



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 50077-2017

Replacing GB 50077-2003

Code for design of reinforced concrete silos

钢筋混凝土筒仓设计标准

(English Translation)

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Table of Contents

1	General provisions
2	Terms and symbols
2.1	Terms
2.2	Symbols
3	Layout principle and structure selection
3.1	General requirements
3.2	Layout principle
3.3	Structure selection
4	Actions on structures
4.1	Classification of actions and load effect combination
4.2	Pressure of stored materials
4.3	Thermal action
5	Structural calculation
5.1	General requirements
5.2	Silo roof, silo wall and silo bottom structures
5.3	Prestressing of silo walls
5.4	Supporting structure below the silo and foundation
6	Detailing
6.1	Walls and supporting walls of circular silos
6.2	Walls of rectangular silos
6.3	Openings
6.4	Hoppers
6.5	Columns and ring beams
6.6	Liners
6.7	Seismic detailing measures
6.8	Prestressed concrete silo walls
7	Stacking tubes
7.1	Layout principle
7.2	Classification of actions
7.3	Load calculation
7.4	Stability checking
7.5	Structural calculation

7.6 Detailing

8 Trough bunkers

8.1 Layout and type

8.2 Structural calculation

8.3 Detailing

Appendix A Physical characteristic parameters of stored materials

Appendix B Discharge load on silo walls of circular silos with large outlet eccentricity

Appendix C Formulas for calculating stored material pressure in squat silos

Appendix D Values of coefficients $\xi = \cos^2 \alpha + k \sin^2 \alpha$, $k = \tan^2 (45^\circ - \phi/2)$
and $\lambda = (1 - e^{(-\mu k s/\rho)})$

Appendix E Reduction factors of concrete and steel reinforcement strength under thermal action, strength of prestressing tendons, friction coefficients; calculated values of the functions of the boundary effect of the fixed-end restraint of the foundation on the silo wall for circular silos with walls resting directly on the ground and squat silos under horizontal lateral pressure of stored material, and of the secondary bending moments and secondary shear forces due to prestress tensioning of silos

Appendix F Lateral stiffness of frame-supported reinforced concrete rectangular silos

Appendix G Stress calculation of interstice silo walls and openings

Appendix H Internal force calculation of axisymmetric shells of revolution under axisymmetric loads

Appendix K Internal force calculation of rectangular silos as plane members

Explanation of wording in this standard

List of quoted standards

Addition: Explanation of provisions

Foreword

According to the requirements of the "Notice on Printing and Distributing the Plan for Formulating and Revising Engineering Construction Standards and Codes in 2011" (Jianbiao [2011] No. 17) issued by the Ministry of Housing and Urban-Rural Development, the drafting group of this standard, through extensive investigation and research, careful summary of practical experience, reference to relevant international standards and advanced foreign standards, and on the basis of wide solicitation of opinions, has revised this standard.

This standard consists of 8 chapters and 9 appendices. The main contents include: general provisions, terms and symbols, layout principle and structure selection, actions on structures, structural calculation, detailing, stacking tubes, trough bunkers, etc.

The main revisions are as follows:

- (1) Provisions of the "Code for design of reinforced concrete silos" GB 50077-2003 (hereinafter referred to as the original standard) whose wording was not clear have been revised, and further elaboration is given in the explanation of provisions;
- (2) Necessary adjustments have been made to the classification of slender silos and shallow bins;
- (3) New provisions have been added on the distinction between the methods for calculating stored material pressure in small shallow bins and in large circular shallow bins;
- (4) In view of the characteristics of the thin-shell structure of silos, design contents for prestressing applicable to silos have been added;
- (5) Calculation and design contents for thermal action on circular silos with a diameter greater than 30 m have been added;
- (6) In accordance with the requirements of the service function and structural characteristics of silos, the points where the provisions of this standard differ from those of other related codes have been clearly defined, and necessary explanations are given in the explanation of provisions;
- (7) Design contents for stacking tubes have been added in this revision, and stacking tubes have been compiled as Chapter 7 of this standard; trough bunkers in Appendix A of the original standard have been changed to Chapter 8 of this standard; the title of original Appendix B has been changed to "Discharge load on silo walls of circular silos with large outlet eccentricity", and the title of Appendix C has been changed to "Formulas for calculating stored material pressure in squat silos"; the design contents of Appendix G of the original standard have been substantially adjusted and supplemented and changed to Appendix K of this standard; Appendix F "Lateral stiffness of frame-supported reinforced concrete rectangular silos" has been added;
- (8) The special foreign-language terms in Chapter 2 "Terms and symbols" have been revised in accordance with the provisions of the International Organization for Standardization (ISO) and the professional terms commonly used abroad in recent years; Chapter 3 adds the design working life, seismic fortification category, structural safety class and conditions of use of silos, and specifies the conditions and provisions for the use of high-strength reinforcement HRB400 and HRB500 in silo structures; Chapter 4 (Loads on structures) has been changed to "Actions on structures".

The provisions printed in bold type in this standard are mandatory provisions and shall be strictly implemented.

The Ministry of Housing and Urban-Rural Development is in charge of the administration of this standard and the explanation of the mandatory provisions; China National Coal Construction Association is responsible for its routine management; and Beijing Huayu Engineering Co., Ltd. of China Coal Technology and Engineering Group is responsible for

the explanation of specific technical contents. During the implementation of this standard, any comments and suggestions for modification and supplement should be sent to the "Standard Group of Reinforced Concrete Silos" of Beijing Huayu Engineering Co., Ltd., China Coal Technology and Engineering Group (address: No. 67 Ande Road, Xicheng District, Beijing; postcode: 100120) for reference in future revision.

Chief development organization: Beijing Huayu Engineering Co., Ltd., China Coal Technology and Engineering Group

Participating development organizations: North China Power Engineering Co., Ltd. of China Power Engineering Consulting Group; Northeast Electric Power Design Institute Co., Ltd. of China Power Engineering Consulting Group; Northwest Electric Power Design Institute Co., Ltd. of China Power Engineering Consulting Group; Tianjin Cement Industry Design and Research Institute Co., Ltd.; Sinoma International Engineering Co., Ltd.; China Coal Handan Design Engineering Co., Ltd.; China Coal Xi'an Design Engineering Co., Ltd.; MCC Changtian International Engineering Co., Ltd.; Changsha Engineering and Research Institute of Nonferrous Metallurgy Co., Ltd.; Henan Gongda Design and Research Institute; Guomao Engineering Design Institute; Jiangsu Xinzhu Prestressed Engineering Co., Ltd.; School of Civil Engineering and Architecture, Henan University of Technology

Participating organization: Survey and Design Committee of China National Coal Construction Association

1 General provisions

1.0.1

This standard is formulated with a view to implementing the national technical and economic policies in the design of reinforced concrete silos, so as to achieve safety and applicability, economy and rationality, advanced technology, resource saving and assured quality.

1.0.2

This standard is applicable to the design of cast-in-situ reinforced concrete silos with a circular or rectangular plan shape for storing granular materials and compressed-air homogenized mixed powder materials. It is not applicable to the design of silos for storing green fodder, fibrous granular materials or wet-mixed materials.

1.0.3

The design of reinforced concrete silos shall comply not only with this standard but also with the provisions of the current relevant national standards.