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# R E G U L A T I O N

# O F T H E M I N I S T E R F O R I N F R A S T R U C T U R E [1)]

of …….. 2025

**on technical conditions to be met by hydraulic structures**

**and their locations[2)]**

Pursuant to art. 7(2)(2) of the Building Law of 7 July 1994 (Journal of Laws of 2024, items 418 and 1080) the following is decreed:

## TITLE I

## General provisions

**§ 1.** 1. The provisions of the Regulation shall apply to the design, construction and conversion of hydro-technical structures.

2. Hydraulic structures shall mean structures, together with the equipment and technical installations associated therewith, serving water management as well as the regulation and use of water resources, and shall include, inter alia: earth and concrete dams, weirs, outlet structures with spillways and bottom outlets, culverts in embankments and monk outlets, navigation locks, flood embankments, flood gates, hydropower stations and hydroelectric power plants, intakes of inland surface waters and infiltration intakes, outlets for sewage and waters, including stormwater and meltwater, reservoir basins together with their slopes and embankments, pumping stations, canals, tunnels, hydraulic pipelines, siphons, standpipes, aqueducts, river and stream regulation structures, thresholds, cofferdams, above-ground tanks intended for the storage of liquid and semi-liquid substances, ports, basins, wintering harbours, piers, jetties, landing stages, quays, riverfront boulevards, slipways, boat lifts and breakwaters on inland waters, as well as fish passes.

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1 )The Minister for Infrastructure manages the Government Administration Department for Maritime Economy, pursuant to § 1(2)(1) of the Regulation of the Prime Minister on the specific scope of activities of the Minister for Infrastructure of 18 December 2023 (Journal of Laws, item 2725).

2 )This Regulation was notified to the European Commission on …… under number ….. , pursuant to § 4 of the Regulation of the Council of Ministers of 23 December 2002 concerning the manner in which the national notification system of standards and legal acts functions (Journal of Laws, item 2039; and Journal of Laws of 2004, item 597), which implements the 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 (OJ EU L 241, 17.9.2015, p. 1).

3. Provisions of the Regulation do not apply to marine hydraulic structures and water reclamation facilities.

**§ 2**. Technical conditions to be met by hydraulic structures shall ensure accessibility within the meaning of Article 2(2) of the Act of 19 July 2019 on Ensuring Accessibility for Persons with Special Needs (OJ 2024, item 1411) - where hydraulic structures are accessible to the public and pedestrian traffic is provided for.

**§ 3.** If provisions of the Regulation do not specify the technical condition to be met by hydraulic structures, or specify it in a general way, the hydraulic structure shall be designed, constructed or reconstructed in accordance with the current level of knowledge and technology, in particular in accordance with the requirements of the Polish Standards.

**§ 4.** For the purposes of this Regulation the following definitions shall apply:

1) impounding structure – any hydraulic structure which allows water and liquid or semi-liquid substances to be permanently or periodically impounded above an adjacent land or water body;
2) weakly reinforced concrete structure - a structure in which the tensile stresses in the concrete do not exceed 150% of the tensile strength of the concrete and the cross-sectional area of the tensile reinforcement is less than the minimum value specified in Polish Standards for the Design of Reinforced Concrete Structures;
3) maximum level of impoundment - the highest position of the water table during the service life of the hydraulic structure;
4) maximum construction flow - the highest flow that does not cause water to overflow the crest of the temporary hydraulic structure and damage to the constricted channel of the watercourse;
5) normal level of impoundment – the highest level of water table under normal conditions of use of the hydraulic structure, where for:
    a) a structure impounding water it shall be periodically assumed to be the water level at the reference flow,
    b) an impounding structure located within the reach of a backwater structure shall be considered to be the position of the water table resulting from backwater caused by the structure, determined for the normal level of impounding in the reservoir and the average annual water flow;

6) basic load system of the impounding structure - loads occurring at the full efficiency of its equipment and the level of impounding at the calculation surge with a reference flow;

7) test water load – water load created during the first impoundment of a hydraulic structure or filling of a reservoir;

8) permitted flow - a flow that does not cause any flood damage to areas downstream of the impounding structure;

9) inviolable flow - the minimum flow that ensures the maintenance of biological life in the watercourse;

10) mean low flow - the arithmetic mean value calculated from the minimum annual flows over a number of years;

11) permanent flood reserve - the capacity of a water body contained between the normal level of impounding and the maximum level of impounding;

12) liquid or semi-liquid substances – liquid, semi-liquid, and solid substances mixed with water, including those arising from the operation of mining plants, power plants or other industrial plants;

13) average annual water flow - the arithmetic mean value calculated from the average annual flows over a number of years;

14) release device - elements of a hydraulic structure or a stand-alone release structure used for the passage of impounded water;

15) exceptional load arrangement of the impounding structure – loads less favourable than those in the basic load arrangement of the impounding structure, including loads:

a) at the control flow or the highest calculated water state,

b) dynamic:

– arising from seismic or paraseismic effects,

- caused by the movement of vehicles, critters or other floating objects,

c) caused by:

– failure of the hydro-technical structure, its components, or failure of the drainage system,

- strong winds,

– a sudden decrease in the level of impoundment,

d) caused by ground deformation in mining areas, in areas of karst phenomena or by the collapse of dispersive soils (in particular loess);

16) impounding height – the difference between the ordinate of the maximum impounding level and the row of the lower water table corresponding to the medium low flow, taking into account the predicted erosion of the bottom of the river or canal or the lowest row of the directly adjacent natural or artificially formed terrain, if the hydraulic structure does not come into contact with the lower water;

17) dry reservoir - a retention reservoir consisting of a complex of hydraulic structures together with installations and equipment, designed to periodically impounded water, usually during periods of flood surges.

## PART II

## Hydraulic structures

### Chapter 1

### General technical conditions for hydraulic structures

**§ 5.** 1. Hydraulic structures and associated equipment and products referred to in Article 10 of the Construction Law Act of 10 July 1994 shall meet requirements relating to the long-term impact of water and atmospheric conditions on them.

2. Elements of a hydraulic structure exposed to damage or corrosion shall be protected against these hazards and constructed so that they can be maintained, repaired or replaced.

**§ 6.** An impoundment used for the retention, storage and transport of water, liquid or semi-liquid substances and the use of water shall be protected against overflow by raising the crests and banks of the structure to a safe height.

**§ 7.** The structure referred to in § 6 shall be equipped with drainage devices, such as overflows, drains, tunnels or other devices enabling the safe drainage of accumulated water or liquid or semi-liquid substances.

**§ 8.** Channels with embankments shall be equipped with emergency gates.

**§ 9.** 1. The stability of an earth hydraulic structure and its substrate shall be ensured in all operating conditions, in particular in the load conditions assumed in the construction project as a whole and in elements such as: body, slopes, fortifications, seals, protective layers and drainages.

2. Earth impounding structures such as dams, dikes, canal embankments and overhead reservoirs storing liquid or semi-liquid substances shall be made of natural or anthropogenic soils in which the content of decomposable or water-soluble components does not compromise their durability and safety both during the construction or reconstruction and during use.

**§ 10.** Cutting through an earth impounding structure by other structures is only permissible if protection against seepage along the junctions of these structures with the ground is provided.

**§ 11.** Concrete, reinforced concrete, stone and weakly reinforced concrete constructions of hydraulic engineering structures meet requirements for strength, the established range of crack resistance and water and frost resistance resulting from the current level of knowledge and technology, in particular requirements of the Polish Standards.

**§ 12.** The subsoil and abutments of the impounding structure are protected against the negative effects of filtration, such as: spoliation, hydraulic penetration, suffosion, soil displacement, in particular by using anti-filtration screens and drains.

**§ 13.** A hydraulic structure shall be founded on a natural or reinforced substrate which, when subjected to loads from the structure's construction, water or other factors, will not undergo changes that will endanger the safety of the structure or interfere with its use.

**§ 14.** 1. The hydraulic structure and its components are subjected to acceptance tests, and the impounding structure is additionally subjected to a test water load, while maintaining the normal level of impounding or, if possible, the maximum level of impounding.

2. The requirement of a water load test does not apply to liquid and semi-liquid storage sites and flood protection structures without closures.

**§ 15.** A hydraulic structure and its components shall be permitted for acceptance testing as referred to in § 14, after it has been established that:

1) all discharge devices with closures and drives shall ensure their free manoeuvring;
2) access to the building and appropriate means of communication are provided, in particular: telephone, radio and Internet communications;
3) control and measurement equipment of this building and adjacent areas have been installed and handed over for use;
4) the floodplain was prepared for flooding and technically received;
5) the complete technical and post-construction documentation has been completed, together with instructions for the operation and use of the structure and instructions for acceptance testing during a test load with water.

## Chapter 2

## Location of hydraulic structures and their impact on the environment

**§ 16.** The hydraulic structure shall be designed and positioned in a way to:

1) ensure the implementation of the principle of sustainable development in an optimal way;

2) limit consequences of a possible failure or construction disaster;

3) harmonise it with the existing landscape, taking into account the regional features of construction and the requirements resulting from the provisions on the protection of monuments;

(4) take into account conditions arising from geological-engineering and geotechnical surveys.

**§ 17.** Banks of water reservoirs and built-up rivers and canals shall be provided with stability by adequately protecting them from damage by water or other factors threatening their loss of stability.

**§ 18.** Slopes and banks of water reservoirs and built-up rivers and canals are shaped to allow animals access to water. If difficulties in access to water cannot be avoided, an adequate access shall be constructed.

**§ 19.** An impounding structure obstructing a river shall, where justified by local conditions, be provided with facilities enabling the migration of fish or other living organisms across the obstacle, and water bodies shall be formed so as to maintain refuges and spawning grounds for fish.

**§ 20.** The head of the water reservoir before impounding shall comply with the sanitary, utility and environmental conditions specified in the separate regulations.

**§ 21.** The shape of the water reservoir limits the possibility of ice and spring blockages and ensures its proper functioning.

**§ 22.** The siltation of water bodies shall be reduced by appropriate anti-bulldoze development in the catchment, using technical solutions to limit the inflow of solids or to allow debris to pass through the body of water.

**§ 23.** The lower stand of the impounding structure and associated land and equipment shall be protected against erosion.

**§ 24.** 1. For an impounding structure, the amount of inviolable flow is determined; and for an impounding structure forming a retention reservoir - the amount of flows: permissible, pre-emptive, flood and catastrophic below these structures is additionally determined.

2. The advance flow should not exceed the permitted flow established for the downstream position of the impounding structure and the section of the river downstream of the impounding

structure, and the flow greater than the permitted flow should not exceed the current inflow to the retention basin.

3. Safeguarding measures to protect people, industrial sites, and monuments from the effects of these flows shall be implemented in the area of potential risk of flows greater than permitted.

4. The lower stand of the impounding structure shall be supplied with a flow no less than the inviolable flow.

**§ 25.** 1. Effects of a potential construction disaster shall be taken into account when designing the construction or alteration of an impounding structure.

2. For areas where a surge caused by the failure of an impounding structure may cause a threat to human life, property, the environment or infrastructure:

1) warning systems shall be installed to indicate the danger of intrusion of the marker wave;

2) evacuation routes shall be indicated;

3) other safeguards shall be provided, in particular shore insurance, hooding or flood barriers.

## Chapter 3

## Division of hydraulic structures

**§ 26.** 1. hydraulic structures are divided into temporary and permanent.

2. Temporary hydraulic structures include structures:

1) that, regardless of their service life, enable the construction of a hydro-technical structure or the reconstruction of an existing hydro-technical structure;

2) whose expected service life does not exceed 5 years.

3. Permanent hydraulic structures include:

1) main conditions upon which the intended technical and economic effects are dependent and the failure, damage or temporary exclusion of which may impair their performance or endanger human life, property, the environment or infrastructure;

2) secondary structures, the failure, damage or periodic shutdown of which does not result in a threat to the safety of the primary hydraulic structure or a reduction in its effectiveness or a threat to human life, property, the environment or infrastructure.

**§ 27.** Permanent hydraulic structures are classified in one of the four classes of importance: I, II, III or IV. The highest class of validity is Class I.

**§ 28.** Depending on the class of the hydraulic structure, a distinction is made:

1) computational flows;

2) coefficients used in static calculations;

3) the safe elevation of the crest of the structure, the banks above a certain position of the water table and above the levels of wave rolling in;

4) equipment:

a) control and measurement,

b) discharge;

5) scope of the required pre-design and design studies, including model studies.

**§ 29.** 1. Classes of main hydraulic structures are determined on the basis of indicators described in the classification of main hydraulic structures, which is set out in Annex 1 to the Regulation.

2. The class of a hydraulic structure shall be determined in a construction project approved by the competent architectural and construction administration authority.

## PART III

## Assessment of the stability of hydraulic structures

**§ 30.** The calculation of the stability and load-capacity of hydraulic structures shall be carried out in accordance with the current level of knowledge and technology, in particular in accordance with requirements of Polish Standards.

**§ 31.** Concrete, reinforced concrete, masonry, or lightly reinforced concrete hydraulic structures founded on non-rocky foundations shall be verified with respect to:

1) exceedances of:

a) the design bearing capacity of the ground,

b) permissible values of displacement and deformation, in particular settlement, differential settlement and tilting;

2) slippage on or in the ground;

3) turnover;

4) negative effects of filtration, in particular hydraulic puncture, sufosia or displacement of the ground of the substrate and footholds;

5) loss of load-bearing capacity of the structures;

6) occurrence of excessive pressures in their base and in the ground;

7) displacement due to buoyancy.

**§ 32.** Hydraulic structures of concrete, reinforced concrete, stone or weakly reinforced concrete founded on bedrock shall be tested in terms of:

1) exceeding the calculation load capacity of the ground;

2) slippage on or in the ground;

3) turnover;

4) occurrence of:

a) tensile stresses on the downstream side at the foundation level and, for structures made of weakly reinforced concrete and stone, also in sections above the foundation level,

b) excessive pressures in the base of these structures and in the ground,

c) hydraulic openings in the rock bed and around the wreaths;

5) loss of load-bearing capacity of the structures of these structures.

**§ 33.** The earth impounding structure shall be checked in terms of:

1) stability of the slopes together with the ground;

2) permissible filtration parameters, such as filtration pressure gradients and filtration velocities, which, if exceeded, may lead to adverse effects, in particular hydraulic breakthrough or sufosion;

3) absorption and drainage capacity;

4) displacements and deformations of the body of the structure together with the ground;

5) slippage on or in the ground;

6) danger of soil displacement from under that structure.

**§ 34.** Where liquefiable soils susceptible to liquefaction are present in the subsoil or in the body of the impounding structure, the possibility of this phenomenon occurring as a result of the acting loads in the basic and exceptional system is checked.

**§ 35.** 1. In order to verify, in condition I of the load-capacity limit (SGN), the stability of the hydraulic structure, with the exception of the shafts of the earth's hydraulic structure and slopes, the following relationships shall be applied:

$$\gamma_n \cdot E_{dest} \leq m \cdot E_{stab}$$

where:

$E_{stab}$ – means the calculated stabilising effects, which are:

- calculated limit resistance of the ground substrate,
- sum of the projections on the slip plane of all forces from the design loads counteracting the displacement, determined taking into account the design values of the geotechnical parameters,
- moments of all the computational forces against rotation,
- vertical component of computational loads at the fixation level for the exit stability check,

$E_{dest}$ - denotes the calculated destabilising impacts, which are:

- loads transferred by the foundations to the subsoil,
– tangential component of all calculation loads that may cause displacements of the hydraulic structure in the slip plane,
- moments of all the design forces capable of causing rotation,
– the vertical component of the design buoyancy value at the ground level when checking the exit stability,

$\gamma_n$ – denotes the destruction consequence coefficient,

m is the correction factor.

2. The dependency referred to in paragraph 1 shall apply when checking the load-bearing capacity of the ground of the hydraulic structure, the slippage of the hydraulic structure on the ground or in the ground, the rotation of the hydraulic structure and its departure.

3. Calculation values of loads, their combination in the basic and unique load system and calculation values of strength parameters of the ground substrate, the calculation limit resistance of the ground and values of the correction factor are determined in accordance with the current level of knowledge and technology, in particular in accordance with requirements of Polish Standards.

4. The destruction consequences factor ($\gamma_n$) of a hydraulic structure (excluding slopes and embankments) is set out in Annex 2 to the Regulation.

5. For hydraulic structures on boundary waters, the value of the coefficient of consequence of destruction ($\gamma_n$) shall be determined individually in agreement with competent services of the neighbouring state, but this coefficient may not be less than that specified in Annex 2 to the Regulation.

6. The calculations referred to in paragraph 1 shall take into account effective stresses determined by taking into account the predicted pore water pressures in the subsoil. The dependency referred to in paragraph 1 shall be verified both for working conditions without run-off

and with run-off, taking respectively the total or effective strength parameters of the soil in the substrate.

7. Other methods of calculation of hydraulic structure stability based on the solution of equilibrium equations may be also used. In that case, the confidence factor ($\gamma_{and}$) satisfies the requirements referred to in Paragraph 40(2).

**§ 36.** 1. In hydraulic structures made of weakly reinforced concrete and stone founded on rock, the resultant of all horizontal and vertical forces acting on the structure, referred to any horizontal cross-section, including the base of the impounding structure, for the basic system of loads are contained in the core of the cross-section when the relation is fulfilled:

$$|x| \leq 1/6\ b$$

where:

x – is the distance of the resultant position from the centre of the cross-section,

b - is the width of the section (base).

For reinforced concrete hydraulic structures, the above condition should be met at the level of foundation.

2. In a hydraulic structure made of weakly reinforced concrete founded on rock for an exceptional load arrangement, it is allowed for the resultant of all design loads to extend beyond the core of the section, satisfying the relation:

$$| x | \leq 1/3\ b.$$

**§ 37.** 1. In the case of reinforced concrete, stone and low-reinforced concrete impounding structures subject to dynamic loads caused by the equipment installed there, the impact of those loads shall be taken into account by assuming, on the right-hand side of the relationship referred to in Paragraph 35(1), an additional coefficient of 0.95.

2. In the case of an impounding structure subjected to seismic or para-seismic loads, the effects of these loads shall be taken into account by assuming an additional destabilising force, the magnitude of which shall be determined on the basis of the anticipated accelerations caused by these loads, in the relationship referred to in § 35(1).

**§ 38.** 1. The filtration pressure gradients occurring in the subsoil of the hydraulic structure and in the body of the earth dam satisfy the relation:

$$\gamma_i \cdot i \leq i_{kr}$$

where:

i – is the gradient of filter pressures,

$i_{kr}$ - denotes critical gradient values for a given soil and flow character,

$\gamma_i$ – is the confidence factor.

2. The value of the confidence factor ($\gamma_{and}$) regardless of the class of hydraulic structure is:

1) 1.5 for the basic load system;

2) 1.3 for an exceptional load regime.

3. Filter pressure gradient values shall be determined for fixed and non-fixed filtration conditions, caused by fluctuations in water levels and consolidation processes in the ground, and shall be verified that their values do not present a risk of adverse filtration deformations of the ground medium, such as displacement, suppression or hydraulic penetration.

**§ 39.** 1. Calculations of the foundation of hydraulic structures of concrete, reinforced concrete, stone and poorly reinforced concrete according to the second serviceability limit state (SGU) are carried out in accordance with the current level of knowledge and technology, in particular in accordance with requirements of Polish Standards.

2. The movement limit values shall be set individually for each hydraulic structure according to requirements of the equipment installed in those structures, permissible variations in movements of adjacent structures, and their permissible deformations.

**§ 40.** 1. A verification of the stability of the slopes of the hydraulic structure with the ground and slopes consists in demonstrating the fulfilment of the following dependencies:

$$\gamma_p \cdot E_{dest}^{ch} \leq E_{stab}^{ch}$$

where:

$E^{ch}_{stab}$, $E^{ch}_{DEST}$ – means characteristic values of stabilising and destabilising effects,

$\gamma_p$ is the confidence factor.

2. The value of the confidence factor ($\gamma_p$) regardless of the class of hydraulic structures shall be:

1) 1.5 for the basic load system;

2) 1.3 – for an exceptional load system.

The given value of the certainty factor ($\gamma_p$) for the exceptional load system applies to water facilities for water resources development as referred to in the water law. For a hydraulic structure which is not a water installation, in particular a tank collecting liquid and semi-liquid substances, for which no water permit is required, the given value may be reduced to 1.2, provided that a

positive specialist opinion is obtained from a person holding building qualifications in the relevant specialisation, in which all components of exceptional loads and factors affecting them are analysed, taking into account their variability over the expected period of use.

3. Characteristic values of loads and geotechnical parameters shall be determined for the relevant geotechnical category in accordance with the current level of knowledge and technology, in particular in accordance with requirements of Polish Standards.

4. The calculations referred to in paragraph 1 shall take into account effective stresses determined by taking into account the predicted pore water pressures in the subsoil.

5. The relationship referred to in paragraph 1 shall be checked both for working conditions without run-off and with run-off, taking as appropriate the total or effective strength parameters of the soil in the body and in the ground.

**§ 41.** The stability of the slopes of the retention reservoir shall be checked taking into account the expected range of fluctuations in the levels of impoundment and the speed of changes in the water level.

**§ 42.** In order to determine excess heights of earth embankments of the hydraulic structure necessary to maintain the designed ordinal crest of this structure, a settlement forecast is prepared on the basis of results of field and laboratory tests of the land.

## PART IV

## Determination of calculated water levels and flood flows

**§ 43.** 1. The discharge capacity and the mode of operation of outlet devices in a permanent hydraulic structure shall ensure the safety of the impounding structure during the passage of design flood events, that is, floods of:

1) computational with a reference flow;

2) computational with the control flow;

3) with the highest calculated water status.

2. The reference flow is understood to be a flood with a probability of occurrence as defined in Annex 3 to the Regulation, on the basis of which a hydraulic structure is designed.

3. A control flow is understood to be the highest design flood with a probability of occurrence as defined in Annex 3 to the Regulation, on the basis of which the safety of a hydraulic structure under an exceptional loading regime is checked.

4. The probability of occurrence of reference and control flows for a permanent hydraulic structure is set out in Annex 3 to the Regulation.

**§ 44.** The highest calculated water level shall be determined as the highest of the states observed or based on an analysis of causes of exceptional water levels, in particular ice congestion and wind collars.

**§ 45.** If the retention of large waters by the reservoir or assembly of reservoirs is ensured, it is permissible to reduce the reference and control flows by values resulting from the transformation of the surge wave, taking into account the water retention capacity of the reservoir or assembly of reservoirs. The retention capacity transforming the development wave is in this case the size of the permanent flood reserve.

**§ 46.** The design, dimensions and method of use of the temporary impounding structure shall ensure the safe conduct of construction flows with a probability of occurrence no greater than that indicated in Annex 4 of the Regulation specifying the probability of occurrence of maximum construction flows for that structure.

**§ 47.** 1. The maximum building flow shall be determined on the basis of an analysis of the expenditure on the construction of water facilities and losses that may result from their insufficient capacity, taking into account the hydrological cover.

2. Where it is not possible to carry out the analysis referred to in paragraph 1, the maximum building flow shall be the one specified in Annex 4 to the Regulation.

3. If the expected period of construction or reconstruction of a hydraulic structure exceeds 5 years, the probability of occurrence of maximum construction flows specified in Annex 4 to the Regulation is reduced to 2 % for earth bulkheads and to 5 % for other types of bulkheads.

**§ 48.** If the period of use of the temporary hydraulic structure is less than one year, the probability of occurrence of maximum construction flows is determined for that period.

**§ 49.** If it is possible to reduce the maximum building flows by automatically transforming the high wave, the maximum water flows are reduced by the value resulting from the reduction of the flood.

# PART V

## Safe elevation of hydraulic structures above water levels and passage of water through hydraulic structures

### Chapter 1

### General requirements

**§ 50.** 1. The crest of the impounding structure, undersides of bridge structures, footbridges, lifting beams and other structures stretched over the water, and unsinkable surfaces and upper edges of sealing elements rise above the characteristic water levels to a safe height, hereinafter referred to as ‘safe elevation’.

2. Under normal operating conditions of a permanently impounding hydraulic structure, the maximum impounding level or the water level at the reference flow shall be assumed, with the consideration of the flow through all the downstream structures, taking into account § 65(3).

3. In exceptional operating conditions of a hydraulic structure, the highest of the water levels shall be taken at:

1) the passage of the reference flow and the inoperative part of the discharge facilities, taking into account § 69;
2) the passage of the control flow;
3) the highest calculated water status.

**§ 51.** For a temporary hydraulic structure, water levels corresponding to the maximum construction flow as specified in §§ 47–49 shall be adopted.

**§ 52.** The safe erection of a hydraulic structure is to be maintained after taking into account the subsidence of the hydraulic structure and its substrate and the lowering of the crest of this structure caused by the movement of vehicles and vibrations, which may be caused by the operation of a hydroelectric power plant or pumping station.

### Chapter 2

### Safe erection of structural elements of hydraulic structures

**§ 53.** The safe elevation of the crest of a permanent hydraulic structure shall not be less than that indicated in Annex 5 to the Regulation specifying the safe elevation of the crest of permanent hydraulic structures.

**§ 54.** 1. For an earth hydraulic structure whose crest is provided with a watertight parapet, the safe height of the crest of that structure shall be measured up to the upper edge of that parapet.

2. The crest of an earth hydraulic structure provided with a watertight parapet is to be elevated above the maximum level of impounding and the water level caused by the reference flood by at least 0.4 m and must not be lower than the water level under exceptional operating conditions of that structure.

3. The window sill on the earthen crest of a hydraulic building shall be protected against washing and loss of stability at a water level not exceeding the crest of the window sill.

**§ 55.** 1. The additional wind-induced impoundment above the static water level for an earth hydraulic structure shall be determined as the sum of the height of the impoundment caused by the wind (aeolian impoundment) and the height of the wave roll-up on the slope of that structure.

2. The additional wind-induced impoundment above the static water level for a hydraulic structure with a vertical or near-vertical wall shall be determined as the sum of the wind-induced impoundment (aeolian impoundment) and the standing wave height.

3. For flood defence shafts, the waveform shall be taken into account if the shaft spacing is greater than 3 km.

**§ 56.** 1. For reservoirs where the wave run-up length does not exceed 3 km, wind-induced impoundment (aeolian impoundment) may be disregarded.

2. The determination of the wave height shall be carried out for a wind speed of not less than:
1) 20 m/s - at the maximum level of impoundment;
2) 15 m/s – at a reference flow.

3. The determination of the height of the wave caused by the movement of vessels shall be calculated by adding the height of the wave caused by the movement of vessels to the designated height of the wave caused by the wind at the speed at which the movement of vessels can still take place.

**§ 57.** The safe elevation of the upper edge of the sealing elements of a hydraulic earthworks above the normal level of impoundment and the maximum level of impoundment shall not be less than that indicated in Annex 6 to the Ordinance determining the safe elevation of the upper edge of the sealing elements of earthworks.

**§ 58**. 1. A safe elevation of the crest of a temporary hydraulic structure above the water level at the maximum construction flow calculated in accordance with §§ 47 - 49 shall not be less than:

1) 0.8 m - where the overflow of water through the crest of a temporary hydraulic structure threatens to destroy it;
2) 0,5 m – if the overflow of water through the crest of the temporary hydraulic structure does not threaten its destruction.

2. When determining the safe elevation of the crest of a temporary hydraulic structure built on rivers, wave action is not taken into account.

3. When determining the safe elevation of a crest of a temporary hydraulic structure built on natural or artificial reservoirs, the wave movement shall be taken into account by adding to the water level at the maximum building flow determined in accordance with Paragraphs 47 to 49 the wave height set at a wind speed of 15 m/s.

**§ 59.** 1. A safe elevation of the underside of the structure of a hydraulic structure located above water shall be at least:
1) 0.5 m - above the water level at the maximum impounding level or the water level at the reference flow, if there is no ice, frazil or other floating bodies in the water during surges;
2) 0,5 m above the expected position of the upper edge of the ice and other floating bodies at a reference flow, if it may be necessary to permeate the ice and other floating bodies;
3) 0.2 m above the water table at the control flow.

2. In the case of a hydraulic structure located near a water reservoir, the impact of the backwater shall be taken into account.

3. A safe elevation of the underside of the structure of a hydraulic structure referred to in paragraphs 1 and 2, located in the river bed, shall not be less than that established in the regulations for bridges over public roads and navigable routes.

**§ 60.** 1. A safe elevation of the crest of embankments of channels not carrying floodwater shall be determined in accordance with Annex 5 to the Regulation.

2. The water level corresponding to the reference flow as defined in Annex 5 to the Regulation shall be taken as the higher water level that occurs at:
1) the sudden immobilisation of a power station or pumping station, taking into account still prior to the immobilisation an operation at full capacity of all installed turbines or pumps, but not including standby pumps;
2) pumping station operation with all installed pumps, including reserve pumps.

3. The water level corresponding to the flow under exceptional operating conditions of the hydraulic structure shall be taken to be the water level when all turbines or pumps are suddenly stopped or started, taking into account the possibility of wave overlaps resulting from the rapid successive start-up and stopping operations of these turbines or pumps.

**§ 61.** The higher of the values determined in accordance with § 53 or § 60 is taken as the safe elevation of the crest of the embankments of the channels carrying floodwaters.

## Chapter 3

## Passage of water through hydraulic structures

**§ 62.** 1. Water permeation shall be ensured during the construction or reconstruction of a hydraulic structure.

2. If a natural channel or part of a watercourse is not used for the passage of water, the hydraulic structure under construction or reconstruction shall be equipped with at least one of the devices for the passage of water, such as a circulating channel, a drain or an adit. In the absence of such devices, the possibility to pump the inflow water shall be ensured.

3. If a permanent hydraulic structure under construction or reconstruction may be destroyed during the passage of the maximum construction flow, the water transfer equipment shall ensure:
1) a safe passing of the flow referred to in § 47 paragraph 1,
2) maintaining a safe elevation of the crest of that structure determined in accordance with § 53
– taking into account the transformation of the high wave by the existing reservoir.

4. If a temporary hydraulic structure is likely to be destroyed during the run-off, the water permeation equipment shall ensure:
1) a safe passing of the maximum structure flow determined in accordance with §§ 47 - 49,
2) maintaining a safe elevation of the crest of that structure determined in accordance with § 58
– taking into account the transformation of the canopy wave by the existing reservoir.

**§ 63.** 1. Thresholds of the inlets of construction water conveyance devices shall be placed at least 0.5 m above the bottom of the flume or debris trap specially made in front of the inlet to these devices.

2. Inlets to the equipment referred to in paragraph 1 shall be equipped with gratings to prevent the ingress of floating and dragged bodies after the bottom. The design of the gratings shall allow for their periodic cleaning.

**§ 64.** Hydraulic structure shall be designed in such a way as to ensure:

1) a regulation of the flow of water in accordance with requirements set out in instructions for water management and in instructions for the operation and use of structures;
2) a safe passage of high flows, while maintaining the safe elevation of the crest of the structure above the water levels associated with these flows;
3) a safe ice passing.

**§ 65.** 1. Water flows through impounding structures are passed through overflows and discharges, including those operating under pressure, and through other hydraulic structures adapted for this purpose.

2. The overflow capacity under normal operating conditions shall be at least 80 % of the reference flow. The remainder of the flow may be carried out by other discharge devices for the passage of water, taking into account § 67.

3. A certain number of triggers, tunnels, levers and turbines shall not be taken into account when determining conditions for transmitting a reference flow for normal operating conditions of a hydraulic structure.

4. The number of spillways, galleries, levers, and turbines which are not taken into account for the purpose of determining the conditions for passing the reference flow shall be specified in Annex VII to the Regulation.

5. In determining the pass-through conditions, it is assumed that all equipment suitable for carrying out the internal waters is in operation.

**§ 66.** 1. Reference and control flood flows are safely introduced through the discharge facilities of the hydraulic structure into the river or channel bed below the structure.

2. A portion of the surge flow is allowed to pass outside the river channel and the discharge facilities of the hydraulic structure for the reservoirs:

1) lowlands with a total capacity of up to 10 million $m^3$ and for water steps maintaining the level of upper water in the river bed, through the floodplain area, provided that it is protected against the formation of a new river bed;
2) mountainous ones, if the part of the flood flow that is conveyed through slope overflows or field saddles onto unfortified rocky slopes without an outflow channel to the river does not exceed the flood flow with a probability of occurrence of $p = 5$ %.

**§ 67.** The use of pressure-operated triggers and rotary trunks, as the only means of transgressing drainage waters, is possible only if these flows can be carried out in their entirety also by emergency water transfer facilities, such as relief channels or emergency overflows.

**§ 68.** Where it is not possible to obtain a warning of impending high water, allowing time to prepare a flood reserve in the reservoir or to open a discharge structure in time, particularly on rivers with rapid surges, it shall be ensured that the entire surge flow can be conveyed through self-acting overflows.

**§ 69.** In the event of a failure of one of the overflow closures, the design of the hydraulic structure shall ensure that the reference flow can be conducted through the remaining spans of the overflow, as well as through spillways, galleries, levers, and turbines, the number of which shall be reduced by the number specified in Annex 7 to the Regulation, and through the sluice if it is adapted for the passage of surges, while maintaining a safe elevation of the crest of the hydraulic structure not less than that required under the exceptional operating conditions of the structure.

**§ 70.** 1. Weirs or scuppers with locks shall have at least three bays.

2. If the total span length of weirs or overflows shall not exceed 6 m, the number of spans may be reduced to two.

3. A single span is permitted in case a weir light not exceeds 3 m.

**§ 71.** 1. Pipelines and tunnels draining water from tower overflows provide a non-pressure water outflow occurring at the maximum level of impoundment, but not exceeding 1.5 times the size of the control flow.

2. The use of pressure hoses is allowed provided that high reliability of their tightness is ensured.

**§ 72.** Weir and overflow spans shall be constructed so that, when the reference flow passes through all active spans of the hydraulic structure, excessive erosion of the bottom of the outflow channel does not occur and so that the unit flow of 30 $m^3$/(sm) is not exceeded at the thresholds of weir and overflow spans.

**§ 73.** 1. Weirs and spillages shall be constructed in such a way as to ensure full capacity during the winter period.

2. The design of the closures and the light of the bays of weirs and swans allows the ice to pass through without the need to completely open their bays.

**§ 74.** 1. The water reservoir shall be equipped with drains to allow it to be completely emptied. Drains can be used to carry stormwater and construction water.

2. When determining the time of emptying the reservoir and the flow rate of water to the lower position of the impounding structure, the safety conditions of the upper and lower positions shall be taken into account.

**§ 75.** 1. Drainage pipes in an earth impounding structure are monolithic - reinforced concrete or weakly reinforced concrete. The impact of the displacement and deformation of the barrier together with the ground shall be taken into account in the design of drain pipes.

2. The use of downpipes made as pipelines laid in reinforced or weakly reinforced concrete galleries is permitted.

3. The use of spill conduits constructed as non-reinforced and non-prefabricated steel or plastic pipelines laid directly in the ground shall be permitted where the water impoundment height does not exceed 2 metres.

4. Drain pipes made as prefabricated pipelines in shaft culverts may be used provided that they are mounted on a monolithic foundation and that the joints are tight.

5. Drain pipes and shaft culverts shall be protected against harmful filtration along their walls.

**§ 76.** The inlets to the triggers shall be protected by gratings with suitably selected clearances, with the possibility for lifting and cleaning the gratings.

**§ 77.** 1. The drains shall be at least two-line, with the possibility of taking one line out of service for maintenance and inspection, while keeping the other drains operational.

2. Single line drains are permitted where the total capacity of the reservoir served by the drain does not exceed 0.2 million $m^3$ and the impounding height is less than 2 m or where there are other facilities capable of taking over the drain function.

**§ 78.** A portion of the floodplain flow may be allowed to pass past a weir or overflow if it does not cause danger to human life, property, the environment or infrastructure.

**§ 79.** 1. The location, shapes and dimensions of inlets to the discharge equipment of the hydraulic structure shall be designed in such a way as to ensure:

1) gentle introduction of water into them and limitation of water flow disorders;

2) avoidance of:

a) the risk of washing away of these structures, neighbouring structures and banks;

b) obstacles to the movement of ships,

c) difficulties in supplying water to places located near the intakes.

2. For hydraulic structures of Class I and II, the throughput capacity and shape of hydroelectric discharge structures and water jet energy dissipation devices shall be tested experimentally on physical models constructed on a scale that provides a correct representation of the physical phenomena tested, except for shaft culverts.

**§ 80.** Inlets of hydraulic structures, in which floating objects or ice may stop, shall be protected by gratings or ice gowns and irregularities.

**§ 81.** The venting hydraulic structure shall be provided with devices for dissipating the energy of the water stream and the slopes and the bottom of the watercourse shall be strengthened in order to protect the structures and the banks from underwatering that threatens their stability and durability. These devices shall be adjusted to the flow corresponding to the control flow rate.

**§ 82.** The shape of the overflow surfaces shall be chosen in such a way that negative pressures likely to cause cavitation do not form on them, or shall be carried out in such a way that cavitation does not cause their destruction. In the triggers, aeration or additional armour is used to reduce effects of cavitation.

## PART VI

## Equipment for the collection and transport of water

### Chapter 1

### Water intakes

**§ 83.** 1. The location and technical solutions of a surface water intake shall prevent or limit the ingress of surface floating or submerged bodies, including ice and slime, as well as aquatic fauna and sediments from entering the intake and accumulating in front of the intake.

2. A surface water intake shall be equipped with facilities for the removal of floating bodies, as well as aquatic fauna and sediments referred to in paragraph 1, if their accumulation upstream of that intake cannot be avoided.

**§ 84.** 1. Inlets of surface water intakes shall be designed in such a way as to reduce the occurrence of turbulence, air suction, and water flow disturbances.

2. The crest of the inlet threshold of the surface water intake shall be located at such a height above the bottom of the watercourse or the reservoir, that the input of dragged debris into the water intake is minimised. The minimum elevation of the inlet threshold of the water intake above the threshold of the vent or other rinsing device shall be 0.3 m.

**§ 85.** Surface water intake and hydroelectric power station pipelines crossing earthen impounding structures below the upper water table shall be constructed in accordance with the conditions referred to in § 75.

**§ 86.** The upper edge of inlets to pressure-operated surface water intake pipes shall be located at a depth that protects against suction of air and floating bodies, as well as of aquatic fauna and sediments referred to in § 83(1).

## Chapter 2

## Surface water pumping station

**§ 87.** 1. The drainage and transmission pumping stations are supplied with electricity from two independent sources. One of the power sources can be a power generator or an assembly of power generators.

2. Drainage and transfer pumping stations shall be equipped with reserve pumps. These pumping stations may not be equipped with back-up pumps provided that, in the event of failure or the need to repair the primary pumps, it is ensured that water can be pumped by other means.

**§ 88.** 1. Bases of the electric motors of the dehydration pumps shall be placed above the maximum level of the water table of the adjacent watercourse or reservoir.

2. If it is not possible to comply with the requirement referred to in item 1, another means of protection shall be used which excludes the flooding of electric motors.

3. In case of the usage of submersible pumps, requirements referred to in paragraphs 1 and 2 shall not apply.

**§ 89.** Surface water pumping stations and the supports of the discharge pipelines, which supply water to the reservoir located above the pumping station or canal, shall be designed to prevent them from being submerged or washed away by unsealing of the pipelines.

**§ 90.** Pipelines of surface water pumping stations passing through earth structures permanently impounding water shall meet the conditions set out in § 75.

Chapter 3

## Water transfer equipment

**§ 91.** 1. Open canal routes are conducted in a way that limits the number of intersections with communication lines and with watercourses and the number of passages through settlements, industrial plants, areas of valuable crops, protected areas and areas of sanitary hazards, as well as landslide, mining, swampy areas, with significant permeability, requiring the conduction of a canal in a embankment.

2. The radii of the arcs of the non-navigable canal route shall not be less than 2,5 times the width of the water table in the canal at the largest calculated flow.

**§ 92.** The design of open ducts provides the required capacity, tightness, stability, durability, ease of maintenance and meets the requirements of environmental protection.

**§ 93.** The banks and slopes of open channels shall be protected against erosion and piping caused by surface and groundwater.

**§ 94.** 1. Spillways, closed channels, and other non-pressurised conduits carrying water shall be provided with aeration.

2. Pressure lines shall be provided with aeration and venting.

**§ 95.** 1. Pressure pipes conducting water shall be adapted to transmit hydraulic impacts arising under operating conditions and failures of transmission equipment.

2. Electrically operated pressure cable closures shall be equipped with a back-up manual drive.

**§ 96.** Non-pressure and pressure pipes carrying water that cross soil impounding structures satisfy the conditions laid down in § 75.

PART VII

## Equipment of hydraulic structures

Chapter 1

## Main closures of impounding structures

**§ 97.** Main closures of the impounding structure shall be constructed in such a way as to enable them to be manoeuvred in flowing water and to ensure their safe operation.

**§ 98.** The rate of closure and opening of main closures of the impounding structure shall be adapted to the flow of water not causing damage to the lower and upper position of the structure and to the nature of the surges and the operational requirements.

**§ 99.** Main closures of an impounding structure shall be equipped with materials and technical devices ensuring their proper operation, in particular the passage of flood events during the winter period.

**§ 100.** 1. Main closures of the impounding structure shall be equipped with a main and reserve electric drive.

2. Drives for main closures of Class I and Class II in impounding structures shall be fed from two independent sources via two lines routed through areas not at risk from washouts, landslides, and avalanches. A hydroelectric power station at the water stage or at the dam and a diesel generator can provide backup power.

3. Drives for main closures of Class III and IV in impounding structures shall be supplied from two independent sources. A reserve power source can be a manual drive.

4. The propulsion of closures of Class III and IV in impounding structures with an impounding height of less than 2 m and a reservoir capacity of less than 0.2 million $m^3$ may be limited to manual propulsion.

5. Main closures of the impounding structure, which operate on the principle of utilising the difference in pressure between the upper and lower water, shall be equipped with devices to activate them under all conditions.

**§ 101.** Main closures of the impounding structure shall be constructed in such a way as to prevent vibrations endangering their durability and, in particular, the spaces under the water flows over the closures and sills shall be aerated.

**§ 102.** 1. The elevation of the upper edge of the main closures of air carriers and weirs above the maximum impoundment level shall be not less than:

1) 0.3 m - for overflows on reservoirs and weirs on the Vistula, Oder, Bug, Narew, Warta and San rivers;

2) 0.1 m – for weirs on other rivers.

2. It is permissible to place the upper edge of the main closures of overflows and weirs at the maximum level of impoundment if the design of the closures allows water to overflow and ice to pass safely over the closure.

**§ 103.** 1. Mechanisms of main closures of the impounding structure shall be protected against accidental activation or damage.

2. Mechanisms of main closures of the impounding structure shall be constructed so that they are protected from the weather.

3. The design of the impounding structure shall ensure a safe maintenance access to the main closure mechanisms in all weather and hydrological conditions.

4. Mechanisms of main closures of the impounding structure shall be equipped with limit stops, brakes, and indicators of their position. Remotely or automatically controlled mechanisms shall be additionally equipped with manual controls for direct operation.

**§ 104.** 1. The use of mobile main mechanisms of closures of impounding structures, which are moved between the spans they serve, is only permitted if there is no need to raise or lower these closures simultaneously.

2. Release devices of the impounding structure shall be equipped with at least two mobile mechanisms for the main closures, whereby one mechanism may operate no more than five such closures.

3. Mobile mechanisms of main closures of the impounding structure shall not be used in the case of automatic or remotely controlled closures.

## Chapter 2

## Emergency and refurbishment closures of impounding structures

**§ 105.** The design of emergency closures of the impounding structure allows:

1) manoeuvring these closures in flowing water;

2) rapid stopping of water flow in the event of failure of the main seals;

3) safe operation of these closures.

**§ 106.** 1. The hydroelectric power plant shall be equipped with emergency closures.

2. An impounding structure other than a hydroelectric power station shall be equipped with an emergency closure only if the failure of the main closure could cause the permitted flow below the structure to be exceeded.

3. In a hydroelectric power plant with an average gross fall not exceeding 3 m, the emergency closure function may be fulfilled by one of the devices regulating the flow of water through the turbine if the turbine is equipped with two such devices.

**§ 107.** Emergency closures can be used as repair closures, but one set of emergency closures should always be available to the user of the hydraulic structure.

**§ 108.** 1. Culverts, weirs, and water intakes shall be fitted with a repair closure.

2. Hydraulic structures referred to in paragraph 1 shall be equipped with at least one set of overhaul closures on the upstream side for every five bays, and on the downstream side where this is necessary for inspection, maintenance and repair. The number of sets of repair closures on the downstream side corresponds to the number of repair closures on the upstream side.

3. Renovation closures in hydraulic structures referred to in paragraph 1 shall be permitted if the refurbishment of the hydraulic structure or its main closures is possible without them.

**§ 109.** 1. Repair closures allow repairs and inspections to be carried out on the main closures and other elements of the impounding structure at normal impounding levels.

2. The design of the overhaul closures allows the space between the overhaul closures and the main closures to be filled with water.

## Chapter 3

## Equipment for drains and inlets for drains and surface water intakes

**§ 110.** 1. Drains are fitted with main, emergency, flow control, and overhaul closures on the upstream and downstream sides.

2. Discharges of a hydraulic structure of Class IV may be fitted with a single main closure located on the side of the upper water. The use of a single main closure on the downstream side is only allowed if the impounding height does not exceed 2 m and the capacity of the water reservoir is less than 0.2 million $m^3$ and safe drainage of seepage and water leakage from the discharge pipe is ensured.

**§ 111.** 1. The bottom of the drain pipe shall be made with a longitudinal slope of at least 0.2% in the direction of the lower water.

2. Sections of drain pipes below the closures shall be aerated.

**§ 112.** Inlets of intakes intended for the abstraction of water for the supply to the public of water intended for human consumption and for industry, and inlets of water directed to pumps, turbines and other equipment shall be fitted with gratings designed to permit their purification.

**§ 113.** Water intake inlets shall be provided with repair closures and, where it is anticipated that the flow at the water intake inlet will need to be regulated or that the water supply to the intake will need to be shut off quickly, with main and emergency closures.

## Chapter 4

## Equipment, materials, and protection measures in hydraulic structures

**§ 114.** Hydraulic structures shall be equipped with equipment, installations and means of transport and shall provide a place for the storage of materials necessary for the normal operation of the structure and intended for use in the event of accidents and flood-prevention operations.

**§ 115.** 1. A reservoir shall be equipped with devices for the removal of floating objects, in particular those originating from the catchment area and from the reservoir basin.

2. A reservoir exposed to ice or spring blockages shall be equipped with devices to counteract or accelerate their elimination.

**§ 116.** The impounding structure shall be equipped with storage areas for spare parts of equipment or installations (warehouses, plazas).

**§ 117.** An impounding structure and associated facilities that constitute an obstacle to water tourism shall be equipped to allow the passage of boats and tourist equipment between the lower and upper stations of that structure.

**§ 118.** In the case of a hydraulic structure:

1) spaces for the installation of rescue equipment, including wheels and lifeboats, shall be provided if the water depth exceeds 1.5 m or the water flow velocity is greater than 1.5 m/s, except that this requirement does not apply to the adjustment structure;
2) a line marked in the field with buoys and warning boards shall be drawn in front of drainage devices and water intakes, the crossing of which poses a risk of abduction by the water current; for a hydraulic structure impounding water floor for up to 2 m, only warning boards may be used;
3) on drainage walls and on slopes steeper than 1:3, there shall be placed ladders or steps reaching 1.5 m below the lowest water level or bottom max. every 100 m; in canals with a water table width of up to 20 m, equipment may be placed alternately on both sides of the canal; if it is not possible to place ladders or steps, the wall or slope shall be protected against unauthorised access;

4) it shall be ensured that inlets to underground conduits - siphons, pipelines or water intakes whose upper edge is less than 5 m below the normal level of impoundment - are provided with grating or netting;
5) at the beginning of sections of non-navigable channels, where water flows at a rate of more than 1.5 m/s, provision shall be made for the fitting of gratings, nets, chains or other devices to prevent the entrainment of people, animals or vessels by the water current, the design of which makes it possible to remove any debris retained on such equipment;
6) on the cappings of sluice piers, retaining walls, and their abutments, as well as on bottom outlets and overflow structures on both the upstream and downstream sides, equipment shall be provided to protect against falls from height.

## Chapter 5

## Control and measurement equipment

**§ 119.** The hydraulic structure and its surroundings shall be equipped with control and measuring devices for checking the technical condition and security status of the structure.

**§ 120.** The hydraulic structure shall be equipped, as necessary, with control and measurement devices enabling observations and measurements to be made, in particular concerning:
1) displacements and deformations of the hydraulic structure, its substrate and adjacent land;
2) stresses in the construction of a hydraulic structure;
3) levels and pressures of groundwater and the filtration processes taking place in a hydraulic structure, its substrate and outposts;
4) conditions of the upper and lower waters and the state of the waters at the main tributaries;
5) changes to the bottom and shores;
6) ice phenomena;
7) meteorological phenomena.

**§ 121.** The type, number and location of the control and measurement devices and the accuracy of the measurements shall be determined individually for each hydraulic structure, depending on its class and the structure and type of substrate under that structure, in such a way that the results of the observations of the measurements allow the assessment of the technical condition and safety status of the structure. The range of monitored sizes shall be adapted to the design values and may be changed from the largest (research) to the minimum (warning) values.

**§ 122.** Hydraulic structures of Classes I and II shall be equipped with automatic-reading control and measuring devices which ensure the periodic checking of the correctness of indications of automated devices by means of other devices, in particular non-automatic devices, in such a way that it is possible to verify the results of observations by means of automated devices.

**§ 123.** 1. The control and measurement devices shall be positioned taking into account the behaviour of the components of the hydraulic structure under the influence of loads.

2. The control and measurement devices are placed in the hydraulic structure and in its substrate, with a density in zones of greater risk or potential occurrence of effects caused by external factors.

3. Higher risk zones include:

1) in the subsoil of a hydraulic structure - places of concentrated and significant changes in geotechnical parameters, in particular: faults, insets of rocks or soils of low strength, high compressibility, unstable structure (swelling, collapsing, subject to filtration deformation, prone to liquefaction and others), as well as geologically active areas, in particular landslide-prone areas, as well as karst areas and areas at risk of mining-induced deformations;
2) in the construction of hydraulic structures - stress concentration zones, connections between embankments and concrete elements and abutments.

4. The location of the control and measurement devices and control points shall be determined in coordinates in accordance with the applicable spatial reference system.

5. At the design stage of a hydraulic structure, on which control and measurement devices for measuring absolute displacements are provided, points of the implementation or measurement warp are designed outside the zone of the anticipated impact of this structure.

**§ 124.** At the design stage of a hydraulic structure, for measurements made with the use of control and measurement devices, the following shall be determined:

1) parameter values of the observed phenomena:
   a) falling within a range whose exceedance indicates the urgent need to analyse the causes of the exceedance and, if necessary, to take appropriate remedial action (acceptable),
   b) which, if exceeded, could give rise to a risk of failure or a construction disaster (borderline)
   - and their permissible dynamics;
2) the frequency of measurements;

3) the deadline for updating the instructions for use and operation of the structure with regard to the taking of measurements.

Part VIII

**Access, communication and premises of hydraulic structures**

**§ 125.** 1. Access roads shall constructed to the hydraulic structure.

2. Access roads to hydraulic structures shall be adapted to the type of means of transport enabling the transport of the necessary equipment and materials.

3. Access roads to lateral dams and flood barriers shall be built along these structures or along their crest, with a connection to public roads - at least every 4 km.

4. Water transport shall be provided for reservoirs and canals and, where it is not technically possible to organise water transport, access shall be provided to enable the safe operation of these structures.

**§ 126.** 1. The control-injection galleries and transport corridors have a height of at least 2.2 m and a width of at least 1.4 m. The control-injection gallery width may be reduced to 1.2 m if no bed is provided for draining water from the leaks in the control-injection gallery.

2. Dimensions of the control and injection galleries allow for the transport and operation of drilling equipment used for the cementation of the subsoil beneath the hydraulic structure.

3. Control galleries and transport aisles are 0.3 m wider than the width of the largest transported object. If provision is made for pedestrian traffic next to objects being moved or placed in these galleries and corridors, this width is increased by 1 m on one side.

**§ 127.** Transport corridors, control galleries, shafts, transport and communication ramps inside or in the subsoil of a hydraulic structure shall be equipped with at least:

1) gravitational or mechanical ventilation;

2) gravity or pump drainage with reserve pumps, which can be activated in the event of flooding of the control and injection gallery;

(3) electric lighting;

4) staircases, including safety guards, including where vertical transport is provided inside the impounding structure.

**§ 128.** Manholes, openings and depressions in a hydraulic structure shall be protected by covers or barriers.

**§ 129.** A hydraulic structure shall provide conditions for the vertical transport of equipment and devices using stairs and shafts or inclined planes, by means of trolleys and electrically powered hoists.

**§ 130.** Directional signs, signs indicating the permissible load and maximum dimensions of the objects to be transported, and traffic signs shall be placed at the site of the hydraulic structure.

**§ 131.** Water reservoirs may have harbours with a quayside or a ramp for the lifting and launching of inspection boats and operational rolling stock. If used for water transport, water bodies shall be equipped with transshipment facilities for equipment and materials.

**§ 132.** 1. Internal and external communication devices shall be installed in the permanent impounding structure.

2. Hydraulic structures of Classes I and II shall have the communication ensured by at least two independent systems. They shall be equipped with communication with measuring stations in the catchment area and with hydrological protection units in order to obtain tributary forecasts.

3. The hydraulic structures referred to in paragraphs 1 and 2 shall be equipped with devices ensuring communication with the competent services responsible for protection against flooding.

**§ 133.** In a hydraulic structure, the rooms in which the devices, including their mechanisms and installations, are located shall be equipped with:

1) gravitational or mechanical ventilation;
2) lighting;
3) marking of the escape route;
4) gravity or pumped drainage, with back-up pumps;
5) protection against negative air temperature;
6) fire-fighting equipment and devices;
7) markings indicating the permissible loads on ceilings and other elements;
8) equipment enabling the transport and lifting of such equipment, or parts thereof.

## Part IX

## Transitional provision and final provision

**§ 134.** 1. For hydraulic structures for which, prior to the date of entry into force of the Regulation:

1) a decision on environmental conditions has been issued or an application for such a decision has been submitted,
2) a decision on obtaining a water-law permit has been issued or an application for such a decision has been submitted,
3) a building permit or an investment implementation permit has been issued, or an application for such a decision has been submitted,
4) a notification of construction or execution of building works has been made, in cases where obtaining a building permit is not required;

- regulations applicable so far shall continue to apply.

2. For hydraulic structures whose construction was commenced before the date of entry into force of this Regulation and for which no building permit decision is required and no declaration of the construction or execution of the works is required, the existing provisions shall apply.

**§ 135.** The Regulation shall enter into force 14 days after its publication[4)].

**MINISTER FOR INFRASTRUCTURE**

**Acting in agreement with**
**MINISTER FOR DEVELOPMENT AND TECHNOLOGY**

Annexes to the Regulation of the Minister for Infrastructure
Of 2025
(Journal of Laws, item 000)

4) [4)] This Regulation is preceded by the Regulation of the Minister of the Environment of 20 April 2007 on the technical conditions to be met by hydraulic structures and their location (Journal of Laws, item 579), which shall cease to have effect on the date of entry into force of this Regulation, pursuant to art. 66 of the Act of 19 July 2019 on ensuring accessibility for persons with special needs (Journal of Laws of 2022, item 2240).

**Annex No 1**

# CLASSIFICATION OF MAIN HYDRAULIC STRUCTURES

| Item | Name, nature or function of the structure | Description and titre of the indicator | | Class indicator value | | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | I | II | III | IV | |
| *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
| 1 | Permanent water impounding structures and dry reservoirs, the failure of which results in a loss of reservoir capacity or may result in flooding by a wave flowing through the damaged or destroyed structure | Height of impounding H [m] | a) on a rocky ground | H>30 | 15<H ≤30 | 5<H≤15 | H≤5 | Impounding height as defined in § 4 point 16 |
| | | | (b) on a non-rocky ground | H>20 | 10<H≤20 | 5<H≤10 | H≤5 | |
| | | Container volume V [mln $m^3$] | | V>50 | 20<V≤50 | 5<V≤20 | V≤5 | Capacity at maximum impounding level |
| | | Area submerged by the wave formed at the normal level of impoundment F [$km^2$] | | F>50 | 10<F≤50 | 1<F≤10 | F≤1 | A submerged area is an area where the water depth exceeds 0.5 m. |
| | | Population in the area submerged as a result of the destruction of the building L [persons] | | L>300 | 80<L≤300 | 10<L≤80 | L≤10 | In addition to permanent residents, the population also includes the staff of factories, offices, offices, etc. and people living in collective accommodation centres (hotels, holiday homes, etc.). |
| 2 | Buildings for irrigation or drainage | Irrigated or drained area F [$km^2$] | | F>200 | 20<F≤200 | 4<F≤20 | F≤4 | – |
| 3 | Buildings to be protected against floods (excluding dry tanks) | Protected Area F[$km^2$] | | F>300 | 150<F≤300 | 10<F≤150 | F≤10 | An area which, prior to embankment, was subject to flooding by water with a probability of p = 1 % |
| 4 | Hydro-electric power plants and impounding structures belonging to thermal and nuclear power plants | Power of the power plant P [MW] | | P>150 | 50<P≤150 | 5<P≤50 | P≤5 | – |
| 5 | Structures facilitating navigation | Waterway class | | – | V–IV | III–II | I | – |
| 6 | Buildings intended for the supply of water to cities and settlements and industrial plants | Use of water | | Buildings are classified as Class I or II | | | | Individual analysis of the validity of the water user |

Explanatory notes:

1) the class of the secondary structure shall be taken one step lower than the class of the main structure finally determined;
2) if the main structure is classified in class IV, the secondary structure shall also be classified in that class;
3) a temporary hydraulic structure shall only be included in a particular class if its failure is likely to have catastrophic consequences for the agglomeration and the construction site of the main structures of Classes I or II under construction;
4) a temporary hydraulic structure in the case referred to in point 3 shall be classified in a class no higher than class III;
5) the hydraulic structure is classified in the highest class of the classes determined on the basis of individual indicators;
6) a hydraulic structure with an intermittent water impoundment, intended for flood protection purposes, shall be classified only according to the function of the structure as specified in the table in lp. 3;

7) hydraulic structure as defined in the table in lp. 3 may not be classified in a class lower than class I if its destruction may have catastrophic consequences for agglomerations and monuments as well as industrial plants of fundamental importance for the economy; the established class III or IV of a hydraulic structure shall be raised by one degree of importance if its destruction may endanger inhabited areas, areas of intensive farming or the safety of critical infrastructure.

**Annex 2**

# CONSEQUENCE OF FAILURE FACTOR ($\gamma_n$) OF A HYDRAULIC STRUCTURE (EXCLUDING SLOPES AND EMBANKMENTS)

| For class 1: | The consequence of failure factor ($y_n$) of a hydraulic structure | | | |
|---|---|---|---|---|
| | I | II | III | IV |
| Basic load pattern | 1,20 | 1,15 | 1,10 | 1,05 |
| Exceptional load arrangement | 1,15 | 1,10 | 1,05 | 1,00 |

**Annex 3**

# PROBABILITY OF OCCURRENCE OF REFERENCE AND CONTROL FLOWS FOR A PERMANENT HYDAULIC STRUCTURE

.

| Item | Type of structure | Flow | Probability of occurrence (p) % for the class | | | |
|---|---|---|---|---|---|---|
| | | | I | II | III | IV |
| 1 | Structures founded on readily erasable ground made up of non-rocky soils, rock rubble or soft rocks, and all earth structures, but excluding flood embankments | reference | 0,1 | 0,3 | 0,5 | 1,0 |
| | | control | 0,02 | 0,05 | 0,2 | 0,5 |
| 2 | Other structures, including flood embankments | representative | 0,5 | 1,0 | 2,0 | 3,0 |
| | | control | 0,1 | 0,3 | 0,5 | 1,0 |

Explanatory notes:

1) for embankments protecting only grassland and classified as Class IV according to Annex 1 to the Regulation, reference water with a probability of occurrence of p = 10 % and a control water with a probability of occurrence of p = 5 % shall be accepted as the gauge water;

2) the determination of the reference flow and the control flow is made by taking the probability of occurrence of these flows for permanent impounding structures, depending on the class of structure;

3) the calculation of the control flow for rivers and streams in mountainous and sub-mountainous areas is carried out by adding to the control flow the average error estimate of this value$\delta$, at $t_a = 1$ and a confidence level of 0.84; for the dimensioning of a hydraulic structure, the control flow is taken to be $(1 + \delta) Q_k$.

**Annex 4**

# PROBABILITY OF OCCURRENCE OF MAXIMUM CONSTRUCTION FLOWS FOR A TEMPORARY HYDRAULIC STRUCTURE

.

| Item | Type of structure | Probability of occurrence (p) % |
|---|---|---|
| 1 | Earth dykes | 5 |
| 2 | Dykes not subject to failure in the event of overtopping | 10 |

**Annex 5**

## SAFE CREST ELEVATION OF PERMANENT HYDRAULIC STRUCTURES

| Type of structure | Conditions of operation | Safe elevation of the crest for an impounding structure for classes I to IV [m] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | above static water level | | | | above wave-induced level | | | |
| | | I | II | III | IV | I | II | III | IV |
| Earth dams and embankments | maximum level of water impoundment | 2,0 | 1,5 | 1,0 | 0,7 | 0,7 | 0,5 | 0,5 | 0,5 |
| | representative flow flood | 1,3 | 1,0 | 0,7 | 0,5 | 0,5 | 0,3 | 0,3 | 0,3 |
| | exceptional operating conditions of | 0,3 | 0,3 | 0,3 | 0,3 | wave action shall not be taken into account | | | |
| Concrete and other structures | maximum level of water impoundment | 1,5 | 1,0 | 0,7 | 0,5 | 0,5 | 0,4 | 0,4 | 0,4 |
| | representative flow flood | 1,0 | 0,7 | 0,5 | 0,5 | 0,3 | 0,3 | 0,3 | 0,3 |
| | exceptional operating conditions of | 0,1 | 0,1 | 0,1 | 0,1 | wave action shall not be taken into account | | | |

**Annex No. 6**

# SECURE ELEVATION OF THE TOP EDGE OF THE SEALING ELEMENTS IN AN EARTH HYDRAULIC STRUCTURE

| Type of sealing | Minimum Elevation of the Upper Edge of Sealing Elements of Earth Structures above: | | |
|---|---|---|---|
| | maximum water level for the structure class [m] | | water table at the reference flow [m] |
| | I | II, III i IV | all classes |
| in the embankment | 0,7 | 0,5 | 0,3 |
| internal | 0,5 | 0,5 | 0,5 |

Explanatory notes:

For flood embankments, the upper edge of the seals shall not be lower than the water level at the control flow.

**Annex No. 7**

# NUMBER OF SPILLWAYS, GALLERIES, LEVERS AND TURBINES NOT TAKEN INTO ACCOUNT WHEN DETERMINING THE CONDITIONS FOR PASSAGE OF THE REFERENCE FLOW

| Item | Total number of installed devices | | Number of spillways, galleries, levers, and turbines not included in the calculations |
|---|---|---|---|
| | spillways, galleries, levers | Turbines of hydroelectric power plants | |
| 1 | 1–3 | 1–5 | 1 |
| 2 | 4–6 | 6–10 | 2 |
| 3 | 7–9 | 11–15 | 3 |