rubble — the design shall assume the value of the load from air shock wave overpressure and the load from rubble shall be skipped unless a different solution concept is included in the design assumptions);

(2) for monolithic, frame, post-and-beam or large-slab buildings up to two floors in height, the rubble load shall be assumed to be 10 kN/m²; for each successive floor — this load shall increase by 2.5 kN/m² but up to a total value of no more than 25 kN/m² (if the assumed load from air shock wave

overpressure is higher than that of the rubble — the design shall assume the value of the load from air shock wave overpressure and the load from rubble shall be skipped unless a different solution concept is included in the design assumptions).

IV. Resistance to shrapnel

The external structural elements of the protective structures shall provide protection against bomb and shell shrapnel and small arms fire as a result of a single action assuming that puncture protection shall be provided by shields with a thickness of at least:

(1) natural or sandy embankment soil: 50 cm;

(2) gravel or stones: 45 cm;

(3) full brick wall on cement mortar: 38 cm;

(4) solid silicone block wall: 36 cm;

(5) concrete: 30 cm;

(6) reinforced concrete: 20 cm;

(7) steel: 2 cm.

V. Protection against gamma-transmitted radiation

1. The multiplication coefficient of the attenuation of gamma-transmitted radiation from radioactive fallout, hereinafter referred to as the 'K-coefficient', shall be assumed to have the following value:

(1) in A-category shelters: $K \geq 100$;

(2) in P-category shelters: $K \geq 100$;

(3) in category 1 hiding places: $K \geq 100$;

(4) in category 2 hiding places: $K \geq 100$;

(5) in category 3 hiding places — no specific requirements.

2. In calculating the K-coefficient, three directions of gamma-transmitted radiation from radioactive fallout shall be taken into account:

(1) from the vertical direction down through the soil layer above the floor slab and through the floor slab;

(2) from the horizontal direction after passing through the soil layer and exterior walls;

(3) through the entrance way, back-up exit and any installation holes.

3. The K-coefficient value ≥ 100 must be provided by the external structural elements of protective structures (horizontal and vertical partitions) assuming that the coefficient shall be provided by shields with a thickness of at least:

(1) natural or embanked sandy soil, gravel, or stones: 60 cm;

(2) full brick wall on cement mortar: 51 cm;

(3) solid silicone block wall: 48 cm;

(4) concrete or reinforced concrete: 40 cm;

(5) steel: 12 cm;

(6) lead: 5.2 cm.

4. Each bend of the path of gamma-transmitted radiation at right angles weakens the radiation tenfold. In the case of protection of entrances, back-up exits and other external openings, the K-coefficient of ≥ 100 shall be provided by two right-angle bends of the path leading to the interior of the facility or one right-angle bend with the use of additional shields (doors, hatches) providing the total K-coefficient of

≥ 10.

5. The K-coefficient of ≥ 10 shall be assumed to be provided by shields with a thickness that is 1/2 of the thickness given in paragraph 3.

VI. Form

1. The design of shelter structures shall take compact forms and a stiffened structural system with floor spans as small as possible and with adjustments for resistance to the assumed loads.

2. The design of the hiding place structure shall take short or elongated forms, resistant to he assumed loads and stiffened as far as possible in the form of:

(1) anti-aircraft gaps — free-standing hiding places in the form of elongated, narrow and covered excavations with a broken design, featuring a permanent enclosure made of reinforced concrete, concrete, composite, masonry, or similar materials;

(2) trenches — free-standing hiding places in the form of elongated, narrow trenches with a broken design, with or without cover, having a temporary enclosure made of wooden formwork, bags filled with sand or similar materials, possibly made without enclosure, with a natural slope angle;

3) dugouts — free-standing hiding places in the form of enclosed and soil-covered rooms with external walls not exceeding 10 m in length.

3. Protective structures shall use a box system including floor, load-bearing walls, and the foundation slab, or a reduced form of reinforced concrete box system including only the floor and exterior walls, connected at the foundation level to a scaffold system of transverse sized footings:

1) width ≥ 0.6 m,

2) height ≥ 0.4 m,

4. Scaffold foundations shall not be used in A-category shelters referred to in Appendix 1. The following shall be used in these shelters:

(1) foundation slab;

(2) in case the reinforced concrete structures are used — a mesh to protect against concrete fragments in the event of a mechanical combat agent operating from the top to be placed in the lower part of the floor slab, in 50 mm thick concrete covering, made of:

(a) rods with a diameter of 6.0– 8.0 mm, with a 100/100 mm mesh;

(b) expanded metal mesh with a thickness of at least 3 mm and mesh length not exceeding 100 mm — instead of rods referred to in letter (a).

VII. Shock

1. Shelters shall be designed taking the phenomenon of shock into account depending on the assumed category of resistance of the shelter to the air shock wave overpressure. This requirement shall not apply to hiding places.

2. For shelters with resistance to air shock wave overpressure of < 0.05 MPa, simple procedures shall be applied to attach equipment to structural components to prevent falling or moving.

3. In the case of shelters with the resistance to air shock wave overpressure of 0.05-0.1 MPa, the design of installation connections shall additionally take into account:

1) maximum downward displacement of load-bearing walls in vertical movement up to 10 cm;
2) maximum downward displacement of the central part of the foundation at 5 cm;
3) horizontal displacements of the shelter in the range of 2-3 cm.

4. In the case of shelters with resistance to air shock wave overpressure above 0.1 MPa, the shock parameters and corresponding protection shall be calculated individually for the given technical

parameters of the shelter, geotechnical conditions, and its foundation as well as the assumed resistance whereby it is recommended to use advanced computational dynamic models of the numerical type.

5. The attachment structures for internal equipment and other internal components shall be calculated taking into account the inertial loads due to accelerations caused by the shock phenomenon assumed to be of the following values:

(1) for P-category shelters: 12.5 g;

(2) for A-category shelters: 16.0 g.

6. In order to protect the installation connections in the event of possible displacement of the shelter occurring during the phenomenon of shock, flexible connectors and compensation wells shall be used to allow mutual displacement of the body of the facility in relation to connections in the ground without destroying the connection.

7. Compensation wells shall be made with the same resistance parameters as the shelter structure. Inspection manhole covers of compensating wells, if used, shall meet the resistance requirements as for manhole covers of sewer expansion wells.

8. Expansion gaps within the layer of protection and hermeticity shall allowed provided that the assumed resistance and hermeticity shall be maintained.

9. The expansion gap shall be used to provide separation of compensation wells and external infrastructure elements from the main body of the shelter, in particular staircases and the back-up exit tunnel the length of which exceeds 3 m. This requirement shall not apply to back-up tunnels located in floodplains which should be monolithically linked to the main body of the shelter.

Annex 4

REQUIREMENTS FOR DOORS, AUTOMATIC EXPLOSION-PROOF VALVES, AND CERTAIN OTHER DEVICES IN PROTECTIVE STRUCTURES

I. Requirements for doors used in protective structures

Table 1. Types of doors used in protective structures

type of door	**application**	**mechanical resistance**	**hermeticity**
protective	vestibule external door	according to table 2	without any specific requirements
hermetic	vestibule internal door	without any specific requirements	in accordance with paragraph 4 and 5 below the table
protective-hermetic	both external and internal vestibule doors	according to table 2	in accordance with paragraph 4 and 5 below the table

Table 2. Required resistance of protective and protective-hermetic doors to the air shock wave overpressure due to explosion

Facility category	Resistance of protective structure construction	Resistance of the door to the effects of air shock wave overpressure [1]	Resistance of doors to reflected overpressure [2]
Category I hiding place	≥0.03 MPa	≥0.05 MPa	≥0.2 MPa
P-category shelter	≥0.03 MPa	≥0.05 MPa	≥0.2 MPa
A-category shelter	A	≥0.1 MPa	≥0.4 MPa
If the resistance of the protective structure to the air shock wave overpressure exceeds 0.1 MPa, or for P-category shelters with a design resistance higher than 0.03 MPa, the resistance of the valve to reflected pressure shall be increased accordingly assuming four times the resistance of the protective structure.			

1. Values given for the minimum duration of pressures ≥ 20 ms.

2. The requirements [1] or [2] shall apply alternatively taking the effect of reflection of shock wave in enclosed spaces into account. The value of [1] shall be determined by physical measurement of the shock wave on the door, and the value of [2] shall be determined by calculation.

3. For the resistance of the door calculated on the basis of Table 2, the permissible stresses in the door shell must not exceed 75 % of the yield point. Where stress is limited to 75 % of the yield point, a partial safety coefficient of 1.0 can be applied to the yield point.

4. The locking elements of the door and the anchorage of the frame in the supporting structure of the protective structure shall provide mechanical resistance to the negative pressure of the air shock wave in the suction phase assumed as 20 % of the air shock wave overpressure.

5. The hermeticity of hermetic and of protective-hermetic equipment elements, such as doors and hatches, as well as of shut-off devices shall be such that the airflow through the closure structure shall be no greater than 0.2 dm^3/s per square metre of opening at an external overpressure of 150 Pa or shall comply at least with Class 4 of the PN-EN 12207:2017 standard.

6. In devices equipped with gaskets, the load must not be transferred to the frame through the gasket. The gasket shall be made of chloroprene rubber or a material with similar properties, shall be serviceable until the end of its normal service life and easy to replace.

7. In categories 2 and 3, hiding places, steel or wooden door can be used without special protective requirements if the place for human occupancy is located in a part of the hiding place which is shielded from the direct action of external agents of destruction and from detached door elements in the event of their mechanical damage or falling inside the hiding place in result of an explosion.

II. Requirements for automatic explosion-proof valves and gas-tight valves used in protective structures

Table 3. Basic requirements for automatic explosion-proof valves

Facility category	Valve resistance to reflected pressure [1]	The lower value of the overpressure at which the valve closes [2]
Category I hiding place	≥ 0.3 MPa	0.01-0.035 MPa
P-category shelter	≥ 0.3 MPa	0.01-0.035 MPa
A-category shelter	≥ 0.6 MPa	0.01-0.035 MPa
If the resistance of the protective structure to air shock wave overpressure exceeds 0.1 MPa, the resistance of the valve to reflected pressure shall be increased accordingly assuming four times the resistance of the protective structure.		

1. Values given for minimum overpressure duration ≥ 20 ms.

2. The reflected pressure provided for a valve of a certain resistance must not cause damage to any of its components, including the attachment, assuming a single pressure operation.

3. The air resistance of the automatic explosion-proof valve with a nominal flow of 150m^3/h must not exceed 150 Pa, and with a nominal flow of up to 900m^3/h must not exceed 350 Pa. For other flow rates, the limiting resistance values shall be assumed proportionally.

4. Culverts in the walls shall be made in the form of through pipes that at least comply with PN- EN 10220 standard terminated with flanges, protected by hot-dip galvanizing that at least comply with PN-EN ISO 1461 standard.

5. Culverts made of steel pipes shall have a strength equivalent to a load of 20 kN applied in the vertical or horizontal direction.

6. The air resistance of the culvert can be greater than 70 Pa at a flow rate of 1,000 m^3/h.

7. The tightness of gas-tight valves shall be such that the air flow through the valve shall be no more than 0.2 dm^3/s for each square metre of the closed opening with an external overpressure of 150 Pa.

8. Gaskets used in gas-tight valves shall be made of chloroprene rubber or a material with similar properties, shall be serviceable until the end of their normal service life and easy to replace.

III. Requirements for contamination detectors used in protective structures

1. The contamination detector shall be able to connect to the filter-ventilation system of the shelter.
2. The contamination detection equipment, the central unit, and the remote alarm shall indicate the type of alarm and the approximate concentration level of the contaminant (agent) in real time.
3. The contamination detector must withstand a pressure wave of 150 kPa passing through the intake air pipeline.
4. The contamination detector shall meet the requirements of at least the following standards:

   (1) in terms of chemical contamination: NO-42-A221:2015;

   (2) in terms of radioactive contamination: NO-42-A204:2014.
5. The contamination detector must operate regardless of a power outage. The power consumption of the actual detector must not exceed 30 W, and the separated CPU must not consume more than 10 W for each detector connected to it.
6. In addition to the dust filter, the gas detector must not have any other part subject to regular replacement.
7. The gas detector shall be designed so that its use shall not require separate calibration after installation and start-up.

IV. Requirements for filter-ventilation devices used in protective structures

1. The filter-ventilation device shall be equipped with a filter absorber consisting of a part filtering solids, aerosols, and vapours.
2. The total resistance of the filter absorber shall not exceed 800 Pa at a nominal flow rate of 300 m^3/h or 2,000 Pa at a nominal flow rate of 620 m^3/h; for other flow rates, the limiting resistance values shall be taken proportionally.
3. The air flow of the fan of the filter-ventilation device must feature stepless adjustment and must remain at the set value.
4. The filter-ventilation device shall provide 1,000 hours of continuous operation at nominal flow rate.
5. The air flow meter connected to the filter-ventilation device must be able to determine the volume of the air flow in filter and bypass mode with an accuracy of 10 %.
6. In the event of a power outage, the filter-vent device must be designed in such a manner as to be able to be cranked at a crank speed of 25-45 revolutions per minute. The height of the crankshaft from the floor must be a minimum of 1000 mm and a maximum of 1,100 mm. The use of a ‘foot’ drive shall also be permitted.
7. The provision of a manual drive shall not be required for filter-ventilating devices intended for protective structures equipped with a back-up power source.
8. The connecting elements shall withstand the external static overpressure of 10 kPa and the internal static overpressure of 30 kPa.
9. Flexible connecting elements shall be capable of compensating movements of at least 10 mm in any direction.
10. Flexible connecting elements shall be made of chloroprene rubber or a material with similar properties. Porous materials shall not be used.

11. The degree of separation of the pre-filter material shall meet at least the requirements of filter class G4 in accordance with PN-EN 779:2005 standard. At the nominal air flow rate through the pre-filter, the effective flow velocity corresponding to the effective area of the filter shall not exceed 0.7 m/s.
12. The pre-filter must withstand separate dissolution in 0.5 N hydrochloric acid and 0.5 N ammonia at +20 °C for 5 hours. The filter part of the pre-filter shall be replaceable.
13. Particulate filter separation capability:
    1) the particulate filter separation capability shall meet at least the requirements of the H13 filter class according to PN-EN 1822-1-2009 standard. The performance according to standard PN-EN 1822 standard shall be at least 99.95 %;
    2) the particulate filter material shall withstand separate dissolution in 0.5 N hydrochloric acid and 0.5 N ammonia at +20 °C for 5 hours. The weight loss of filter materials under the influence of chemicals shall not exceed 2 % of the original weight;
    3) the filter material of the particulate filter shall meet the minimum tensile strength values of at least 0.8 N/mm on a dry basis and 0.35 N/mm after 24 hours of water hydration in accordance with PN-EN ISO 1924-2:2010 standard;
    4) the particulate filter material must repel moisture so that no more than 10 g of water per square metre shall be absorbed, at least as determined by the Cobb absorption test in accordance with PN-EN 20535 standard.
14. Additional requirements for filter absorber:
    1) the shell shall withstand the external static overpressure of 10 kPa and the internal static overpressure of 30 kPa;
    2) tightness of the finished special filter shall be such that the test pressure of 10 kPa of the internal overpressure varies by a maximum of 2.5 % in five minutes;
    3) the special filter shall withstand the stresses caused by two-minute vibrations with a maximum acceleration of about 100 m/s^2 and a frequency of about 25 Hz without damage.

Table 4. Retention capacity of finished special filter with dry carbon sorbent for warfare and other harmful gases

Warfare gas	Gas concentration volume [%]	Capacity limit mg/m^3	Capacity $kg/dm^3/s$
Chloropicrin	0.2	2	0.125
Chlorocyan	0.2	20	0.015
Hydrogen cyanide	0.2	11	0.02
Chlorine	0.2	1.5	0.038
Sulphur dioxide	0.2	13	0.025
Ammonia	0.2	18	0.005

The required capacity is given in kilograms of nominal gas/air flow of the filter.

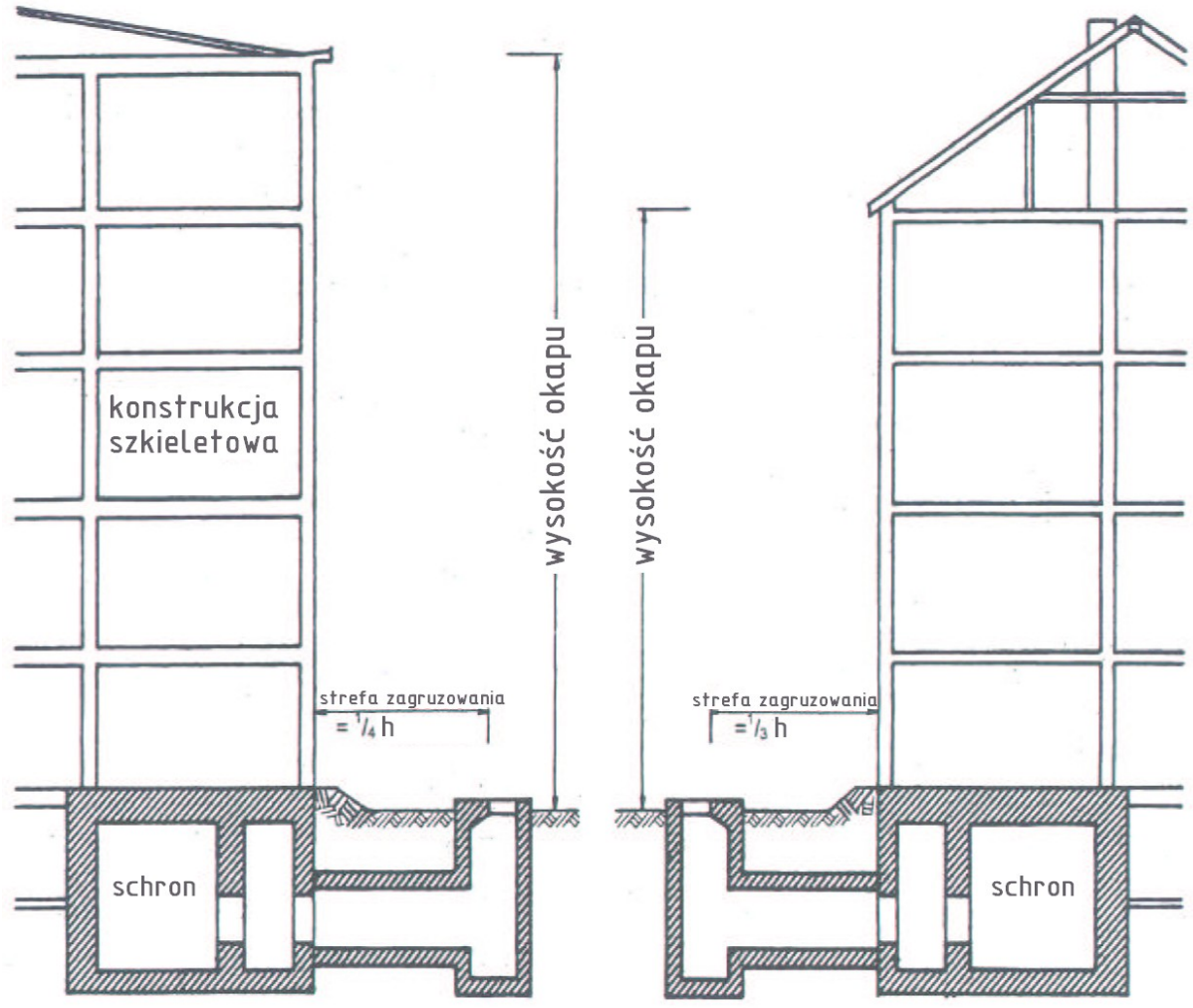
1. For one warfare gas and one noxious gas at most, the retention capacity may be 10 % lower than the values in Table 4.
2. The filter absorber must remove radioactive methyl iodide (131 CH_3I) from the air in such a way that after 20 hours of equilibration the separation rate of the filter shall at least be 99.999 % with dry carbon, and 95 % with wet carbon.
3. When determining the retention capacity and separation rate of the filter, the temperature of the air entering the filter shall be +20 °C, and the relative humidity of the air shall be 80 %. The moisture content of the filter shall not exceed 5 % on dry carbon basis.
4. The absorber shall be tightly closed and sealed.
5. The construction of the filter absorber shall prevent carbon dust from entering the filtered air.

Annex 5

HOW TO CALCULATE A ZONE SAFE FROM RUBBLE

1. It is assumed that the zone safe from rubble, understood as being covered by rubble in the event of the collapse of the above-ground floors of buildings or structures, shall be at ground level at a distance of at least 1/3 of the height of buildings (structures) of masonry construction, or at least 1/4 of the height of buildings (structures) of frame or monolithic construction adjacent to the protective structure.

2. The distance referred to in paragraph 1 shall be measured from the averaged ground level at the walls of the buildings to the top surface of the highest floor including the thickness of thermal insulation and the layer covering it, or to the highest point of the roof or building cover structure (not including wooden attics).



konstrukcja szkieletowa	frame structure
schron	shelter
strefa zagruzowania	rubble zone
=1/4 h	=1/4 h
wysokość okapu	height of the eaves
1/3 h	1/3 h

Annex 6

LIST OF POLISH STANDARDS THE TECHNICAL CONDITIONS OF PROTECTIVE STRUCTURES DEFINED IN THE REGULATION REFER TO

<table>
<tr><td>No.</td><td>Section under which the Standard is cited</td><td>Number of the Standard*)</td><td colspan="2">Title of the standard (scope of the reference)</td></tr>
<tr><td>1.</td><td>§ 7(2)
§ 9(1)</td><td>PN-EN 1990**)
PN-EN 1991**)
PN-EN 1992**)
PN-EN 1993**)
PN-EN 1994

PN-EN 1995**)
PN-EN 1996**)
PN-EN 1997**)</td><td colspan="2">Eurocode: Basis of structural design Eurocode 1: Actions on structures
Eurocode 2: Design of concrete structures
Eurocode 3: Design of steel structures
Eurocode 4: Design of composite steel and concrete structures
Eurocode 5: Design of timber structures
Eurocode 6: Design of masonry structures
Eurocode 7: Geotechnical design</td></tr>
<tr><td rowspan="4">2.</td><td rowspan="4">§ 12(3), (5)
§ 35(2)(2)
§ 36(3)(2)</td><td rowspan="4">PN-EN 13501-1</td><td colspan="2">Fire classification of construction products and building elements – Part 1: classification using data from reaction to fire tests</td></tr>
<tr><td>Terms regarding flammability used in the Regulation</td><td>Classes of reaction to fire pursuant to the Polish Standard PN-EN 13501-1</td></tr>
<tr><td>non-combustible</td><td>A1;
A2-s1, d0; A2-s2, d0; A2-s3, d0;</td></tr>
<tr><td>very limited contribution to fire</td><td>B-s1, d0; B-s2, d0; B-s3, d0;
B-s1, d1; B-s2, d1; B-s3, d1;
B-s1, d2; B-s2, d2; B-s3, d2;</td></tr>
<tr><td></td><td></td><td></td><td>limited contribution to fire</td><td>C-s1,d0; C-s2,d0; C-s3,d0;
C-s1,d1; C-s2,d1; C-s3,d1;</td></tr>
</table>

				C-s1,d2; C-s2,d2; C-s3,d2; D-s1, d0; D-s1, d1; D-s1, d2;
			easily flammable	D-s2, d0; D-s3, d0; D-s2, d1; D-s3, d1; D-s2, d2; D-s3, d2; E-d2; E; F
			high intensity of smoke emission	A2-s3, d0; A2-s3, d1; A2-s3, d2; B-s3, d0; B-s3, d1; B-s3, d2; C-s3,d0; C-s3,d1; C-s3,d2; D-s3, d0; D-s3, d1; D-s3, d2; E-d2; E; F
3.	§ 12(5), (6)(2)	PN-B-02855:1988	Fire protection of buildings — Testing method of emission of toxic products of decomposition and combustion of materials	
4.	§ 32(2)	PN-B-02151-2:2018-01	Building acoustics – Protection against noise in buildings – Part 2: Requirements concerning permissible noise levels of sound in rooms	
5.	§ 33(2)(1)	PN-B-03430:1983, PN-B-03430:1983/Az3:2000	Ventilation in residential, common living and public buildings — Requirements	
6.	§ 34(7)(2), § 35(2)(2), (3)	PN-EN 1505:2001	Ventilation for buildings — Sheet metal air ducts and fittings with rectangular cross section — Dimensions	
		PN-EN 1506:2001	Ventilation for buildings — Sheet metal air ducts and fittings with circular cross-section — Dimensions	
		PN-EN 1507:2007	Ventilation for buildings — Sheet metal air ducts with rectangular section — Requirements for strength and leakage	
		PN-EN	Ventilation for buildings — Ductwork — Strength and leakage of circular sheet metal ducts	

		12237:2005	
		PN-EN 12097:2007	Ventilation for Buildings — Ductwork — Requirements for ductwork components to facilitate maintenance of ductwork systems
		PN-EN 12236:2003	Ventilation for buildings — Ductwork hangers and supports — Requirements for strength
7.	§ 41(1)	PN-B-01706:1992	Installations for water supply — Design requirements (in the scope of point 2.1; 2.3; 2.4.1; 2.4.3-2.4.5; 3.1.1-3.1.3; 3.1.5; 3.1.7; 3.2.2; 3.2.3; 3.3; 4.1; 4.2. and 4.4-4.6)
8.	§ 42(1)	PN-EN 12056-1:2002	Gravity drainage systems inside buildings – Part 1: General and performance requirements (in the scope of points 4 and 5)
		PN-EN 12056-2:2002	Gravity drainage systems inside buildings – Part 2: Sewerage — Sanitary pipework, layout and calculation (in the scope of points 4-6)
		PN-EN 12056-5:2002	Gravity drainage systems inside buildings – Part 5: Installation and testing, instructions for operation, maintenance and use (in the scope of points 5 to 9)
		PN-EN 12109:2003	Vacuum drainage systems inside buildings (in the scope of point 5, 7, and 8)
9.	§ 42(4)	PN-EN 13564-1:2004	Anti-flooding devices for buildings – Part 1: Requirements
10.	§ 42(12)	PN-EN 12056-4:2002	Gravity drainage systems inside buildings – Part 4: Wastewater lifting plants — Layout and calculation (in the scope of points 4-6)
11.	§ 43(1)	PN-HD 308 S2:2007	Identification of cores in cables and flexible cords
		PN-HD 60364-4-41:2017-09	Low-voltage electrical installations – Part 4–41: Protection for safety – Protection against electric shock
		PN-EN ISO 7010:2020-07	Graphical symbols — Safety colours and safety signs — Registered safety signs
		PN-E-05010:1991	Voltage bands for electrical installations of buildings
		PN-E-05115:2002	Power installations exceeding 1 kV a.c.
		PN-E-08501:1988	Electrical equipment — Plates and safety signs

		PN-EN 50310:2012	Application of equipotential bonding and earthing in buildings with information technology equipment
		PN-HD 60364-1:2010	Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions
		PN-HD 60364-4-41:2017-09	Low-voltage electrical installations – Part 4–41: Protection for safety – Protection against electric shock
		PN-HD 60364-4-42:2011	Low-voltage electrical installations – Part 4-42: Protection for safety – Protection against thermal effects
		PN-HD 60364-4-43:2012	Low-voltage electrical installations – Part 4-43: Protection for safety – Protection against overcurrent
		PN-HD 60364-4-442:2012	Low-voltage electrical installations – Part 4-442: Protection for safety – Protection of low-voltage installations against temporary overvoltages due to earth faults in the high-voltage system and due to faults in the low voltage system
		PN-HD 60364-4-443:2016-03	Low-voltage electrical systems – Part: 4-443: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances – Protection against transient overvoltages of atmospheric origin or due to switching
		PN-HD 60364-4-444:2012	Low-voltage electrical installations – Part 4-444: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances
		PN-IEC 60364-4-45:1999	Protection for safety – Protection against undervoltage
		PN-HD 60364-5-51:2011	Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules
		PN-HD 60364-5-52:2011	Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems
		PN-IEC 60364-5-53:2000	Electrical systems of buildings – Selection and erection of electrical equipment – Switchgear and controlgear
		PN-HD 60364-5-534:2012	Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control – Clause 534: Devices for protection against overvoltages

		PN-HD 60364-5-537:2017-01	Low-voltage electrical installations – Clause 5-537: Selection and erection of electrical equipment – Devices for protection, isolation, switching, control and monitoring – Isolation and switching
		PN-HD 60364-5-54:2011	Low-voltage electrical installations – Clause 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors
		PN-IEC 60364-5-551:2003	Electrical systems of buildings – Selection and erection of electrical equipment – Other equipment – Low-voltage generating sets
		PN-HD 60364-5-559:2010	Electrical installations of buildings – Part 5-55: Selection and erection of electrical equipment — Other equipment — Clause 559: Luminaires and lighting installations
		PN-HD 60364-5-56:2019-01	Low-voltage electrical installations – Part 5-56: Selection and erection of electrical equipment – Safety services
		PN-HD 60364-6:2016-07	Low-voltage electrical systems – Part 6: Checking
		PN-HD 60364-7-701:2010 PN-HD 60364-7-701:2010 /AC:2012	Low-voltage electrical installations – Part 7-701: Requirements for special installations or locations – Locations containing a bath or shower
		PN-IEC 60364-7-706:2000	Electrical installations of buildings – Requirements for special installations or locations. – Restrictive conducting locations
		PN-HD 60364-7-715:2006	Electrical installations of buildings – Part 7-715: Requirements on special systems or locations – Extra-low-voltage lighting installations.
		PN-EN 60445:2010	Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals and conductor terminations
		PN-EN 60446:2010	Basic and safety principles for man-machine interface, marking and identification – Identification of conductors by colours or alphanumerics
		PN-EN 60529:2003	Degrees of protection provided by enclosures (IP code)
		PN-EN 61140:2005 PN-EN	Protection against electric shocks — Common aspects for installations and equipment

		61140:2005/AI:2008	
		PN-EN 61293:2000	Marking of electrical equipment with ratings related to electrical supply – Safety requirements
		PN-EN 1838:2005	Lighting application – Emergency lighting
		PN-HD 60364-5-54:2011	Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment — Earthing arrangements and protective conductors
		PN-EN 62305-1:2011	Protection against lightning – Part 1: General principles
		PN-EN 62305-2:2012	Protection against lightning – Part 2: Risk management
		PN-EN 62305-3:2011	Protection against lightning – Part 3: Physical damage to structures and life hazard
		PN-EN 62305-4:2011	Protection against lightning – Part 4: Electrical and electronic systems within structures
		PN-IEC 60364-4-443:1999	Electrical installations of buildings – Protection for safety – Protection against overvoltages – Protection against overvoltages of atmospheric origin or due to switching
		PN-EN 1363-1:2012	Fire resistance tests – Part 1: General requirements
		PN-EN 50200:2003	Method of test for resistance to fire of unprotected small cables for use in emergency circuits
		PN-EN 50172:2005	Emergency escape lighting systems
		PN-EN 12464-1:2012	Light and lighting – Lighting of work places – Part 1: Indoor work places
12.	Annex 4	PN-EN 12207	Windows and doors – Air permeability – Classification
		PN-EN 10220	Seamless and welded steel tubes – Dimensions and masses per unit length
		PN-EN ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods
		PN-EN 779:2005	Particulate air filters for general ventilation –

			Determination of the filtration performance
		PN-EN 1822-1	High efficiency air filters (EPA, HEPA and ULPA) – Part 1: Classification, performance testing, marking
		PN-EN ISO 1924-2:2010	Paper and board – Determination of tensile properties – Part 2: Constant rate of elongation method (20 mm/min)
		PN-EN 20535:1996	Paper and board – Determination of water absorptiveness – Cobb method

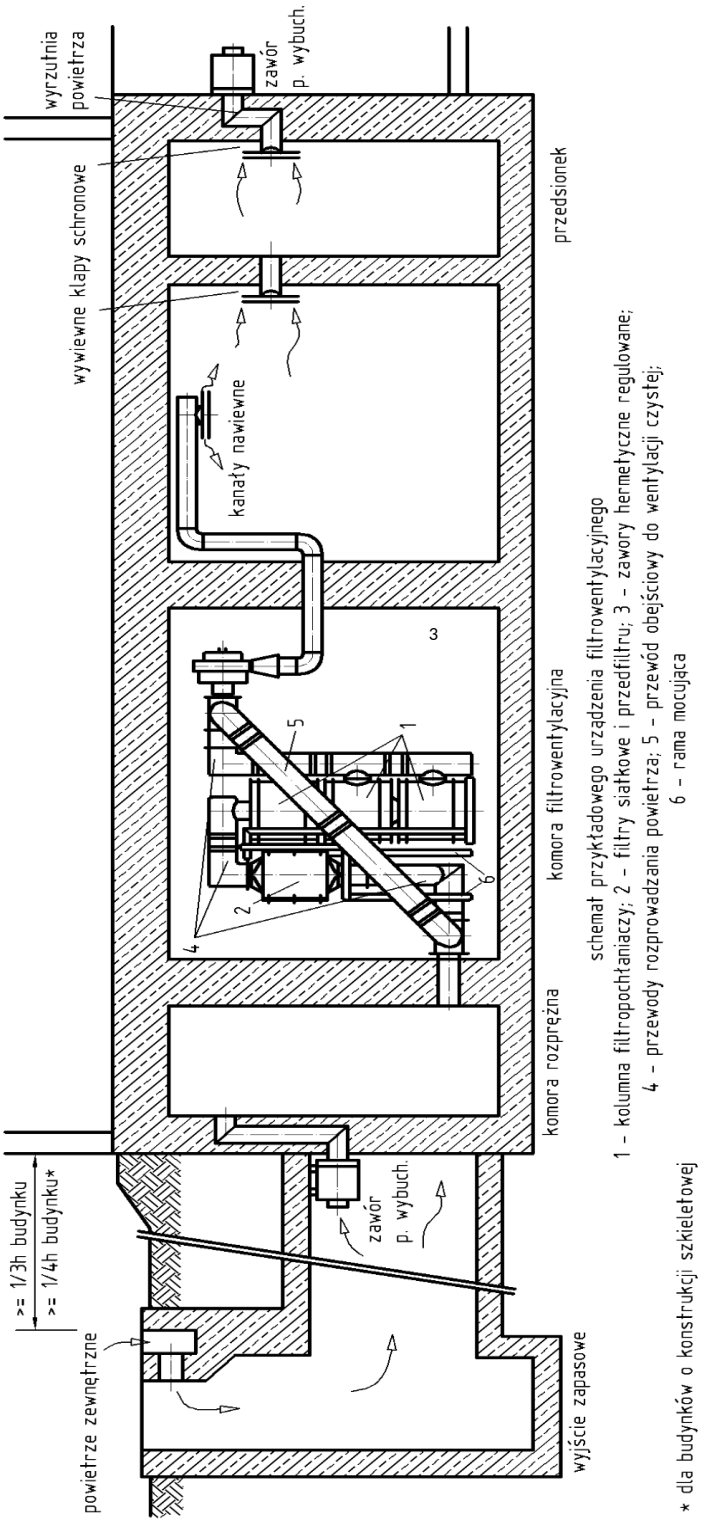
*) Where an undated Polish Standard is referred to, the most recent standard published in Polish shall be used.

**) Polish Design Standards introducing the European Standards for the Design of Structures — Eurocodes, approved and published in the Polish language, shall be used for the design of structures if they cover all the necessary aspects related to the design of that structure (they constitute a complete set of standards enabling design). As a minimum, the design of any type of structure requires the use of PN-EN 1990 and EN 1991.

Annex 7

DIAGRAM OF THE VENTILATION SOLUTION IN PROTECTIVE STRUCTURES AND NOMINAL AIRFLOW THROUGH THE STONE FILTER BEDS

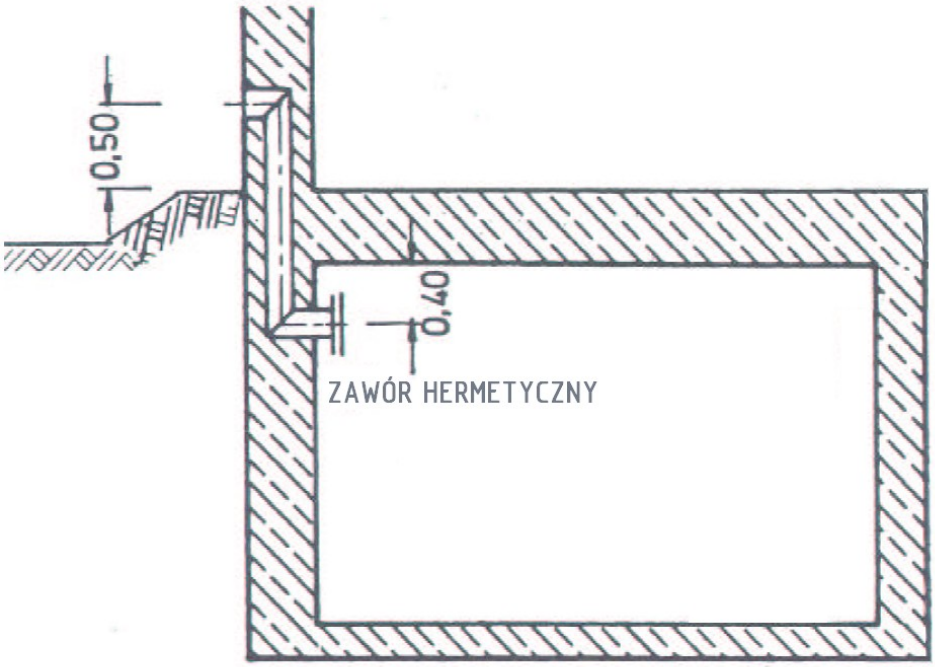
I. Example of ventilation solution with air intake in the spare exit tunnel, expansion chamber, and filter-ventilation chamber



powietrze zewnętrzne	outside air
>= 1/3h budynku	>= 1/3h of the building

>= 1/4h budynku*	>= 1/4h building*
zawór p, wybuch,	explosion-proof valve
wywiewne klapy schronowe	shelter’s exhaust dampers
wyrzutnia powietrza	air ejector
kanały nawiewne	air supply channels
zawór p, wybuch.	explosion-proof valve
wyjście zapasowe	back-up exit
komora rozprężna	expansion chamber
komora filtrowentylacyjna	filter-ventilation chamber
przedsionek	vestibule
schemat przykładowego urządzenia filtrowentylacyjnego	diagram of an example of a filter-ventilation device
1 - kolumna filtropochłaniaczy; 2 - filtry siatkowe i przedfiltru; 3 - zawory hermetyczne regulowane; 4 - przewody rozprowadzania powietrza; 5 - przewód obejściowy do wentylacji czystej; 6 - rama mocująca	1 — filter absorbers column; 2 — mesh filters and pre-filters; 3 — adjustable hermetic valves; 4 — air distribution ducts; 5 — bypass duct to clean ventilation; 6 — mounting frame
* dla budynków o konstrukcji szkieletowej	* for buildings featuring a frame structure

II. Positioning of gravity ventilation channels using double bends of channels in the wall



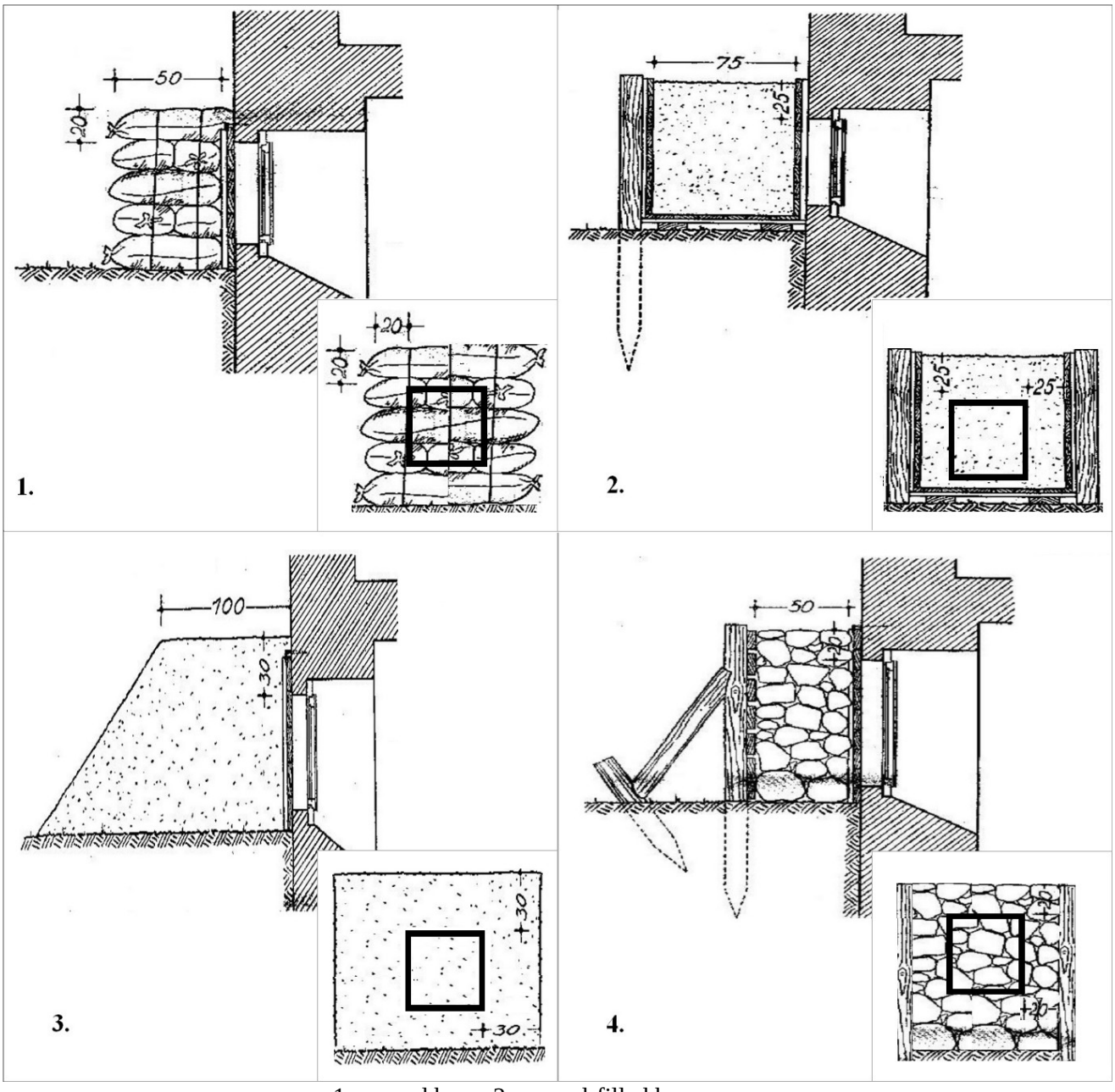
ZAWÓR HERMETYCZNY	HERMETIC VALVE

III. Nominal air flows through the stone filter beds at the outlet

Flow through surface unit	Linear speed	Flow resistance
$m^3/m^2 \times h$	m/s	Pa
72	0.02	24
144	0.04	49
216	0.06	75
288	0.08	105
360	0.1	140
432	0.12	183
504	0.14	230

Annex 8

MEANS OF SECURING WINDOW OPENINGS
IN PLACES OF PROVISIONAL SHELTER



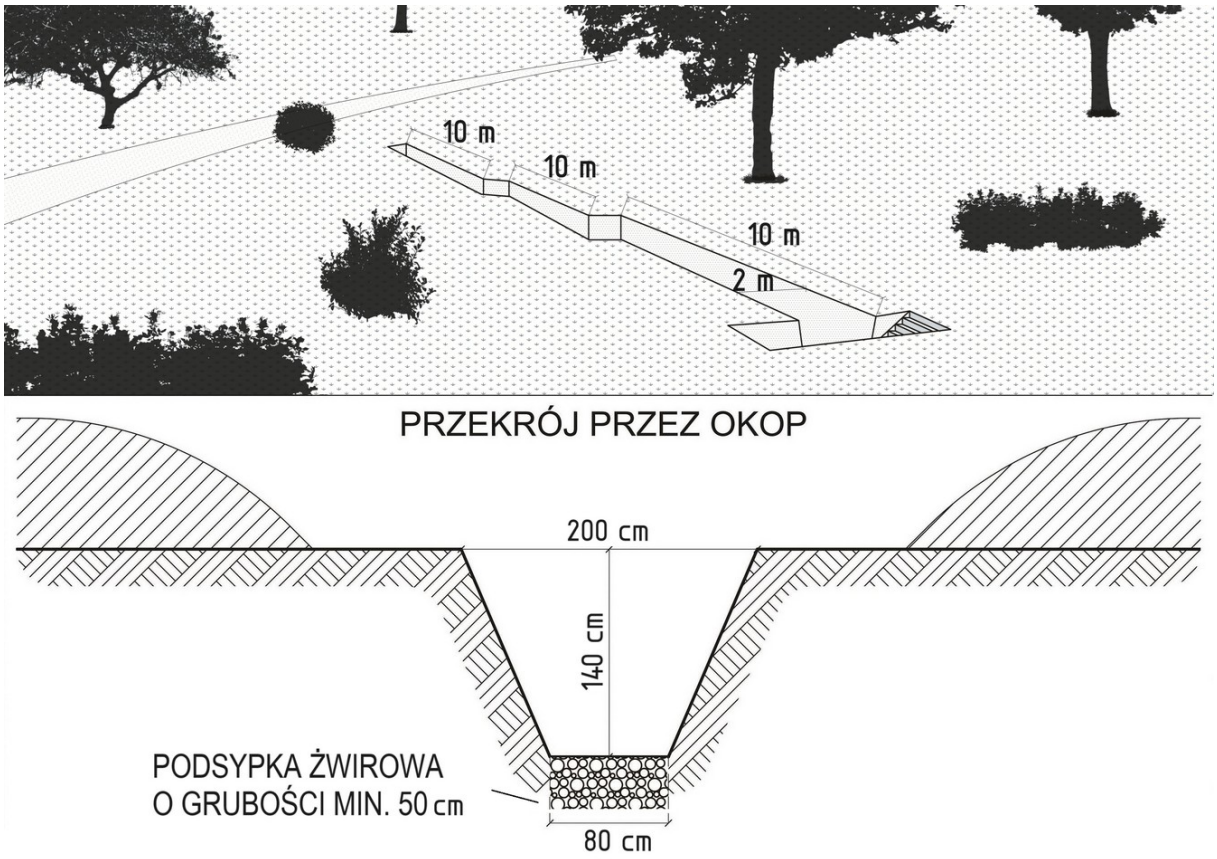
1 — sand bags; 2 — sand-filled box;
3 — soil embankment; 4 — layer of stone or paving slabs

Window openings shall be secured in advance in the event of an expected hazard. The proper protection of window openings shall ensure the protection of the hiding place against the factors of destruction: **shrapnel** and **the blast of the air shock wave**. The protection methods described shall provide a similar degree of protection. Selection of the method shall depend on technical capabilities and available materials. Consideration shall also be given to protecting window openings by removing the frame and bricking them up with solid brick to the thickness of the wall.

Annex 9

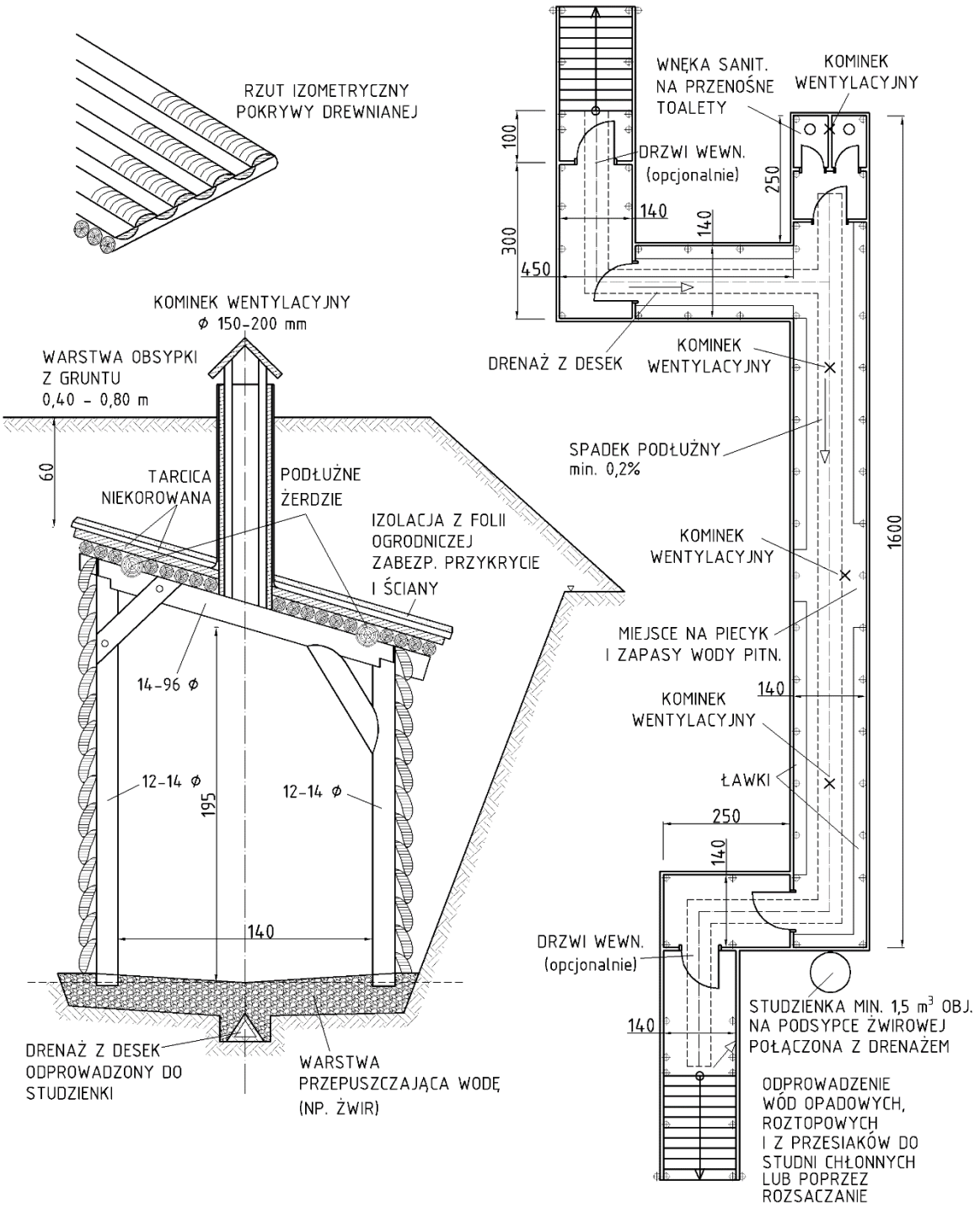
EXAMPLES OF HIDING PLACE SCHEMES
IN THE FORM OF TRENCHES AND ANTI-AIRCRAFT GAPS

I. The simplest hiding place in the form of a trench using the angle of a natural slope



PRZEKRÓJ PRZEZ OKOP	CROSS-SECTION THROUGH A TRENCH
PODSYPKA ŻWIROWA O GRUBOŚCI MIN. 50 cm	GRAVEL SUB-CRUST WITH A THICKNESS OF MIN. 50 cm

II. Provisional Shelter for 50 people of the DG-50 type of lightweight construction to be prepared as part of general self-defence

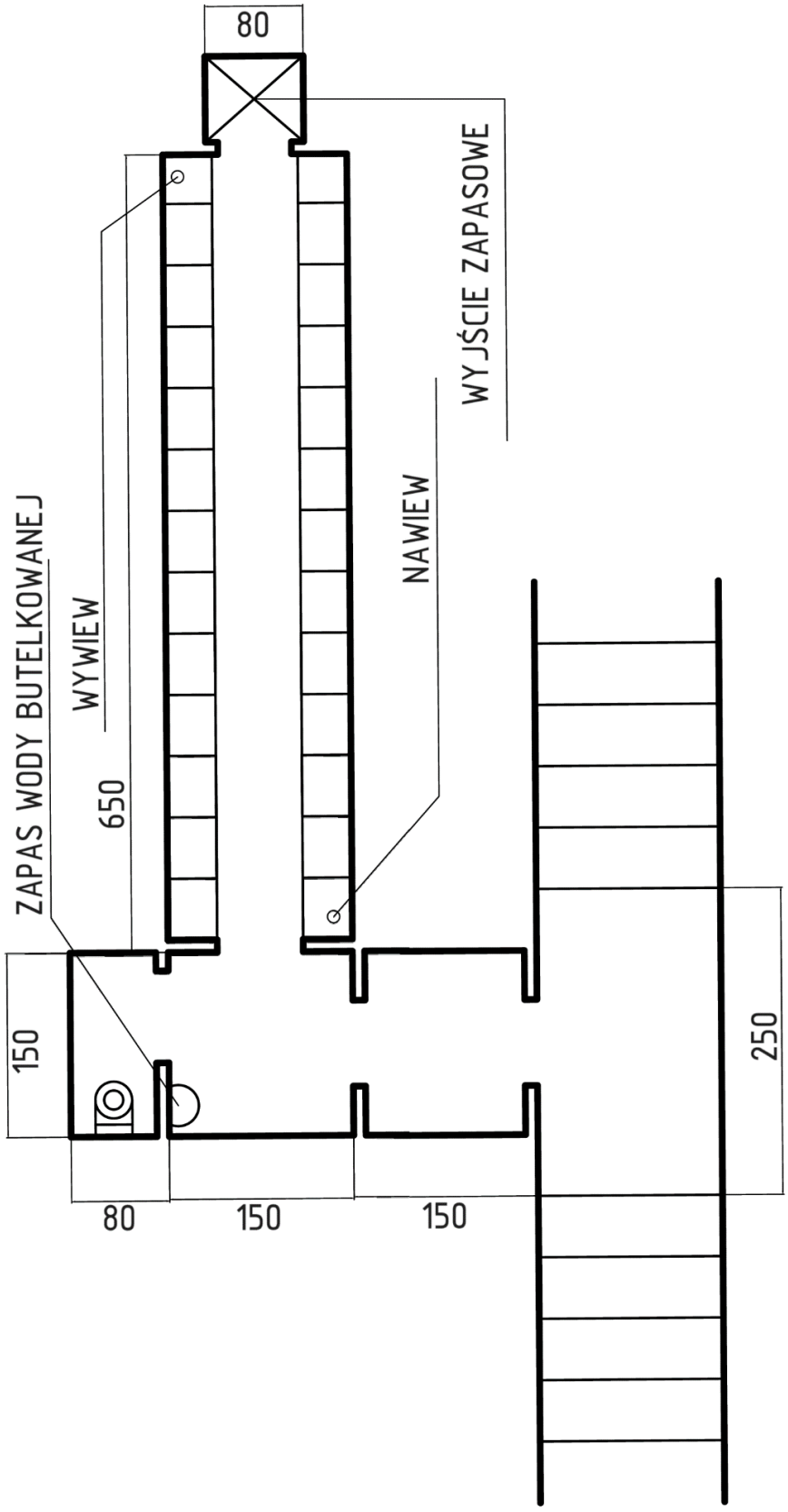


RZUT IZOMETRYCZNY POKRYWY DREWNIANEJ	ISOMETRIC VIEW OF THE WOOD COVER
KOMINEK WENTYLACYJNY Ø 150-200 mm	Ø 150-200 mm VENTILATION CHIMNEY
WARSTWA OBSYPKI	SOIL BACKFILL LAYER
Z GRUNTU 0,40 - 0,80 m	0.4-0.8 m THICK
TARCICA NIEKOROWANA	UNBARKED LUMBER
PODŁUŻNE ŻERDZIE	LONGITUDINAL POLES

IZOLACJA Z FOLII OGRODNICZEJ ZABEZP. PRZYKRYCIE I ŚCIANY	HORTICULTURAL FILM INSULATION TO PROTECT COVER AND WALLS
DRENAŻ Z DESEK ODPROWADZONY DO STUDZIENKI	PLANK DRAINAGE ROUTED INTO A MANHOLE
WARSTWA PRZEPUSZCZAJĄCA WODĘ (NP, ŻWIR)	WATER-PERMEABLE LAYER (E.G. GRAVEL)
WNĘKA SANIT. NA PRZENOŚNE TOALETY	SANITARY RECESS FOR PORTABLE TOILETTES
KOMINEK WENTYLACYJNY	VENTILATION CHIMNEY
DRZWI WEWN, (opcjonalnie)	DOORS, (OPTIONAL)
DRENAŻ Z DESEK	PLANK DRAINAGE
KOMINEK WENTYLACYJNY	VENTILATION CHIMNEY
SPADEK PODŁUŻNY- min, 0,2%	LONGITUDINAL DROP — at least 0.2 %
KOMINEK WENTYLACYJNY	VENTILATION CHIMNEY
MIEJSCE NA PIECYK I ZAPASY WODY PITN.	SPACE FOR OVEN AND DRINKING WATER SUPPLIES
KOMINEK WENTYLACYJNY	VENTILATION CHIMNEY
ŁAWKI	BENCHES
DRZWI WEWN. (opcjonalnie)	INTERNAL DOORS (optional)
STUDZIENKA MIN. 1,5 m^3 OBJ. NA PODSYPCE ŻWIROWEJ POŁĄCZONA Z DRENAŻEM	WELL AT LEAST 1.5 m^3 IN VOLUME ON GRAVEL SUB-CRUST COMBINED WITH DRAINAGE
ODPROWADZENIE WÓD OPADOWYCH, ROZTOPOWYCH I Z PRZESIAKÓW DO STUDNI CHŁONNYCH LUB POPRZEZ ROZSACZANIE	DRAINAGE OF RAINWATER, SNOWMELT AND SEEPAGE WATER INTO ABSORPTION WELLS OR BY DRENCHING

dimensions stated in cm

III. Horizontal view of the anti-aircraft gap for 25 people (single segment)

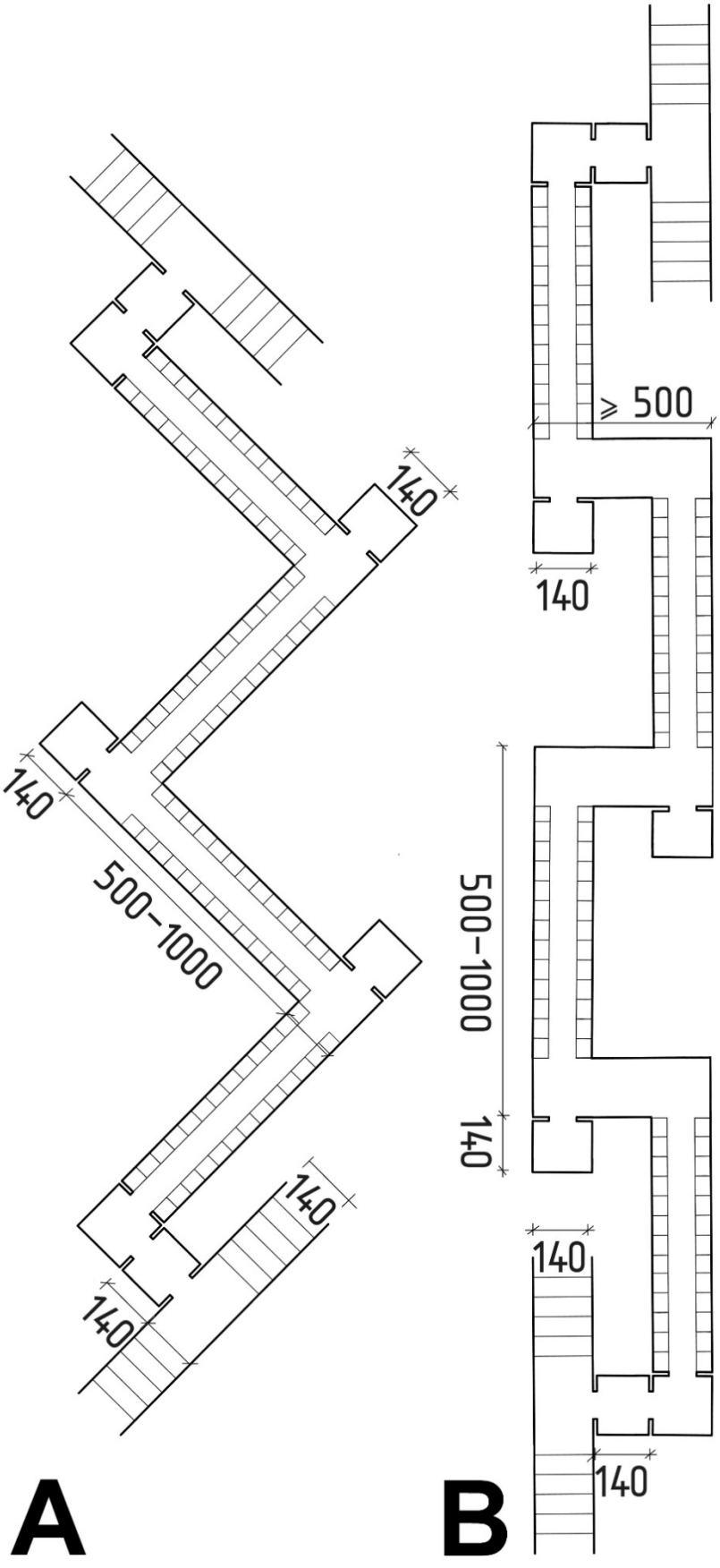


dimensions stated in cm

ZAPAS WODY BUTELKOWANEJ	BOTTLED WATER SUPPLY
WYWIEW	AIR EXHAUST

NAWIEW	AIR SUPPLY
WYJŚCIE ZAPASOWE	BACK-UP EXIT

IV. Horizontal view of the anti-aircraft gap for 200 people



A — zigzag form; B — simple form
dimensions stated in cm

V. Functional solution

Places of provisional shelter using the shielding properties of soil, including the simplest-to-make ditches and trenches, shall be used in modern fortification to protect the military from the agents of destruction: small-arms fire, shell shrapnel, and the blast of the air shock wave.

They can also serve to protect the health and life of civilians. In the event of war-time threats, they shall protect against agents of destruction, providing greater security than the above-ground parts of buildings. They shall mainly protect against the indirect effects of air-plane bombs and artillery shells (shrapnel, shock wave blast, shock) and provide protection against the effects of distant nuclear explosions (heat radiation, shock wave blast, gamma-transmitted radiation). They shall be applied when shelter cannot be found in existing collective protection facilities. At the end of each longitudinal section, there shall be a toilette (a sealed container) recess or, in every other recess, for drinking water supplies. There shall be seating places (benches) in the hiding places. Due to the expected short-term human occupancy (in principle, up to several hours, i.e. until the alert is cancelled), no lying places shall be foreseen. Optional heating can be implemented using external heaters that inject warm air into the supply openings.

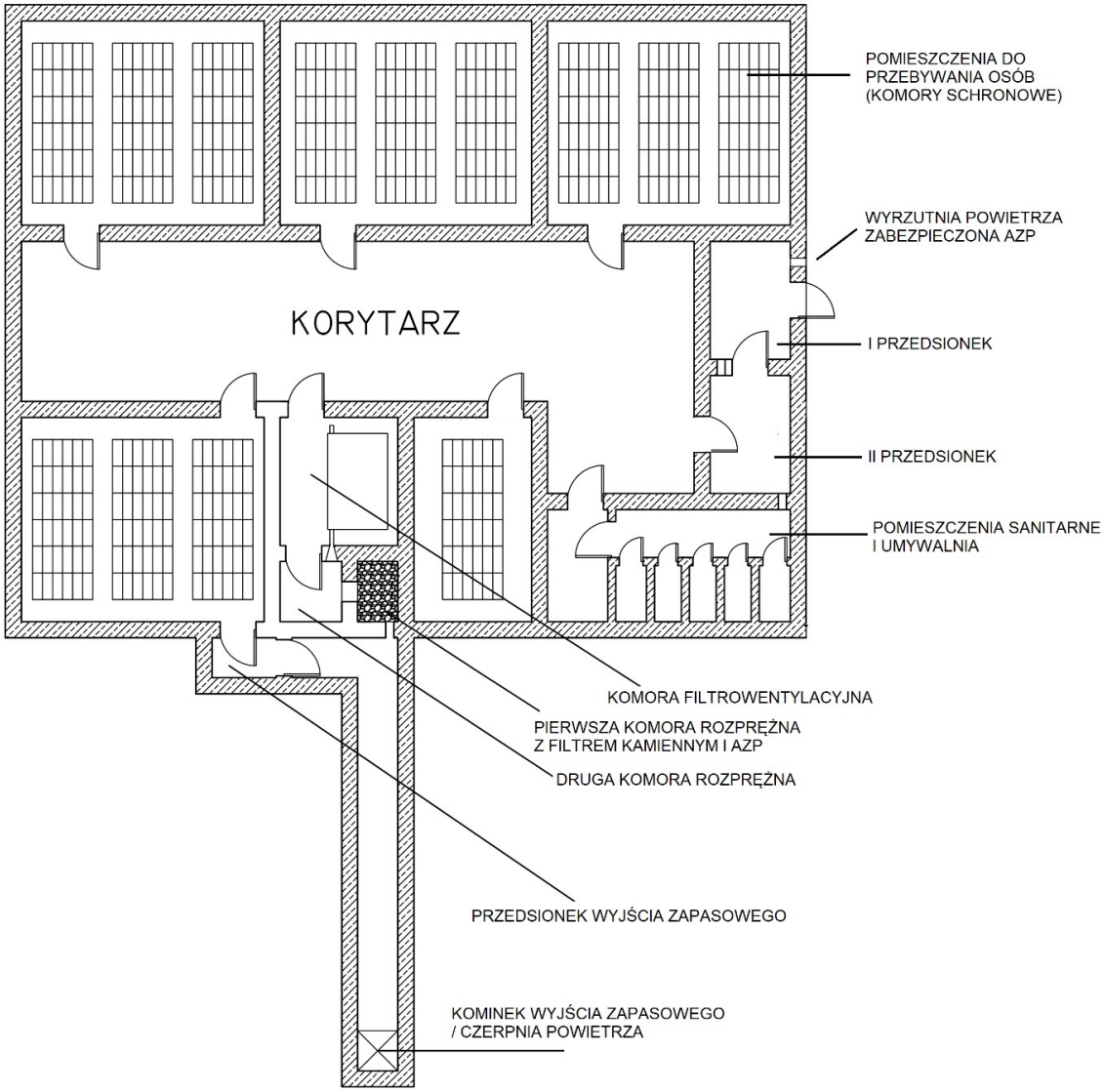
Places of provisional shelter in the form of covered and enclosed ditches, known as anti-aircraft gaps, and uncovered ditches known as trenches, shall also provide temporary hiding places for people staying in tents or summer houses providing protection from injury from damaged trees in the event of windstorms, cyclones, and air vortices (the depression in the ground shall protect against the direct impact of wind gusts, and the broken-design ditch form shall protect against being crushed by windblown trees). Hiding places of this kind protecting against the effects of extreme weather events shall have a simpler functional layout than hiding places providing protection against military hazards, i.e. they do not need to have recesses or entrances that are additionally shielded from shrapnel. In the case of uncovered trenches, their shallow depth (140 cm) ensures that children can stay safely near them without the need for additional safeguards. A properly constructed trench shall be resistant to weather conditions and soil subsidence and can perform its function for many years. Preparation of an anti-aircraft gap (trench) shall not require a building permit or specialised equipment. Anti-aircraft gaps (trenches) built of natural materials (earth, wood) shall have no harmful effects on the environment and can be easily dismantled if necessary.

VI. Design solution

The preparation of anti-aircraft gaps and trenches shall require a relatively little labour and construction materials compared to shelters. These facilities shall be suitable for preparation as part of the general self-defence of the population. It is possible to build them in the form of an above-ground (soil-backfilled), partially sunken, or underground structure. Anti-aircraft gaps can be built entirely of reinforced concrete, brick (walls), and reinforced concrete (floor), prefabricated elements (the possibility of using frame culverts or large-diameter sewer pipes), composite materials, gabion baskets filled with sand. The trenches can be of simpler construction and made of wood or other available materials (such as railroad sleepers). In the simplest version, using the angle of a natural slope, uncovered trenches can be prepared without building materials, by people equipped only with spades and shovels.

Annex 10

A MODEL DIAGRAM OF THE FUNCTIONAL LAYOUT OF A SHELTER FOR 150 PEOPLE



KORYTARZ	CORRIDOR
POMIESZCZENIA DO PRZEBYWANIA OSÓB (KOMORY SCHRONOWE)	ROOMS FOR HUMAN OCCUPANCY (SHELTER CHAMBERS)
WYRZUTNIA POWIETRZA ZABEZPIECZONA AZP	AIR EJECTORS SECURED WITH AZP
I PRZEDSIONEK	I VESTIBULE
II PRZEDSIONEK	II VESTIBULE
POMIESZCZENIA SANITARNE I UMYWALNIA	SANITARY FACILITIES AND WASHROOMS
KOMORA FILTROWENTYLACYJNA	FILTER-VENTILATION CHAMBER
PIERWSZA KOMORA ROZPRĘŻNA Z FILTREM KAMIENNYM I AZP	THE FIRST EXPANSION CHAMBER WITH STONE FILTER AND AZP
DRUGA KOMORA ROZPRĘŻNA	SECOND EXPANSION CHAMBER
PRZEDSIONEK WYJŚCIA ZAPASOWEGO	BACK-UP EXIT VESTIBULE
KOMINEK WYJŚCIA ZAPASOWEGO/ CZERPNIA POWIETRZA	BACK-UP EXIT CHIMNEY/AIR INTAKE

AZP — automatic explosion-proof valve