MINISTRY OF REGIONAL DEVELOPMENT AND PUBLIC WORKS

Draft

REGULATION NO ……
FOR IMPLEMENTATION, CONTROL AND ACCEPTANCE OF CONCRETE AND REINFORCED CONCRETE STRUCTURES

Chapter One

GENERAL PROVISIONS

Article 1. (1) This Regulation sets out the technical requirements for the implementation, control and acceptance of concrete and reinforced concrete structures of buildings and construction works, executed on the construction site or from pre-cast concrete and reinforced concrete products, components and structures.

(2) The requirements of the Regulation shall apply to the execution of all constructions, designed based on the category of construction and the system applied for the design of building structures, pursuant to Regulation No. RD-02-20-19 of 2011 on the design of building structures by applying the for the design of building structures by applying the European structural design system (SG issue No. 2 of 2012).

(3) The Regulation requirements shall apply to the execution of new constructions, as well as to reconstruction, major renovation, overhaul or reconstruction of existing buildings and facilities.

(4) In the execution of sprayed concrete, underwater concrete constructional work, concrete and reinforced concrete structures for tunnels, bridges, culverts, pavements, geo-technical elements and facilities, high free-standing chimneys, cooling and television towers, masts and other specific structures and facilities, in addition to the requirements of this Regulation, the technical requirements of the relevant specialised regulations shall also be complied with.

Article 2. (1) The execution and acceptance of concrete and reinforced concrete structures of buildings and construction facilities shall be carried out in accordance with an approved investment project according to the Spatial Planning Act (SPA) and its implementing regulations, on the basis of which a building permit has been issued.

(2) The Regulation shall be applied simultaneously with the normative acts and the technical specifications defining the technical rules and norms for ensuring the basic requirements for construction works under Article 169 of the SPA, the requirements for health and safety at work, as well as other requirements related to the safety of construction works.

(3) In the execution of concrete and reinforced concrete structures, construction products shall be usedin accordance with the requirements of Regulation No. RD-02-20-1 of 2015 on the conditions and procedure for the use of construction products in the construction structures of the Republic of Bulgaria (SG issue No. 14 of 2015) (Regulation No. RD-02-20-1 of 2015).

(4) The assessment of construction products, including factory made reinforced concrete structures, shall be certified by the documents required under Article 4 of Regulation No. RD-02-20-1 of 2015.

Article 3. (1) Construction and technological solutions related to the execution of concrete and reinforced concrete structures shall be defined in the investment project and in accordance with BDS EN 13670 “Execution of concrete structures” and the National Annex thereto.

(2) In case of a need to supplement the approved investment project with specific and/or additional construction and technological solutions (technologies) and technical implementing instructions for the construction and installation works (CIW) that support and ensure the implementation of the design solutions, the contracting authority may commission the development of an execution specification.

(3) The specification referred to in paragraph 2 shall be developed in accordance with the approved investment project, with BDS EN 13670 and the National Annex thereto and shall be agreed by the design engineer on part "Structural" in case its development is entrusted to another technically qualified person under Article 229 of the SPA with a professional qualification “civil engineer”.

Article 4. (1) The execution specification shall be drawn up on the basis of terms of reference (TOR) from the contracting authority, which shall define its scope and content.

(2) The execution specification may be produced by the design engineer under the "Structural" part of the construction documents or by technically competent persons with professional qualification “civil engineer”.

(3) Where attached to the investment project, or to the execution specification a Quality plan and/or a Control plan is required, and these do not form part of them, they may be drawn up by persons designated by the builder or the contracting authority who possess technical competency.

Article 5. (1) The construction and installation works performed during the execution of concrete and reinforced concrete structures shall be documented by the acts and protocols specified

with Regulation No. 3 of 2003 for drawing up acts and protocols during construction (SG issue No. 72 of 2003) (Regulation No. 3 of 2003) and the in the logbooks as provided for in this Regulation.

(2) The acts and protocols shall be drawn up by the participants in the construction works, in accordance with Article 160 of the SPA and in accordance with Regulation No. 3 of 2003.

(3) The logbooks referred to in paragraph 1 shall be kept by the technically qualified persons who perform the technical management of the construction works, and shall be maintained by the technically competent persons appointed by the builder under an employment contract, or by the technical director provided by the contracting authority, in the cases referred to in Article 163a(5) SPA.

Article 6. In the process of execution of the concrete and reinforced concrete structures, health and safety working conditions shall be ensured in accordance with the Health and Safety at Work Act (HSWA), Regulation No. 2 of 2004 on the minimum requirements for health and safety at work during construction and installation works (SG issue No. 37 of 2004), Regulation No. 7 of 1999 on the minimum requirements for health and safety working conditions at workplaces and in the use of work equipment (SG issue No. 88 of 1999), as well as the applicable regulations issued on the basis of HSWA.

Chapter Two.

REQUIREMENTS FOR THE EXECUTION OF CONCRETE AND REINFORCED CONCRETE STRUCTURES (MONOLITHIC CONSTRUCTION)

Section I

General requirements

Article 7. (1) The execution (installation) of concrete and reinforced concrete structures shall be performed by builders who meet the requirements of the Bulgarian Construction Chamber Act (BCBA) and are enrolled in the Central Occupational Register of Builders for the respective group and category of construction.

(2) Builders who are not enrolled in the register referred to in paragraph 1 may perform constructions of low-rise residential and villa buildings and construction works under Article 137(1) (5)(c) and (d) of the SPA with floor area of up to 100 sq.m.

Article 8. The execution of concrete works (laying, sealing, processing of concrete mix, grouting of joints, etc.) at an air temperature of less than 5°C and higher than 30 °C shall be allowed only if prescribed by the design engineer. The provisions apply to classes of concrete, the technology of concrete works and the maintenance of concrete at an early stage.

Article 9. (1) The main axial and level benchmarks of the construction site shall be handed over with a protocol for the opening of the construction site and determination of the construction line and level in accordance with Annexes NoNo 2 and 2a to Regulation No. 3 of 2003.

(2) The benchmarks shall be positioned in such a way that they remain visible during the execution of the construction works and shall be prevented from damage.

Article 10. The execution of concrete works, shuttering and form-work for road facilities shall be carried out in accordance with the requirements of the standards BDS EN 13670; BDS EN 1992-2 and the applicable specialised regulations and technical requirements.

Section II

Support scaffolding and form-work

Article 11. (1) The support scaffolding and the form-work shall be constructed in accordance with the project in such a way as to ensure that any intended impact to which they are subjected during the execution of the works will be absorbed without danger to workers or accident to the structures. They shall also ensure that the current loads are transmitted to the ground base or to already completed load-bearing structures.

(2) The support scaffolding and the form-work must have the necessary load-bearing capacity and shall be constructed in such a way that the tolerances specified for the reinforced concrete structure and its components shall not be exceeded.

(3) The form, function, appearance and durability of permanent structures shall not be affected or impaired by the execution of the support scaffolding, the form-work and the re-supporting of reinforced concrete slabs and elements, or by their removal.

(4) The support scaffolding and form-work shall not impede the elastic deformations of the concrete during post-stressing.

Article 12. The support scaffolding shall meet the requirements of Regulation No. RD-02-20-3 of 2020 on technical requirements for the design, installation, control, acceptance and operation of scaffolding (SG issue No. 105 of 2020) (Regulation No. RD-02-20-3 of 2020).

Article 13. In cases where the support scaffolding is designated as Class A and a project is not developed pursuant to Regulation No. RD-02-20-3 of 2020, the scaffolding shall be accompanied at least by the following documents:

1. installation instructions, including design parameters and accepted class, method of installation and dismantling of temporary structures, including reinforcement;

2. requirements for assembly, adjustment, permissible deformations, loading, wedge removal, dismantling and disassembly;

3. requirements for maintaining a portion of the completed concrete or reinforced concrete structure until additional portions or supporting structures are completed.

Article 14. (1) The requirements for installation of the form-work, the methods and sequence for supporting, installation and dismantling, instructions for adjustment, connection, permissible sagging, loading, etc. shall be determined by the investment project.

(2) The form-work and the connections between the individual elements and components must be sufficiently dense to minimise the loss of cement paste from the concrete mix.

(3) Where ready-made form-work systems are used, the manufacturer's requirements shall also be followed.

(4) Form-work where a significant amount of water may be absorbed by the concrete or evaporate unhindered, must be appropriately treated to reduce the loss of water from the concrete, unless it is specifically designed for this purpose.

(5) The inner surface of the form-work must be clean. Where the investment project provides for the form-work to form visible external concrete surfaces, its surface shall be treated in such a way as to obtain the required appearance.

Article 15. (1) Temporary reinforcements that ensure the load-bearing capacity of the form-work, bars, pipes and the like remaining within concrete, as well as the parts embedded in the concrete, should:

1. be securely fastened so as to maintain their design position during concrete placement;

2. be protected by an appropriate anti-corrosion coating;

3. have sufficient strength and rigidity to maintain their shape during concrete placement;

4. be covered with the specified concrete coating, unless their surface has been treated;

5. have no unacceptable impact on the concrete and reinforced concrete structure;

6. have no harmful reaction with concrete and reinforcement;

7. not cause defects on the required outer surface appearance;

8. not reduce the performance and durability of the structural element;

9. not interfere with the intended method of laying and compacting the concrete mix.

(2) Grooves and openings used for temporary construction and assembly works shall be filled and finished with products having the same characteristics as the construction element in which the temporary openings are left.

Article 16. (1) Form-work lubricants (emulsions) shall be selected and applied so as not to have a detrimental effect on the concrete, reinforcement, pre-stressed reinforcement or form-work and not to damage the permanent structure.

(2) Form-work lubricants shall not have an unintended influence on the colour and quality of

the surface of the permanent structure or on the subsequent coatings and layers intended for application, if such are provided for in the investment projects.

Article 17. (1) The support scaffolding, additional supporting elements and the form-work should not be dismantled until the design strength of the concrete has been reached so as:

1. to avoid damage to surfaces that may occur when the form-work is removed;

2. to avoid damage from climatic influences;

3. to bear the load to which the reinforced concrete element is subjected at this stage;

4. to avoid sags/displacements exceeding the permissible tolerances.

(2) The form-work removal shall be carried out in such a way that the permanent concrete or reinforced concrete structure is not affected by impact, overload or damage.

(3) The dismantling, unloading and storage of the support scaffolding elements shall be carried out in such a sequence that its remaining elements and the entire concrete or reinforced concrete structure are not overloaded.

(4) The sequence of dismantling when using additional supporting elements of the structure shall be carried out in accordance with the investment project.

Article 18. (1) In order to determine the time for dismantling the load-bearing scaffolding, the form-work and/or the additional supporting elements, calculations may have been carried out in the "Structural" part of the investment project.

(2) When using form-work systems for early de-shuttering, calculations shall be carried out to prove the load-bearing capacity of the completed structure, which shall be presented under the "Structural" part in the investment project.

Article 19. (1) The form-work from the completed concrete and reinforced concrete structures shall be removed upon reaching the conditions and in the manner prescribed in the investment project and/or the design of the support scaffolding.

(2) Removal of the form-work from concrete and reinforced concrete structures shall not be permitted where the in-situ concrete strength is less than 5 MPa.

(3) For the removal of form-work and/or the dismantling of support scaffolding and/or additional supporting elements for class A support scaffolding, it is necessary to use:

1. additional supporting elements or other support to absorb the impacts on the concrete or reinforced concrete element at this stage;

2. weather protection to prevent surface damage until the concrete reaches its design strength.

Article 20. (1) Where no other specific requirements are provided for in the investment project, the following minimum time limits for the removal of form-work shall be observed:

1. for vertical form-work of beams, columns and walls – minimum ageing period of the

concrete:

(a) 48 hours, provided that the surface temperature of the concrete is equal to or greater than 5ºC, but with an in-situ concrete strength of not less than 5 MPa;

(b) 24 hours, provided that the surface temperature of the concrete is equal to or greater than 15ºC, but with an in-situ concrete strength of not less than 5 MPa;

(c) 16 hours, provided that the surface temperature of the concrete is equal to or greater than 20ºC, but with an in-situ concrete strength of not less than 5 MPa;

2. for form-work of slabs and beams – the minimum concrete ageing period for Ageing class 4, corresponding to a concrete strength equal to 70% of the required characteristic strength, under the conditions set out in Annex 1, Table 3.

(2) Where no assessment has been carried out of the strength development and characteristics of the concrete, or the concrete strength increment information has not been obtained from the concrete manufacturer, the form-work for slabs and beams shall be dismantled under the conditions relating to the slow strength development of concrete as stated in Annex No. 1, Table 3.

(3) Assessments of the strength development and the performance of concrete shall be based on the methods set out in Article 82(1).

Section III

Reinforcement and welding works carried out on the construction site

Article 21. (1) Steel products for reinforcement of reinforced concrete structures should be in compliance with the requirements specified in the “Structural” part of the project. The characteristics of steel reinforcement products should be in compliance with the specified national requirements for the incorporation of steel reinforcement products into reinforced concrete structures, and with Annex C of BDS EN 1992-1-1 and BDS EN 1992-1-1/NA.

(2) The requirements specified in BDS EN 13670 and in the national Annex thereto shall be complied with when carrying out the reinforcement work.

(3) Anchoring and splicing devices shall be used in accordance with the prescriptions of the investment project.

Article 22. (1) Prefabricated welded steel meshes and reinforcing steel scaffolds shall be accompanied by documents drawn up in accordance with Regulation No. RD-02-20-1 of 2015 as follows: declarations, instructions and safety information.

(2) The contractor supplying the welded meshes and reinforcing steel scaffolds prepared on the site shall draw up a declaration of compliance with the requirements of the investment project for the specific construction, in accordance with the requirements of Article 4(4) of Regulation No. RD-

02-20-1 of 2015.

Article 23. (1) The reinforcement surface shall be free from rust or deleterious contamination which would adversely affect the steel, the concrete or the adhesion between them. The condition of the reinforcement surface shall be inspected before installation; light rust on the surface shall be permitted.

(2) Application of concrete on reinforcement steel scaffolds covered with ice or snow is not allowed.

(3) The reinforcement shall be installed in the form-work forms without any damages.

(4) Where galvanised reinforcement is used, the zinc coating must be performed in such a way as to avoid chemical reactions with the cement, or the concrete shall be prepared with a cement that does not adversely affect the bond with the galvanized reinforcement.

(5) The posts and the fixing elements shall allow for achieving the required concrete coating of the reinforcement, taking into consideration the loads during installation of the reinforcement, the laying and compaction of the concrete mixture.

Article 24. (1) Products other than steel, such as composite carbon, glass or aramid fibres or rods, may be used to reinforce the structures of buildings and construction facilities where provided for in the “Structural” part of the design project. The characteristics of the input products should correspond to those specified in the design project. The conformity of the input products with the requirements of the design project shall be demonstrated by a declaration drawn up in accordance with the requirements of Article 4 of Regulation No. RD-02-20-1 of 2015.

(2) The execution of the structural elements with the reinforcement referred to in paragraph 1 shall be carried out in accordance with the conditions and requirements specified in the design project under the “Structural” part.

Article 25. (1) The cutting and bending of the reinforcement steel shall be carried out subject to measures taken to prevent mechanical damage, weld seam breakage and section reduction from corrosion.

(2) Bending of steel at temperatures below minus 5^{o}C, shall be permitted only if it is specified in the design project.

Article 26. (1) Prefabricated steel reinforcement products (made in a factory or a yard/workshop for the manufacture of reinforcement products) must not be damaged during transportation, storage, splicing and incorporation in the structure and must be kept clean of soil.

(2) Straightening of already bent bars shall be allowed only if provided for in the investment project and in accordance with the instructions given in BDS EN 13670.

Article 27. Reinforcement steel delivered to the site and stored in coils may be used for the preparation of steel reinforcement products if suitable straightening equipment is in place and the specified national requirements for the incorporation of steel reinforcement products in reinforced concrete structures are achieved, as follows:

1. for the straightened brazed weldable reinforcing steel stored in coils, as well as for welded reinforcing steel meshes and scaffolds, in accordance with the requirements of BDS 9252, BDS 4758 and BDS 10080;

2. for straight and bent bars with gauge lengths and brackets, in accordance with the requirements of BDS EN 13670/NA and BDS EN 1992-1-1, for mechanical joints of steel reinforcement products, the requirements of BDS ISO 15835-1 shall be complied with.

Article 28. The dimensions of the reinforcement bending mandrels shall be nationally determined parameters and their values shall be in compliance with BDS EN 13670.

Article 29. Welding of reinforcement steel on site is permissible if the product is classified as suitable for welding in accordance with national requirements.

Article 30. (1) Connections executed by welding for structures designed according to the European Construction Structure Design System (Eurocode), shall be implemented in accordance with the applicable standards, unless otherwise specified in the investment project.

(2) Connections executed by welding for structures designed in accordance with the Standards for Design of Concrete and Reinforced Concrete Structures shall be performed in accordance with the requirements given therein.

(3) The welding electrodes shall be in accordance with BDS EN ISO 2560 “Welding consumables - Covered electrodes for manual metal arc welding of non-alloy and fine grain steels - Classification (ISO 2560:2020).”

Article 31. The face surfaces of the parts of sheet and profile steel embedded in concrete shall be flat. The deviation from the flatness of the face surfaces shall not be greater than 3 mm where the length of the flat component is up to 250 mm and not greater than 5 mm where the length of the flat component is greater.

Article 32. (1) In the case of assembly welding, the straightening of curved ends or curvature to the alignment of the welded bars shall be allowed, as the deviations shall be at an angle not greater than 6°.

(2) No bar ends shall be bent or straightened by striking them.

(3) The works referred to in paragraph 2 shall be carried out after pre-heating to a temperature of 600-800 °C, after taking measures to protect the concrete from overheating and cracking.

Article 33. Use of welded joints with visible cracks shall not be permitted. The weld metal of fusion-welded joints may not have surface pores, slag contamination or other incomplete or uneven lay-ups above the permissible limits. The weld metal shall be cleaned from the slag crust. Reinforcing bars shall not be undercut at the edges of the welding seams.

Article 34. The design position of the reinforcement in the form-work shall be secured against displacement and checked and accepted before laying the concrete.

Article 35. The concrete coating of the reinforcement shall be executed in accordance with the requirements prescribed in the investment project under the “Structural” part. The tolerances of the concrete coating shall be in accordance with Annex 2 and Annex 3.

Article 36. (1) For the execution of the welding works, a logbook shall be kept in accordance with the template set out in Annex 4.

(2) The welding of the reinforcement and of the parts embedded in concrete shall be carried out by authorised welders certified in accordance with the requirements of clause 9 of BDS EN 17660-1 “Welding - Welding of reinforcing steel - Part 1: Load-bearing welded joints (ISO 17660-1:2006)”.

(3) Staff responsible for the welding coordination (welding supervision) shall be qualified in accordance with BDS EN ISO 14731 “Welding coordination - Tasks and responsibilities (ISO 14731:2019)”.

Article 37. (1) The welded joints of reinforcement steels shall conform to the prescriptions of the investment project.

(2) The deviations from the dimensions and locations of the components of the welded joints and of the components embedded in concrete from the ones specified in the design shall not exceed those under Annex No. 2 and Annex No. 3.

Article 38. Where tolerances for the installation of reinforcement are not prescribed in the design, the values specified in Annex No. 2 and Annex No. 3 shall be observed.

Article 39. (1) The reinforcement shall be laid in accordance with the approved reinforcement plans included under the “Structural” part of the project.

(2) The connection of the reinforcement shall be carried out by wire binding or by welding. Where not otherwise specified, bars spliced by overlapping should be laid in contact with each other.

Section IV

Pre-stressing

Article 40. (1) When performing the pre-stressing, the requirements of BDS EN 13670 shall be complied with.

(2) Steel products intended for pre-stressing shall comply with the design requirements, the requirements of the applicable standards and the national requirements for pre-stressing steel products.

Article 41. The characteristics of construction products, including channel-forming tubes of material other than steel, anchoring components of the pre-stressing system, grease or lubricant for filling channels and anchoring devices for pre-stressing, etc., which are not covered by European Harmonised Standards or European Technical Assessments shall be in accordance with those provided for in the investment project and with the national requirements for incorporation in construction works, where such are specified for them.

Article 42. (1) Valid calibration protocols must be in place for the devices measuring the tensile strain prior to commencing the straining on site.

(2) The tensioning reinforcement, the elements of the anchoring devices to be embedded in concrete and the channel-forming pipes shall be secured against displacement until the concrete is laid down and compacted.

Article 43. The tensioning reinforcement shall be protected against:

1. the action of an aggressive medium (chemical, electrochemical or biological) which may cause corrosion, as well as against damage to the bundles; Contamination which affects the durability or adhesion to the concrete;

2. deformation of the tensioning reinforcement, not foreseen in the design project;

3. rain, snow or contact with the ground during storage without appropriate protection measures;

4. use of water transport without proper packaging;

5. splashing when welding in the vicinity is executed with no precautions provided.

Article 44. Construction products/materials susceptible to corrosion (e.g. pre-tensioning steel, channel-forming tubes, anchoring and splicing devices, pre-fabricated and on-site prepared tensioning components) must be protected from harmful influences during transportation and storage and also during installation into the structure prior to their permanent protection. Construction products/materials which have corroded to an extent that may affect adversely their performance shall be replaced with compliant to the requirements ones.

Article 45. The pre-stressing reinforcement shall be assembled, laid and reinforced in accordance with the “Structural” part of the investment project. The pre-stressing reinforcement must follow a smooth line without sagging or breakage and shall be within the tolerances specified in Annex No. 2 and Annex No. 3.

Article 46. The following shall not be allowed:

1. welding of pre-stressed steel or anchoring devices;

2. cutting or welding steel with oxygen in the vicinity of pre-stressed steel, except under the conditions specified in the investment project;

3. welding of reinforcement in local anchoring zones, welding of anchor plates and spot welding of perforated plates, except under the conditions specified in the investment project.

Article 47. Ropes shall not be twisted or intertwined during assembly and installation.

Article 48. (1) The materials for grouts shall be protected from water and moisture during delivery and storage on site and shall be used within the specified shelf life.

(2) Channel-forming tubes shall be free of local damage and internal corrosion, watertight, and resistant to aggressive environments and to mechanical impacts.

(3) All connections of ductwork pipes, anchoring and splicing devices must be sealed against water penetration.

Article 49. Anchoring devices, tensioning equipment (presses and pumping units) and tensioning systems tested in accordance with the technical specifications shall be used in the construction.

Article 50. The tensioning works shall be carried out according to a pre-prepared programme, by a specialised unit with the appropriate qualifications and under the supervision of a person with a professional qualification as a structural engineer.

Article 51. The tensioned equipment used shall be calibrated by an accredited laboratory. Prior to the commencement of tensioning works, the order of tensioning of the bundles shall be determined and the actual frictional losses of the bundles in the duct walls shall be measured.

Article 52. (1) The following measurements shall be taken for the reinforcement stress: tensioning force, bundle elongation and slipping of the wedges in the anchors.

(2) The person referred to in Article 50 shall document the strength of the concrete at the time of tensioning, the deviations of the measured values from the design values, and the time of formwork removal from the structure.

Article 53. The permissible deviations from the controllable tensioning forces and from the controllable bundle extensions shall be in accordance with Annex No. 2 and Annex No. 3.

Article 54. Up to 20 per cent of the bundles in the structure may have broken or incompletely tensioned wires or ropes, but not more than 5 per cent of the number of wires or ropes in one bundle.

Article 55. (1) The permissible deviations in the installation of the tensioning reinforcement specified in the investment project shall not exceed the values specified in Annex No. 2 and Annex No. 3.

(2) Where the tolerances for the installation of the tensioning reinforcement are not specified in the investment project, the values specified in Annex No. 2 and Annex No. 3 shall be complied with.

Article 56. The straining must be in accordance with the previously prepared and approved programme under Article 50 and the written instructions provided for the execution of the straining. The execution of the tensioning and injection works shall be documented in logbooks following the template given in Annex No. 5 and Annex No. 6.

Article 57. The following requirements shall be observed when pre-stressing before laying the concrete:

1. the actual elongation of the pre-stressed bundle in an individual cross-section of the structure shall be within (±) 3% of the calculated elongation or the single pre-stressed reinforcement shall be within (±) 5% of the calculated elongation; where the required reinforcement strain is not within the specified limits, corrective actions shall be taken in accordance with the project prescriptions;

2. the edges of the pre-stressed reinforcement shall be protected against corrosion during service;

3. the anchoring at the jacks, as well as anchoring at the edges of the bench, shall be in accordance with the drawings;

4. the application and/or transmission of pre-stressing to the structure shall only be permitted where the concrete strength is equal to or greater than the minimum compressive strength required in the investment project.

Article 58. The following requirements shall be observed when pre-stressing after laying the concrete:

1. all parts of the post-tensioning system shall be compatible, i.e. they shall form part of the same tensioning system;

2. the actual elongation of the pre-stressed bundle in an individual cross-section of the structure must be within + 5% of the calculated elongation or the single pre-stressed reinforcement must be within + 15% of the calculated elongation; where the required reinforcement strain is not within the specified limits, corrective actions shall be taken in accordance with the project prescriptions;

3. shearing, in case of deviation from the planned performance during tensioning, of the ends of the tensioning reinforcement or injection of grout shall not be allowed; the process may continue after the approval of the report on the revised tensioning by the person exercising construction supervision;

4. post-tensioned reinforcement with adhesion to the concrete shall be provided with vents, marked for rope identification, in the channel-forming tubes at both ends and at the points; vents or ventilation apertures may also be required at intermediate points where water or air may collect;

5. The channel-forming pipes and vents referred to in paragraph 4 shall not change position when the concrete is placed and compacted;

6. internal and external tensioning reinforcement without adhesion to the concrete shall be protected from moisture penetration throughout its entire length;

7. the steel strip channel-forming pipes shall comply with BDS EN 523 “Steel strip sheaths for prestressing tendons - Terminology, requirements, quality control”;

8. the tensioning supports shall not have a detrimental effect on the steel or concrete, shall be sufficiently rigid to ensure that the tensioning components are securely anchored in their design position during concrete placement, and shall not damage the channel-forming tubes;

9. the spacing of the tensioning supports shall ensure that the channel-forming pipes are in line with their design position and level.

Article 59. The preparation and implementation of measures for the protection of pre-stressed reinforcement, including against corrosion, frost and mechanical damage, shall be carried out on the basis of written instructions or implementation guidelines in accordance with the investment project.

Article 60. The cement-based grout for the filling of channels and anchoring devices shall comply with BDS EN 446 “Grout for prestressing tendons - Grouting procedures” and BDS EN 447 “Grout for prestressing tendons - Basic requirements”. The grout injection devices shall be in compliance with BDS EN 446.

Article 61. (1) The injection of channels for post-tensioned reinforcement with adhesion to concrete shall comply with BDS EN 446.

(2) Where permanent protection measures cannot be applied after installation or after tensioning of the reinforcement, temporary protection measures shall be taken in accordance with BDS EN 446.

(3) When temporary precautions are implemented for the reinforcement, they shall not damage the prestressing steel and/or the grout for injection and/or the concrete. Any reduction in adhesion due to the temporary precautions shall be certified for compliance with the design of the structure.

Article 62. For protection with grout for injection of internal and external tensioning reinforcement without adhesion to concrete, the grout and grouting technique must be in compliance with BDS EN 446.

Article 63. In the case of tensioning without adhesion of the reinforcement, the channel-forming pipes and the anchoring devices of the tensioning reinforcement shall be filled in a specified manner with anti-corrosion grease or with lubricants which shall comply with the following requirements:

1. injection with grease or lubricant shall be performed at a continuous and constant speed;

2. the volume injected shall be comparable to the theoretical free volume in the channel, taking into account the variation of the volume depending on the temperature;

3. upon completion of the injection, any unforeseen loss of grease or lubricant from the channels shall be prevented by sealing them under pressure;

4. materials, connections and equipment shall be compatible within the temperature limits required for injection of grease or lubricant; special handling precautions shall apply at elevated temperatures.

Article 64. (1) Anchoring points and nozzles shall be protected in the same manner as the tensioning reinforcement.

(2) Anchorage devices shall be sealed after greasing to provide anti-corrosion protection equivalent to the protection along the length of the pre-stressed reinforcement (e.g., sufficient thickness of dense, low-permeability concrete or backfill, or a combination of measures).

(3) Anchorage areas must be protected from drainage water.

(4) All vents and injection inlets and outlets must be sealed and protected.

Article 65. The results of the controls and compliance with the requirements shall be documented in logbooks following the template given in Annex No. 5 and Annex No. 6.

Section V

Concrete works

Article 66. (1) The production of concrete mixtures must meet the requirements of BDS EN 206 “Concrete - Specification, performance, production and conformity” and the national Annex thereto.

(2) The transport and laying of the concrete mix shall be carried out by technical means which allow the characteristics of the mix obtained during production to be preserved.-

(3) The investment project under the “Structural” part shall determine the requirements for the specification of the concrete in accordance with BDS EN 206, the national Annex thereto and other applicable standards in force relating to the particular method of execution of the concrete works on the construction site.

Article 67. (1) The composition of the concrete mix shall not be allowed to be altered after the main mixing process and after leaving the mixer.

(2) The addition of various constituents to the concrete (chemical admixtures, pigments, fibres, etc.) on the site in order to influence the bonding time of the cement, the consistency of the concrete mix, or other properties of the mix, is possible where and as provided for in the investment project or with the approval of the design engineer.

Article 68. (1) Prior to laying the concrete, the working joints, including the concrete section and reinforcement, shall be cleaned of dust, cement milk/paste and wetted to a damp condition. To provide a better bond between new and existing concrete, the working joints may be additionally treated with cement or cement-polymer based compounds.

(2) Where concrete is laid directly on a ground base, the concrete mixture shall be protected from mixing with the base and from water loss by the placement of a separation layer. The specific solutions and materials (polyethylene film, geotextile, etc.) shall be specified in the investment project under the “Structural” part.

(3) The form-work shall be cleared of litter, debris, ice, snow and retained water.

Article 69. (1) Measures to protect and preserve the site concrete from harmful climatic influences shall be undertaken and implemented by the builder, as prescribed by the design engineer under the “Structural” part, when:

1. There is a risk, during laying of concrete, for washout of cement milk/paste and minor aggregates from the concrete mix by rain or other running water;

2. The ambient temperature is lower than 5^{o}C or is expected to be less than 5^{o}C during the laying and ageing of the concrete;

3. The ambient temperature is higher than 30^{o}C or is expected to be higher than 30^{o}C during bonding and ageing.

(2) During the laying of concrete, the temperature of the working joints should be above 0^{o}C.

(3) The specific measures shall be implemented and documented into the order book of the construction site.

Article 70. (1) The control of the acceptance of the concrete mix shall be performed by the technical director of the construction and shall be documented by signing the dispatch note.

(2) The acceptance control of self-compacting concrete shall include testing of its viscosity characteristics, flow ability and/or resistance to layering during sieving, whichever and as specified in the investment project.

Article 71. No changes to the concrete mix, such as layering, water separation, loss of

cement paste, etc., shall be allowed during its loading, transportation, placement and compaction.

Article 72. The structures shall be concreted, preserving the design position of the form-work, reinforcement, tension elements, channel formers and anchoring devices.

Article 73. (1) The concrete mix shall be laid and compacted so as to provide the prescribed design concrete coating prescribed in the design documents.

(2) The speed, method of placing and compacting concrete shall be such as to ensure a continuous concrete placement process and to avoid the formation of working joints, except where such joints are provided, and to prevent unacceptable deformation and/or displacement of the form-work and supporting scaffolding.

(3) During laying and compacting, the concrete mix shall be protected from the adverse effects of solar radiation, wind, frost, water, rain, and snow.

Article 74. (1) The compaction of the laid concrete mix shall be carried out in accordance with the design engineer's prescriptions. It is not allowed to unlayer the concrete as a result of its vibration.

(2) When compacting the concrete mix with internal vibrators, the thickness of the placed layer shall be less than the length of the vibrating device (nozzle) of the vibrator.

Article 75. No water, cement, surface hardeners or other materials shall be added during the surface treatment of the laid concrete mix unless required by the design under the "Structural" part or agreed in writing between the contracting authority and the builder, about which the design engineer under the "Structural" part and the person exercising construction supervision shall be informed.

Article 76. When executing concrete with lightweight admixtures, self-compacting concrete, sprayed concrete, in executing with escalation form-work and in concreting under water, the requirements specified in the design project shall be observed.

Article 77. When tensioning prior to concrete placement, protection of the tensioning reinforcement shall be provided to prevent corrosion until concrete placement begins. The protective materials placed on the tensioning reinforcement shall not affect its adhesion to the concrete, nor have a detrimental effect on it.

Article 78. (1) When post-tensioning concrete, the bundles placed in channel-forming pipes in the concrete, the couplings and anchorages shall be protected against corrosion.

(2) At temperatures lower than + 5 °C, measures shall be taken against freezing water in the channels that are not grouted. The measures should prevent the ingress of water into the channels. If, despite the measures taken, the water in the channels freezes, the channels shall be freed of ice before the grouting begins.

Article 79. (1) The method of preparation of the grout for grouting shall comply with the requirements of BDS EN 446 and BDS EN 447.

(2) The grouting shall be carried out in accordance with BDS EN 446.

(3) The grouting of the channels with cement grout shall be carried out without interruption and at a constant speed and shall continue until the water leaking from the cement grout is pushed out through the vents.

(4) After completion of the grouting, in case of impaired implementation technology, the filling of the grooves with cement grout shall be checked with appropriate equipment.

Article 80. (1) Upon completion of concrete placement and to protect against early concrete ageing, measures shall be taken to:

1. prevent plastic drying and/or sedimentation of the concrete mix;
2. reduce the amount of humidity drying;
3. avoid the appearance of cracks over 0,3 mm in width when this is prescribed in the design project;
4. ensure the requirements for the surface layer;
5. Protect the concrete against harmful atmospheric conditions;
6. protect it against frost;
7. protect it against harmful vibrations, shocks or damage.

(2) For protection in the period of ageing, the following methods may be used alone or in combination:

1. non-removal of the form-work until the prescribed ageing class is reached;

2. covering the concrete surface with water evaporation protection covers, provided against air draughts at the edges and at the joints between them;

3. laying of wet coverings or fabrics, e.g. geotextiles, etc., on the surface and protecting them from drying out;

4. keeping the concrete surface permanently damp, by means of water misting or wetting facilities;

5. using protective compounds;

6. other methods of protection of equal effectiveness.

Article 81. (1) The curing period depends on the curing classes as set out in Table 1.

Table 1

Curing classes of concrete

	Curing class 1	**Curing class 2**	**Curing class 3**	**Curing class 4**
Period (hours)	12 [a]	not applicable	not applicable	not applicable
Percentage of the required characteristic compressive strength on day 28-th	not applicable	35%	50%	70%
[a] Provided that the bonding time does not exceed 5 hours and the surface temperature of the concrete is equal to or greater than 5°C.				

(2) The curing class shall be specified in the investment project under the "Structural" part.

Article 82. (1) The assessment of the development of the characteristics of concrete may be carried out by an accredited laboratory, or by a laboratory using calibrated measuring and testing equipment by one of the following methods:

1. testing of sample bodies (cored specimen) cut from the structure;

2. testing of sample bodies stored and ageing in-situ;

3. indirect (non-destructive) testing of the concrete, according to the requirements of BDS EN 13791 "Assessment of in-situ compressive strength in structures and precast concrete components" and the National Annex and the series of standards BDS EN 12504-1 (BDS EN 12504-1 "Testing concrete in structures". Part 1: Cored specimens - Taking, examining and testing in compression"; BDS EN 12504-2 "Testing concrete in structures. Part 2: Non-destructive testing - Determination of rebound number" and BDS EN 12504-3 "Testing concrete in structures. Part 3: Determination of pull-out force").

4. calculation of the temperature-time function value by measuring the temperature at a depth of 10 mm from the surface according to BDS EN 13791/NA;

5. calculation of the value of the temperature-time function by the average daily air temperature according to BDS EN 13791/NA.

6. determining the curing time according to the temperature of the concrete (so-called temperature-matched curing);

7. other well-established appropriate methods.

(2) In assessing the change in the characteristics of concrete using the methods specified in

items (3) to (7) of paragraph 1, a control check of the results obtained by testing according to paragraph 1(1) and/or (2), as the testing shall be carried out by an accredited laboratory and by a laboratory using calibrated instruments.

(3) When no method to determine the strength of the concrete referred to in paragraph 1 is used, Tables 1, 2 and 3 of Annex No. 1 may be used.

(4) Until a minimum strength of 5 MPa of concrete in the surface area is reached, the surface temperature of the concrete shall not be lower than 0^{o}C.

Article 83. Requirements for each finished appearance of the concrete surface concrete or reinforced concrete elements are defined in the project under the “Structural” part, by taking into account SD CEN/TR 15739 “Precast concrete products - Finishing treatment of concrete - Identification”. In the execution of exposed concretes, the prescriptions of BDS 14068 “Exposed Concrete. Classification and Technical Requirements” shall also be complied with. Indicative requirements and typical use of the different types of finished surface appearances are given in Annex No. 7 of the Regulation and in BDS 14068.

Article 84. In the process of concreting of structures, the specific requirements developed with the investment project shall be executed as follows:

1. use in concrete, the actual maximum size of the additive material D_{Upper} and D_{Lower};

2. drawing and preparation of a concrete laying plan;

3. initial testing of the concrete placement by trial concrete placement;

4. preparation of working joints prior to concrete placement;

5. speed of concrete placement and compaction;

6. placement of concrete with lightweight admixtures, self-compacting concrete, sprayed concrete, when executing with escalation form-work and when concreting under water;

7. to sprayed concrete in accordance with the national requirements for determining and declaring the constancy of performance of shotcrete source mixes and hardened shotcrete, depending on the intended use, in accordance with BDS EN 14487-1 “Sprayed concrete - Part 1: Definitions, specifications and conformity” and the requirements for implementation according to BDS EN 14487-2 “Sprayed concrete - Part 2: Execution”.

8. preventing concrete at an early age from harmful contact with aggressive substances, including chlorides, salts, acids, oils, etc.;

9. special requirements for the ageing of concrete, requiring a strength percentage higher than 70 %;

10. reduction of the possibility of cracking due to heat release and temperature gradient in massive concrete and reinforced concrete elements;

11. finished appearance on the surface.

Article 85. For the execution of concrete works, a logbook shall be kept in accordance with the template set out in Annex No. 8.

Chapter Three

REQUIREMENTS FOR THE EXECUTION OF STRUCTURES OF PRECAST CONCRETE AND REINFORCED CONCRETE COMPONENTS

Article 86. (1) The precast components shall be used in accordance with the requirements of the design documentation, and the coordination between them shall be checked during installation. The inspection shall be carried out by the builder, the person exercising construction supervision and the design engineer under the “Structural” part.

(2) The geodetic plotting of axes shall be carried out after verification at all levels by the Builder.

Article 87. Prior to commencing the installation of the elements, the Builder shall perform the following inspections:

1. for absence of ice, snow and other dirt of the supporting structures and elements;

2. that all markings necessary for the installation are applied to the support structures;

3. that the markings on the components are in accordance with the requirements of the design;

4. the availability of the necessary aids for the installation work (ropes, slings, platforms, ladders, guard rails, etc.).

Article 88. (1) It is not allowed to carry out installation works at air temperature lower than minus 10°C.

(2) Panels shall not be installed over frozen or hardened mortar.

Article 89. Upon completion of the installation of a section or floor, an instrumental check of the location of the reinforced concrete elements installed shall be carried out, and the results obtained shall be recorded in the installation logbook, in accordance with the template set out in Annex No. 9.

Article 90. The actual deviations of the installed elements shall not exceed those provided for in the design. Where there are no design prescriptions, the values given in Annex No. 2 and Annex No. 3 shall be observed.

Article 91. Precast reinforced concrete components manufactured under factory conditions shall be incorporated into the construction on the basis of a declaration of performance, a CE marking, or a declaration of product characteristics or a declaration of conformity with the

investment design, in accordance with the requirements of Article 4 of Regulation No. RD-02-20-1 of 2015. The statement of the characteristics of the precast component shall comply with the characteristics required in the design documentation.

Article 92. (1) Precast reinforced concrete components which are not load-bearing, used for installation in the structure, manufactured on the construction site, must meet the requirements of the design documentation, the relevant product standard and BDS EN 13369 “Common rules for precast concrete products”.

(2) Each precast component shall be marked for identification in accordance with item 7 of BDS EN 13369 and its position of construction shall be indicated.

(3) For each precast component, information on its total weight should be available.

Article 93. The conditions and methods (procedures) for transportation, storage, assembly and adjustment of the precast components shall be in accordance with the investment project.

Article 94. (1) The installation of the precast components with a sequence of the installation (operations) shall be carried out in accordance with the installation specification developed in the investment project.

(2) The installation specification shall include:

1. a lifting scheme specifying the suspension locations, the forces, the distribution of the lifting system, the locations of the supports, the means required and, where necessary, the locations for temporary bracing and other special prescriptions.

2. Instructions, including the manufacturer’s instructions, for the transport and storage of the precast components, including to determine the position of the element in storage, the permitted points of support, the maximum stowage height, precautions and, if necessary, stability requirements;

3. information on the access and working position for guiding each precast component, and also the range and lifting capacity of lifting gear and machinery.

4. data and/or guidelines (instructions) for transportation and storage capability — for each delivery of precast components on the site.

Article 95. (1) During installation, structural measures shall be taken to ensure the stability of the supports during construction and to minimise the risk of damage to these supports.

(2) During installation, the design position of the precast components, the dimensional accuracy of the supports, the condition of the connections and the overall arrangement of the structure shall be checked, including any necessary adjustments.

(3) Acceptance of completed construction and installation works, depending on their type, shall be made after inspection of erection.

(4) Completed types of construction and installation works shall be carried out according to

the requirements of the Regulation, taking into account the climatic conditions.

Article 96. Structural connections shall satisfy the following requirements:

1. connecting parts of any kind should be used according to the manufacturer's recommendations;

2. screw and glued joints should be executed according to the specific technology for the materials used.

Article 97. In-situ construction works include:

1. prior to installing the form-work and grouting of the joints – cleaning of debris;

2. grouting of joints – only after completion and acceptance of all welding seams and prescribed joint protections (anti-corrosion, etc.) and after drawing up an act for establishing the types of construction and installation works subject to closure, certifying that the requirements of the project have been achieved (template 12), drawn up in accordance with Regulation No. 3 of 2003.

Article 98. For anti-corrosion protection, a logbook shall be kept in accordance with the template set out in Annex No. 10.

Article 99. For the grouting of joints, a logbook shall be kept in accordance with the template set out in Annex No. 11.

Chapter Four

QUALITY CONTROL OF CONCRETE AND REINFORCED CONCRETE STRUCTURES

Article 100. The control in the process of execution of concrete and reinforced concrete structures and the completed ones shall be carried out by the person exercising construction supervision, by the person exercising author's supervision, as well as by the technically qualified persons appointed by the Builder under an employment contract, who carry out the technical management of the constructions, or by the technical director provided by the contracting authority, in the cases referred to in Article 163a(5) SPA.

Article 101. (1) The control of construction products, materials, articles and elements for concrete and reinforced concrete structures, of the types of works and of the completed structures shall be carried out for compliance with the requirements of this Regulation and the approved investment projects.

(2) The control over the construction products used shall be carried out by the person exercising construction supervision for compliance of the construction products used in the construction works with the requirements of the design project.

(3) For the construction works referred to in Article 14(2) of the CBA, the control of

construction products used shall be carried out by the technical director.

(4) Administrative control of construction products in design and construction shall be performed by the authorities under Articles 220 to 223 of the SPA.

Article 102. The control of the concrete mix and of the hardened concrete on the construction site includes:

1. incoming inspection upon delivery of the concrete mix. The control shall be carried out in accordance with Article 69 of the Regulation;
2. verification of the concrete mix declaration for compliance with the prescriptions of the investment project;
3. verification of the consistency, temperature of the concrete mix and air content, where required;
4. preparation, storage and testing of sample bodies to check the characteristics of the hardened concrete, where agreed between the parties;
5. the individual works (processes) during the placing, handling and ageing of the concrete in accordance with the requirements of Chapter Two, Section V of the Regulation and the project documents;
6. an assessment of the quality of the concrete and reinforced concrete works carried out by appearance after removal of the form-work in accordance with the requirements of Chapter Two, Section V of the Regulation and the project documents;

Article 103. (1) Control of the execution of reinforcement work with construction products, including straight and bent rods of measured lengths, brackets, welded meshes and scaffolds and reinforcements containing welded joints, shall include:

1. incoming control and verification of the delivered precast products, for compliance with the geometrical dimensions and requirements of the investment project under the “Structural” part, with the requirements of Chapter Two, Section III of the Regulation, the current technical specifications and national requirements for determining and declaring the performance//characteristics of steel reinforcement products for reinforced concrete structures depending on the intended use.

2. verification of the declarations of performance/characteristics of construction products and/or products drawn up by the manufacturer of the precast product and/or item;

3. the individual works (processes) during the execution of the reinforcement and welding works in accordance with the requirements of Chapter Two, Section III of the Regulation.

(2) The control during the execution of welding works on the construction site, in addition to the requirements under paragraph (1) shall also include control of compliance with the requirements

of the applicable standards.

Article 104. In case of execution of pre-tensioned structures, the following shall be subject to control:

1. the physical and mechanical characteristics of the tensioning reinforcement;

2. the condition of the surface of the tensioning reinforcement (presence of corrosion, dirt, mechanical damage, etc.), as well as the conditions of storage of the reinforcement;

3. the installation of the tensioning reinforcement;

4. the anchoring devices (condition, dimensions, test results, etc.);

5. the calibration of the tensioning equipment;

6. the actual frictional losses of the bundles in the channel walls;

7. the tensioning force, the elongation and the slip of the wedges in the anchors of each bundle;

8. the time elapsed between tensioning and completion of the precautions for the tensioning reinforcement and the anchoring devices;

9. In the case of grouting the channels – the air temperature, the composition and characteristics of the injection grout, the injection speed, the quality of the channel filling.

Article 105. In the case of installation works, the following shall be subject to control:

1. the conformity of the declarations of the precast elements with the requirements of the investment project;

2. the geodetic breakdown of the axes and design levels;

3. the spatial arrangement of the precast elements in relation to:

(a) traced geodetic axes and design levels;

(b) abutment sites;

(c) verticality;

(d) location of the parts embedded in concrete.

Article 106. When grouting of assembly fittings and sealing of joints, the following shall be subject to control:

1. the conformity of the declarations of the grout and sealing materials with the requirements of the investment project;

2. the corrosion protection and other prescribed protection and insulation (thermal insulation, waterproofing, etc.);

3. the solidity of the grouted joint.

Article 107. (1) In the finished constructions, the design dimensions and positions shall be subject to control. The tolerances shall be in accordance with the values given in Annex No. 2 for structures designed under the European design system Eurocode, and in Annex No. 3 for structures designed according to the Standards for Design of Concrete and Reinforced Concrete Structures.

(2) The values of tolerances for foundations of buildings and structures (shallow and deep foundations), fortifications of construction excavations, slotted walls, sheet piling, post-tensioned foundations, earth anchors, descending wells and caissons, executed by different methods, shall comply with the requirements of this Regulation and with the requirements of Regulation No. RD-02-20-1 of 2023 on the execution and acceptance of earthworks, earth structures, ground base and foundations (SG issue No. 94 of 2023).

Article 108. All findings during the control of the completed structures shall be documented in the construction site order book (template No. 4) and shall be recorded in the relevant acts and protocols drawn up during the construction process in accordance with Regulation No. 3 of 2003.

Chapter Five

ACCEPTANCE OF CONCRETE AND REINFORCED CONCRETE STRUCTURES

Article 109. (1) In the individual stages of implementation of concrete and reinforced concrete structures, the acceptance of the works executed shall be carried out by means of an act accepting the construction and installation works executed, by levels and elements of the construction structure (template 7), drawn up in accordance with Regulation No. 3 of 2003. The act shall be drawn up separately for form-work, reinforcement, including for the embedded parts, and for welding works. The declarations of construction products shall be annexed to the act.

(2) The completed concrete and reinforced concrete elements and structures, which are subject to closure or the quantity and quality of which cannot be determined at the time of their closure via subsequent technological operations, processes, works, etc., shall be subject to interim adoption by an act establishing all types of construction and installation work subject to closure, certifying that the requirements of the project (template 12), drawn up in accordance with Regulation No. 3 of 2003, have been met.

Article 110. (1) The acceptance of a completed structure or a stage thereof shall be documented by a construction acceptance certificate (template 14) in accordance with Regulation No. 3 of 2003.

(2) Upon acceptance, the following shall be presented:

1. the order book of the construction site;

2. an act (templates 2 and 2a) drawn up in accordance with Regulation No. 3 of 2003;

3. the certificates for the acceptance of the construction and installation works carried out, by levels and elements of the building structure (template 7), drawn up in accordance with Regulation No. 3 of 2003, for the acceptance of form-work and reinforcement works (including embedded components and welding works);

4. the acts establishing all types of construction and installation works subject to closure, certifying that the requirements of the project have been met (template 12);

5. the declarations on the construction products used, drawn up in accordance with Regulation (EU) No 305/2011 and Regulation No. RD-02-20-1 of 2015;

6. the logbook for the execution of welding works;

7. the logbook for the execution of concrete laying and grouting works;

8. the logbook for the execution of tensioning works;

9. the logbook for the execution of installation works;

10. the logbook for the application of anti-corrosion and other types of protection on welded joints;

11. the logbook for the execution of grouting of joints and fittings;

12. other documents at the discretion of the parties.

Additional provision

§ 1. (1) Within the meaning of this Regulation:

1. "Construction" and "construction and installation works" are the concepts defined in Article 5, items 38 and 40 of the Additional Provisions of the SPA.

2. "Contracting authority", "Builder", "design engineer", "the natural person exercising technical control for the "Structural" part", "technical director" and person exercising construction supervision" are the persons designated in the SPA.

3. "Execution specification" means design documentation, including drawings, technical data and requirements necessary for the execution of particular construction work.

4. "Installation specification" means design documentation including drawings, technical data and requirements necessary for the installation of the precast components.

5. "**Form-work"** means a temporary or permanent structure in which a concrete mix is laid and which gives it the required shape and dimensions, supporting it until it is capable of supporting itself.

6. "**Removal of form-work at an early stage**" is the process of completely or partially removing the form-work before the concrete has gained the required strength for the form-work removal, in which the reinforced concrete structure remains supported on the support scaffolding or

on individual supports.

7. **“Support scaffolding”** means a temporary support for part of a structure until it can be carried by itself, and for the connected bearing loads. The support scaffolding can be executed by precast components, by support towers of precast components or by individual adjustable telescopic struts.

8. “**Additional supporting elements”** are supporting elements mounted at a level or levels situated below the slab supporting the scaffolding intended to distribute the load on appropriate supports.

9. “**Precast concrete or reinforced concrete component”** means a component prepared and aged in a place other than its end-use (manufactured in the factory or prepared in-situ).

10. “**Reference line”** is a line to which the distances are related.

11. **“Secondary reference line”** is any line other than the reference line, used to trace the position of a building and to check and conform the building or parts thereof.

12. “**Finished appearance on the surface”** is a description of the appearance of the concrete surface, including geometry, texture, colour, etc.

13. “**Tolerance”** is the permitted deviation of the measured dimension from the established limit values.

14. “**Tolerance limit”** is the difference between the upper and lower limit value.

15. **“Posts”** for reinforcements are devices made of reinforcement material used to ensure the design position of the supporting reinforcement rows, e.g. supporting (positioning) the load-bearing upper reinforcement in a slab.

16. “**Fixing element”** is a device used to provide a precise distance between the form-work and the reinforcement.

17. **“Aggressive environment”** is an external environment under the impact of which corrosion of the materials of building structures and equipment occurs and which falls within the range from category II to category IV according to BDS 9075.

§ 2. For the standards cited in the Regulation, the current versions shall apply, with the exception of harmonised standards within the meaning of Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, for which cited in the Official Journal of the European Union shall apply.

Transitional and final provisions

§ 3. The Regulation is issued on the basis of Article 169(4) in conjunction with paragraph

1(1) of the SPA and repeals Regulation No. 3 of 1994 on the control and acceptance of concrete and reinforced concrete structures (SG, issue No. 97 of 1994).

§ 4. The Regulation shall enter into force six months after its promulgation in the State Gazette.

§ 5. Proceedings for the commissioning of a building started before the entry into force of the Ordinance shall be completed in accordance with the existing conditions and procedure. Commissioning proceedings shall be deemed to have commenced on the date of submission of a request to the competent authority under the SPA.

Annex 1
to Article 20(1)(2) and (2) and Article 82(3)

Minimum period of curing of concrete in the structures depending on the curing class and the temperature of the concrete surface

Tables 1 to 3 specify the duration of curing of the concrete in days, calculated to satisfy curing class 2 to curing class 4, and shall be used unless a more accurate method of determining the strength of concrete in the surface area is applied.

Table 1

Minimum curing period for curing class 2 (corresponding to a concrete strength equal to 35% of the required characteristic strength)

Concrete surface temperature (t), °C	**Minimum curing period, days [a]**		
	Developing the strength of concrete [c,d]		
	(f_{cm2}/f_{cm28})=r		
	Fast r ≥ 0.50	Average 0.50> r ≥0.30	Slow 0.30 > r ≥ 0.15
t≥ 25	1.0	1.5	2.5
25 > t ≥ 15	1.0	2.5	5
15 > t ≥ 10	1.5	4	8
10 > t ≥ 5[b]	2.0	5	11

[a] Plus the bonding period if it exceeds 5 h.
[b] For temperatures below 5 °C, the duration shall be extended by a period equal to time with temperatures below 5 °C.
[c] The strength development of the concrete is the ratio of average compressive strength after 2 days to the average compressive strength of the mix after 28 days, determined by initial tests or based on a known characteristic of concrete of comparable composition, according to BDS EN 206.
[d] For a very slow strength development of the concrete, special requirements should be given in the investment project.

Table 2

Minimum curing period for curing class 3 (corresponding to a concrete strength equal to 50% of the required characteristic strength)

Concrete surface temperature (t), °C	**Minimum curing period, days [a]**
	Developing the strength of concrete [c,d]
	(f_{cm2}/f_{cm28})=r

	Fast r ≥ 0.50	Average 0.50> r ≥0.30	Slow 0.30 > r ≥ 0.15
t≥ 25	1.5	2.5	3.5
25 > t ≥ 15	2.0	4	7
15 > t ≥ 10	2.5	7	12
10 > t ≥ 5[b]	3.5	9	18

[a] Plus the bonding period if it exceeds 5 h.
[b] For temperatures below 5 °C, the duration shall be extended by a period equal to time with temperatures below 5 °C.
[c] The strength development of the concrete is the ratio of average compressive strength after 2 days to the average compressive strength of the mix after 28 days, determined by initial tests or based on a known characteristic of concrete of comparable composition, according to BDS EN 206.
[d] For a very slow strength development of the concrete, special requirements should be given in the investment project.

Table 3

Minimum curing period for curing class 4 (corresponding to a concrete strength equal to 70% of the required characteristic strength)

Concrete surface temperature (t), °C	**Minimum curing period, days [a]**		
	Developing the strength of concrete [c,d]		
	(f_{cm2}/f_{cm28})=r		
	Fast r ≥ 0.50	Average 0.50> r ≥0.30	Slow 0.30 > r ≥ 0.15
t≥ 25	3	5	6
25 > t ≥ 15	5	9	12
15 > t ≥ 10	7	13	21
10 > t ≥ 5[b]	9	18	30

[a] Plus the bonding period if it exceeds 5 h.
[b] For temperatures below 5 °C, the duration shall be extended by a period equal to time with temperatures below 5 °C.
[c] The strength development of the concrete is the ratio of average compressive strength after 2 days to the average compressive strength of the mix after 28 days, determined by initial tests or based on a known characteristic of concrete of comparable composition, according to BDS EN 206.
F_{cm} – average compressive strength of concrete; *fcm = fck + 8 (MPa);*
f_{ck} – characteristic value of the cylindrical compressive strength of concrete on the 28th day;
[d] For a very slow development of concrete strength, special requirements should be given in the investment project.

Note: Information on the development of concrete strength can be obtained from the concrete manufacturer when agreed by the parties.

Annex No 2

to Art. 35, Art. 37, para 2, articles 38, 45, 53, 55, 90 and Article 107(1)

Tolerances for the execution of concrete and reinforced concrete structures designed in accordance with the requirements of the European Construction Structure Design System, Eurocodes

Table 1

Tolerances for foundations in accordance with **BDS EN 13670**

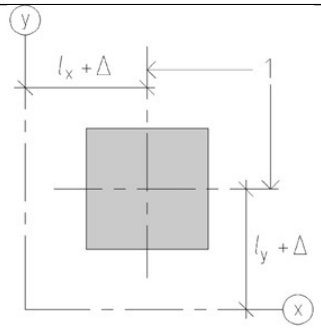
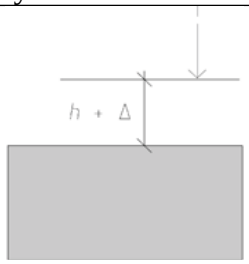
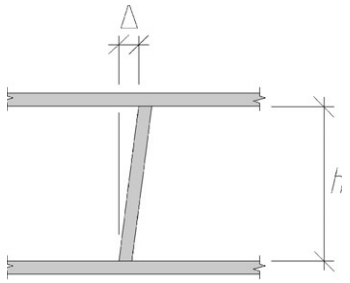
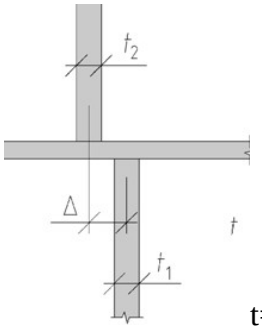
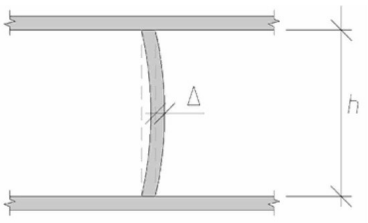
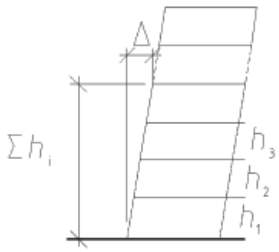
№	Type of deviation	Description	Tolerance Δ
			class 1
1	 1 – axes of the base (horizontal section) y – secondary reference line in direction y x – secondary reference line in direction x	Plan position of the base relative to the secondary reference lines	± 25 mm
2	 l – secondary reference horizon (verical section) h – the required distance of the base from a secondary reference horizon	Position in the vertical direction of the base relative to the secondary reference horizon	± 20 mm

Table 2

Tolerances for columns and walls in accordance with **BDS EN 13670**

№	Type of deviation	Description	Tolerance Δ
			class 1
1	 h - clear height	Displacement from the vertical position of a column or wall at any level in a single or multi-storey building h ≤ 10m h > 10m	The larger of 15 mm or h/400 25 mm or h/600
2	 $t=(t_1+t_2)/2$	Deviation between axles	Greater than t/30 or 15 mm but not more than 20 mm
3		Bending a column or wall between two adjacent floors	Greater than t/300 or 15 mm but not more than 20 mm
4	 Σhi – sum of the heights of the floors in question	The position of a column or wall at any floor level relative to the vertical line through a specified centre of foundation level for a multi-story structure: n is the number of floors, where	The lesser of: 50 mm or $\Sigma hi/(200\ n^{1/2})$

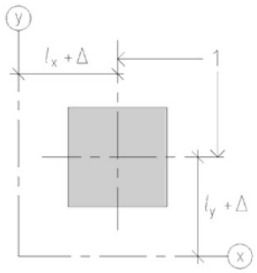
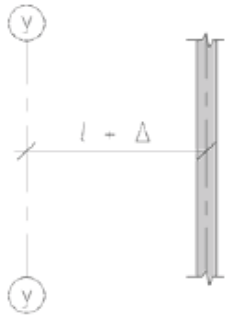
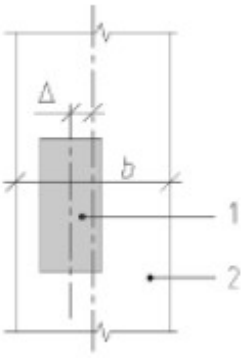
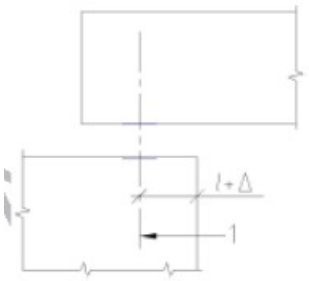
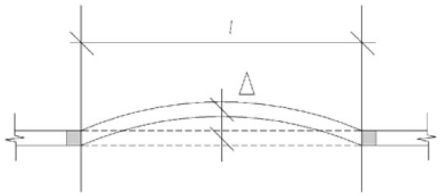
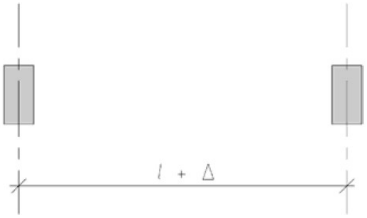
		n>1	
5	 l - foundation axes (horizontal section) Y – secondary reference line in direction y x – secondary reference line in direction x	Plan position of the column relative to the secondary reference lines	± 25 mm
6	 y – secondary reference line in direction y	Plan position of the wall relative to the secondary reference lines	± 25 mm
7		Clearance between adjacent columns or walls	The greater of [a]: ± 20 mm or ± l /600, but not more than 60 mm
[a] Note: More stringent positional deflection requirements are allowed for columns and walls supported by fabricated elements, depending on the deflection for the length of the supported element and the required support length.			

Table 3

Tolerances for beams and slabs in accordance with **BDS EN 13670**

№	Type of deviation	Description	Tolerance Δ
			class 1
1	 1- beam, section 2 - column, vertical section	Beam-column distance in their relationship relative to the column. b = the size of the column in the same direction as Δ	The greater of ± b/30 or ± 20 mm
2	 1 – support axis of the strut	Position of the support axis of the strut when structural supports are used l = design distance from edge	The greater of ± l /20 or ± 15 mm
3		Horizontal sweeping of beams	The lesser of: ± 20 mm or ± l /600
4		Distance between adjacent beams measured from corresponding points	The greater of [a] ± 20 mm or ± l /600, but not more than 40 mm
	[a] Note: More stringent positional deflection requirements are allowed for beams supported by		

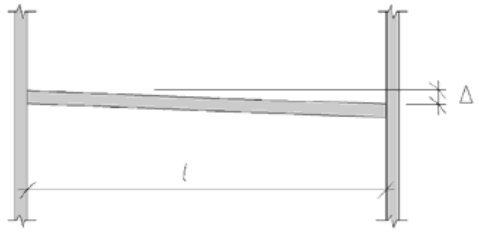
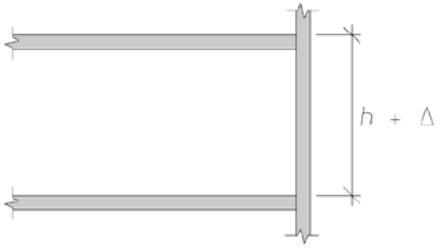
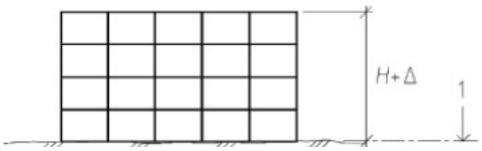
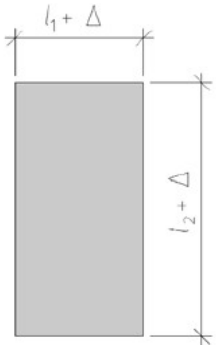
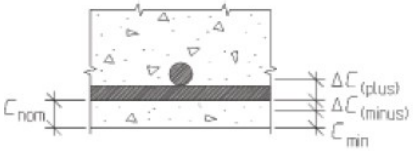
	precast components, depending on the deflection for the length of the supported component and the required support length.		
5		Tilt of beam or slab	± (10+ l /500) mm
6		Difference in levels between adjacent beams measured from corresponding points	± (10+ l /500) mm
7		Difference from the design distance between adjacent slab levels measured at support points	± 20 mm
8	 1 – secondary reference horizon	Upper floor level, measured towards a secondary reference horizon H ≤ 20m 20m < H	± 20 mm ± 0.5(H+20), but not more than 50 mm

Table 4

Tolerances in the cross-section dimensions
(in accordance with **BDS EN 13670**)

№	Type of deviation	Description	Tolerance Δ	
			class 1	**class 2** see 10.1 (2) of BDS EN 13670
1	 l_i= cross-section dimensions	Cross-section dimensions Applicable to beams, slabs and columns For l_i < 150 mm l_i = 400 mm $l_i \geq$ 2500 mm by linear interpolation for intermediate values	± 10 mm ± 15 mm ± 30 mm	± 5 mm ± 10 mm ± 30 mm
	Note: 1. For foundations: (a) the positive tolerances shall be indicate in the investment project; (b) the negative tolerances shall be applied according to the table. 2. Class 1 and Class 2 tolerances do not apply to special geotechnical concrete elements poured directly into the ground (slotted walls, cast pilots, etc.).			
2	 Requirement: $c_{nom} + \Delta c_{(plus)} > c > c_{nom} - \lvert\Delta c_{(minus)}\rvert$ c_{min} = minimum coating c_{nom} = nominal coating = $c_{min} - \lvert\Delta c_{(minus)}\rvert$ c = actual coating Δc = tolerance from c_{nom}	Position of the ordinary reinforcement $\Delta c_{(plus)}$ h > 150 mm h = 400 mm h ≥ 2500 mm by linear interpolation for intermediate values $\Delta c_{(minus)}$	+ 10 mm + 15 mm + 25 mm [b] Δc_{dev} [a]	+ 5 mm + 10 mm + 20 mm Δc_{dev} [a]

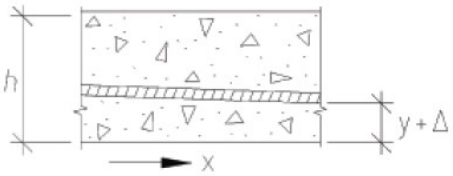
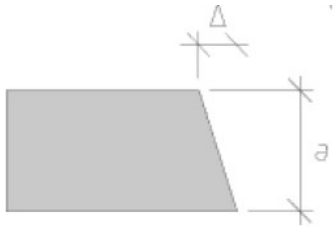
	h = cross-sectional height			
[a] **Note:** The values of Δc_{Dev} shall be determined according to BDS EN 1992-1-1/NA. The class 1 tolerances shall be achieved in accordance with BDS EN 1992, the required level of safety, and the partial material coefficients given in clause 2.4.2.4. of BDS EN 1992-1-1. Where the tolerances for the installation of the reinforcement are not specified in the investment design, class 1 shall be considered as applicable. [b] **Note**: In the case of foundations and embedded parts (welling parts) in foundations, the positive values of the tolerances may be increased by 15 mm to achieve a similar to nominal concrete reinforcement coating.				
3		Joining the reinforcement with overlapping l = overlap length	-0.06 l	
4	 Longitudinal section; y – rated position (usually a function of the position (x) along the tensioning reinforcement)	Position of the pre-tensioned reinforcement[a] For h ≤ 200 mm For h > 200 mm Concrete coating measured to the channeler $\Delta c_{(min)}$	± 6 mm The lesser of: ± 0.03 h or ± 30 mm $\Delta c_{(dev)}$	
[a] **Note:** The given values refer to height and transverse direction. For transverse direction h is the width of the element. For tensioned reinforcement in slabs, larger deviations from ±30 mm may be accepted, if necessary to avoid small holes, pipes, dents and inserts. The profile of the tensioned reinforcement with such deviations should be flat.				
5	 a – cross-sectional dimension	Rectangular form of the cross-section	Greater than ± 0.04 a or ± 10 mm, but not more than ± 20 mm	

Table 5

Tolerances for surfaces and edges
(in accordance with **BDS EN 13670**)

№	Type of deviation	Description	Tolerance Δ
			class 1

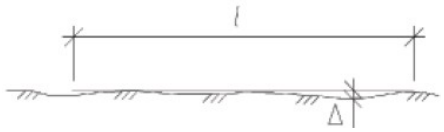
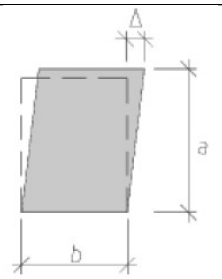
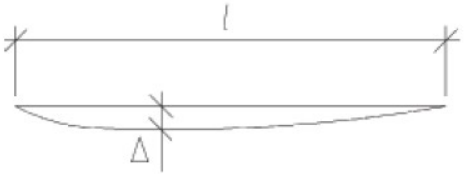
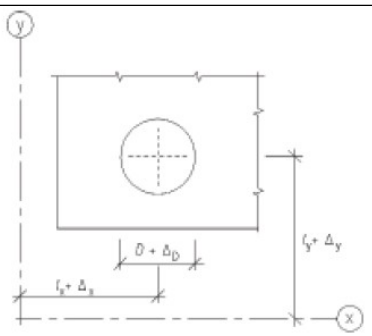
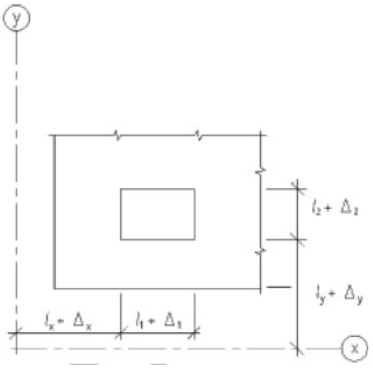
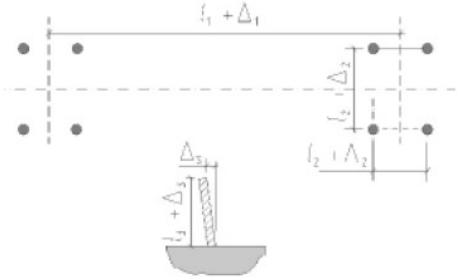
1	Form-work imprinted or smoothed surfaces: total local Surfaces not resulting from form-work: total local 	Flatness l = 2.0 m l = 0.2 m l = 2.0 m l = 0.2 m	 9 mm 4 mm 15 mm 6 mm
2		Tilt of the cross-section	The greater of ± a/25 or ±b/25, but not more that ± 30 mm
3		Deviation of an edge from a straight line For lengths: l < ± 1 m l > 1 m	 ± 8 mm ± 8 mm/m, but not more that ± 20 mm

Table 6

Tolerances for holes (round and rectangular) and inserts,
in accordance with **BDS EN 13670**

№	Type of deviation	Description	Tolerance Δ
			class 1
1	 Δ_x and Δ_Y – deviations from secondary reference line in direction x and direction y Δ_D — deviation from diameter	Holes and pipe inserts Δ_x and Δ_Y Δ_D	± 25 mm ± 10 mm unless otherwise specified in the investment project
2	 Δ_x and Δ_Y – deviations from secondary reference line in direction x and direction y Δ_1 and Δ_2 — deviations of the barrier Alternative measurement up to the axles as in the figure in pont 1	Examinations and dents Δ_x , Δ_y , Δ_1 , Δ_2	± 25 mm, unless otherwise specified in the investment project
3	 l_1 — spacing between groups of bolts l_2— distance between bolts in a group	Anchor bolts and similar inserts Position of bolts and centre of a group of bolts Internal distance between bolts in a group Protruding part	Δ_1 = ± 10 mm Δ_2 = ± 3 mm Δ_3 = + 25 mm - 5 mm Δs = the greater of

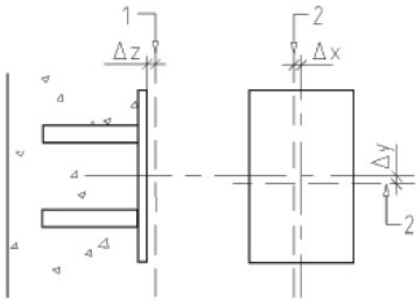
	l_3 — free bolt length	Slope:	5 mm or $l_3/200$, unless otherwise specified in the investment project
4	 1 – nominal position in depth 2 – nominal position in plan	Anchor plates and similar inserts Deviation in plan Deflection in depth	 Δ_x , Δ_y = ± 20 mm Δ_z = ± 10 mm unless otherwise specified in the investment project

Table 7

Tolerances for the execution of reinforcement and welding works

Subject of the requirement	**Unit of measurement at the level**	**Tolerance**
Deviations from the dimensions and locations of the components of the welded joints and of the embedded components from those specified in the design		
Displacement of the axes of the welded bars at: (a) electric resistance butt welded joints (b) joints welded in a tub (c) aluminothermic welded joints (d) arc-welded joints with pads	 d d d d	 0.1 0.2 0.1 0.3
Angle between the axes of the welded bars at: (a) joints with two pads (b) all other frontal joints	 - -	 6 3
Displacement of pads along the length relative to the middle of the distance between the rod faces	d	0.5
Distance between pad axles and the joined rods	d	0.5
Gauge dimensions of flat elements	mm	+3
Distance between parallel flat elements: (a) up to 250 mm (b) more than 250 mm	 mm mm	 +3 +5
Mutual displacement of parallel flat elements	mm	10
Length of anchoring rods	mm	+20
Angle between anchoring rod and flat element	-	5
Permissible tolerances for the installation of the reinforcement		
Bearing bars in the plane of the rows for: (a) columns, beams and other (b) slabs, walls and foundations	 mm mm	 10 20

(c) elements with a height exceeding 1 000 mm	mm	30
Bearing bars by cross-sectional height: (a) up to 100 mm (b) 100 to 1 000 mm (c) more than 1 000 mm	 mm mm mm	 3 5 20
Brackets	mm	10
Distribution rods for: (a) slabs, walls and foundations (b) elements with a height exceeding 1 000 mm	 mm mm	 25 40
Bent rods – displacement of the flex	mm	50
Tolerance for deviation of the axis of the bars from the straight line	mm	6 mm to 1 m length
Tolerances for the installation of the tensioning reinforcement		
Deviation from the length of the wires and ropes of the bundles during group straining		0.03 of the elastic tension reinforcement extension
Deviation from perpendicularity between the surfaces at the abutment sites of presses and anchorages and the axes of the corresponding tensioning components		Not more than 1/100

Annex No 3

to Article 35, Article 37, paragraph 2, Articles 38, 45, 53, 55, 90 and Article 107(1)

Tolerances for the execution of concrete and reinforced concrete structures designed according to the requirements of Standards for Design of Concrete and Reinforced Concrete Structures

The values of the tolerances for the execution of concrete and reinforced concrete structures designed in accordance with the requirements of the Standards for Design of Concrete and Reinforced Concrete Structures shall be in accordance with Annex 2 except No. 1 (Cross-section dimensions applicable to beams, slabs and columns) and No. 2 (Position of ordinary reinforcement) of Table 4.

For the tolerances of cross-sectional dimensions and the position of the ordinary reinforcement, the values in Table 1 and Table 2 of Annex 3 shall apply.

Table 1

Tolerances in cross-sectional dimensions

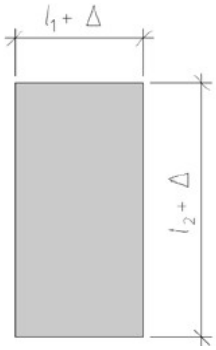
№	Type of deviation	Description	Tolerance Δ
1	 l_i= cross-section dimensions	Cross-section dimensions Applicable to beams, plates and columns For l_i < 150 mm l_i = 400 mm $l_i \geq$ 2500 mm by linear interpolation for intermediate values	 ± 5 mm ± 10 mm ± 30 mm

Table 2

Position of the ordinary reinforcement
Deviation from the design value of the concrete coating of the reinforcement

Description	**Unit of measurement**	**Tolerance**
1. For concrete coating up to and including 15 mm	mm	0 to +5 mm
2. With a concrete coating value of more than 15 mm and a linear cross-sectional dimension of the structure in the relevant direction *h*: h < 150 mm h = 400 mm h ≥ 2500 mm linear interpolation for intermediate values	mm	 0 to +5 mm 0 to +10 mm 0 to +20 mm

Annex No 4
to Article 36(1)

Contracting Authority:
Builder:
Construction site:

Logbook of welding works

Date of execution of the work	Names of the joined components; welding method (process), grade of steel	Place or No (in accordance with the drawing or scheme) of the welded component	Notes for the acceptance of the weldable knot	Types and trade marks of used welding materials	Type of the welding flow; polarity	Atmospheric conditions during welding (ambient air temperature, wind speed, humidity)	Welder's surname and initials, licence/certificate of competency number[1]	Signature of welder performing the welding	Samples, place, date[2]	Results of the protocol[2]	Party accepting the welding work	Remarks on the control
1	2	3	4	5	6	7	8	9	10	11	12	13

Notes:

1. Persons performing welding operations (welders) shall be qualified according to the requirements laid down in item 9 of BDS EN 17660-1. Persons shall be issued with a registered licence/certificate of competency. Staff responsible for the welding coordination (welding supervision) shall be qualified in accordance with BDS EN ISO 14731 "Welding coordination - Tasks and responsibilities (ISO 14731:2019)".
2. The testing of welded joints shall be carried out by destructive and/or non-destructive methods to be determined in the investment project under the "Constructive" section and/or specified in the construction contract.

Annex No 5
to Articles 56 and 65

Contracting Authority:
Builder:
Construction site:

Logbook of tensioning works on the construction site

Tensioning date	Type of components	Ambient air temperature during tensioning	Type of steel	Number of strings or ropes	Controllable strain (MPa)	Number and type of the tensioning press	Type of manometers	Parameters						Persons performing the tensioning		Accepted by:		Compressive strength of concrete during tensioning*	Loosening allowed by:	Note
								By design			Effective			Name and surname	Signature	Name and surname	Signature			
								P kN	p MPa	Δl cm	P kN	p MPa	Δl cm							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

* The following should be filled in:
– the compressive strength of the concrete before tensioning;
– the compressive strength of the concrete during tensioning after concrete is poured;
– the compressive strength of the concrete before release of the ropes, when concrete is poured after tensioning.

Annex No 6

to Articles 56 and 65

Contracting Authority:
Builder:
Construction site:

Logbook of Grouting Works

Date of grouting	Type and signature of the component	Location, signature, drawing No, item No.	Air temperature in degrees, C	Parameters of the injection grout									Working pressure by design, in MPa	Effective pressure, in MPa	Notes for deviations from the requirements of the project	Signatures: -Contractor -Contracting Authority
				by design					actual							
				mobility in s	compressive strength in MPa		water segregation in %	laying temperature in degrees C	mobility in s	compressive strength in MPa		water segregation in %	laying temperature in degrees C				
					on day 7	on day 28				on day 7	on day 28						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Annex No 7

to Article 83

Requirements for the finished appearance of the concrete surface

1. For each finished appearance of the concrete surface of the concrete and reinforced concrete elements, the following requirements must be specified in the design documents:

(a) visible form-work material – acceptability of the form-work material leaving an imprint on concrete that is not a specific part of the finished appearance on the surface. Discretion of the builder to use different types of facial materials to secure longer use of the front part of the form-work;

(b) colour – no requirement for uniformity or shade of colour except where special coloured materials are used;

(c) cams – limitations as to the size, depth and frequency should be given where appearance is important;

(d) abrupt and smooth irregularities – their size and frequency should be given. These irregularities are independent of the tolerances allowed for the component and shall include only irregularities on the face of the formwork;

(e) corrections – eligibility of corrections to improve the finished appearance.

2. Typical cases of application of the different types of finished species for corrugated and non-corrugated surfaces, which may be

included as requirements in the execution specification are stated in Table 1.

Table 1

Types of finished appearance on the surface

Type	Normal application	Examples
Shaped surfaces		
Main finished appearance	Where no special requirements are necessary	Foundations
Plain finished appearance	Where the appearance does not matter or an additional means will be applied to obtain a finished appearance	Areas with application of plasters for finished appearance or invisible surfaces such as inner parts of pipelines or elevator shafts
Finished appearance of the facade	Where the visual effect has some significance	Areas that are sometimes visible, and areas that are prepared for direct painting where there are some specific requirements
Special finished appearance	Where special requirements have to be stated	Areas for which the correct surface and/or colour are important
Unshaped surfaces		
Main finished appearance	A closed uniform surface obtained by levelling. No further work required	Areas for laying screeds or other means of finished appearance
Plain finished appearance	A flat uniform surface levelled by rough smoothing or similar process	Areas for double flooring or laying of other floor coverings
Finished appearance of the facade	Solid smooth surface obtained by fine smoothing with a trowel or the like	Ordinary warehouses and factories, areas with premises and workspaces with no finishing on the surface other than paint
Special finished appearance	Surface to which special requirements must be made for further processing for another finished appearance	Floor areas in warehouses for special traffic

Annex No 8
to Article 85

Contracting Authority:
Builder:
Construction site:

Logbook of the Concrete Works

Construction (component)	Concrete class [1]	Concrete volume	Curing of concrete (treatment method)	Date of concrete placement (date/month/year)	Consistency of the concrete mix[2]	Description of the place of measurement of the temperature of the concrete mix and the concrete	Temperature measurements		Beginning and end of removal of the form-work		Control test pieces[3]			Note[5]
							Temperature of the concrete mix °C	Ambient air temperature at the beginning and end of the concrete placement °C	Beginning date, time/End date, time	Temperature of concrete °C[4]	Design ation	Curing conditions	Characteristics (strength of pressure, etc.), protocol No, date, result	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Notes:

1. The class of concrete and its characteristics shall be in accordance with BDS EN 206, BDS EN 206/NA and WP.OSSPNI-2.1;
2. Measurement of the consistency of the concrete mixture shall be carried out in cases where agreed by the parties;
3. Testing of control test pieces shall be carried out where agreed by the parties;
4. In the absence of data in column 11, the average daily temperatures according to National Institute of Meteorology and Hydrology (NIMH) shall be recorded;
5. In case of heat treatment of concrete, the date and time of the thermal input (steam, electric current, etc.) shall be recorded and when thermal insulation coatings (the “thermos” method, etc.) shall be used – the date and time of laying and removal of the thermal insulation coating;

Annex No 9

to Article 89

Contracting Authority:
Builder:
Construction site:

Installation works logbook

Date of execution of the work	Description of the work carried out	Installation location and assembly scheme number	Element production number, certificate number of reinforced concrete elements (Steel Structure Certificate No)	Air temperature and weather condition	Name and surname of the performer (signature)	Name and surname of the accepting party	Signature for acceptance of the installation	Note
1	2	3	4	5	6	7	8	9

Annex No 10

to Article 98

Contracting Authority:
Builder:
Construction site:

Anti-corrosion protection logbook for welded joints

Date of performance of the work	Name of the joined components and type (material) of the anti-corrosion factory coating	Place or No (in accordance with the drawing or scheme) of the joined components	Notes on the acceptance of the anti-corrosion protection node	Material of the coating of the joints and method of its application	Weather conditions during the laying of anti-corrosion protection	Name and initials of performers	Contractor's signature	Results of the inspection of coverage quality. Coverage thickness	Signatures for acceptance of anti-corrosion protection	Note
1	2	3	4	5	6	7	8	9	10	11

Annex No 11

to Article 99

Contracting Authority:
Builder:
Construction site:

Logbook for the grouting of joints

Date of concrete placement	Name of the grouting	Design concrete grade and mix composition	Ambient air temperature in degrees, °C	Temperature of preheated elements	Temperature of concrete at the time of laying	Control test pieces			Date of removal of the form-work	Name and initials of the contractor (signature)	Signature for acceptance of the grouting	Note
						designation	curing conditions	strength, Protocol No, Date, Results				
1	2	3	4	5	6	7	8	9	10	11	12	13