



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

GB 50003-2011

Replacing GB 50003-2001

Code for design of masonry structures

砌体结构设计规范

(English Translation)

Issued on: July 26, 2011

Implemented on: August 1, 2012

Issued by: Ministry of Housing and Urban-Rural Development

Table of Contents

1	General Provisions
2	Terms and Symbols
2.1	Terms
2.2	Symbols
3	Materials
3.1	Strength Class of Materials
3.2	Calculation Data of Masonry
4	Basic Rules on Design
4.1	Principles of Design
4.2	Stipulations for Static Calculation of Buildings
4.3	Rules on Durability
5	Unreinforced Masonry Members
5.1	Compression Members
5.2	Local Compression
5.3	Members Subjected to Axial Tensile Load
5.4	Members Subjected to Bending
5.5	Members Subjected to Shear
6	Detailing Requirements
6.1	Verification for Slenderness Ratio of Wall and Column
6.2	General Detailing Requirements
6.3	Frame Filled Wall
6.4	Cavity Wall Filled with Insulation
6.5	Main Measures to Prevent Walls from Cracking
7	Ring Beams, Lintels, Wall Beams and Cantilever Beams
7.1	Ring Beams
7.2	Lintels
7.3	Wall Beams
7.4	Cantilever Beams
8	Reinforced Brick Masonry Members
8.1	Mesh-reinforced Brick Masonry Members
8.2	Composite Brick Masonry Members
9	Reinforced Concrete Masonry Members

9.1 General Requirements
9.2 Calculation of Reinforced Masonry Members Subjected to Axial Compression
9.3 Calculation of Reinforced Masonry Members Subjected to Shear
9.4 Detail Stipulation of Reinforced Concrete Masonry Shear Walls
10 Earthquake Resistance Design for Masonry Structure Members
10.1 General Requirements
10.2 Brick Masonry Members
10.3 Concrete Masonry Members
10.4 Earthquake Resistant Elements of Masonry Buildings with Bottom Frames
10.5 Earthquake Resistant Wall of Reinforced Concrete Masonry
Appendix A Specification and Dimension of Stone Materials and the Method for Defining the Strength Grades of Stone Materials
Appendix B Calculating Formulas for Strength Mean Values of Various Kinds of Masonry and Their Characteristic Strength Values
Appendix C Statical Calculation of "Semi-rigid" Buildings
Appendix D Influence Coefficients ψ and ψ_{in}

1.0.1

This code is formulated with a view to implementing the technical and economic policies of the nation, persisting in wall material innovation, adjusting measures to local conditions, using local materials, reasonably selecting structural scheme and masonry materials, and achieving advanced technology, safety and usability, economy and rationality and quality guarantee.

1.0.2

This code is applicable to the design of the following masonry structures in building engineering, and the design for special conditions or with specific requirements shall be carried out according to special requirements:

- 1 Brick masonry: including unreinforced and reinforced masonry of fired common brick, fired perforated brick, autoclaved sand-lime brick, autoclaved flyash-lime brick, common concrete brick and perforated concrete brick;
- 2 Block masonry: including unreinforced and reinforced masonry of concrete block and light aggregate concrete block;
- 3 Stone masonry: including masonry of various squared stones and rubbles.

1.0.3

This code is established according to the principle specified in the current national standard "Unified Standard Reliability Design of Building Structures" GB 50068. The design terms and symbols are adopted according to the requirements of the current national standard "Standard for Terminology and Symbols Used in Design of Building Structures" GB/T 50083.

1.0.4

For design according to this code, the load shall comply with the current national standard "Load Code for the Design of Building Structures" GB 50009; the selection and application of wall materials shall comply with the current national standard "Uniform Technical Code for Wall Material used in Buildings" GB 50574; the selection of concrete materials shall meet the requirements of the current national standard "Code for Design of Concrete Structures" GB 50010; the construction quality control shall meet the requirements of the current national standards "Code for Acceptance of Constructional Quality of Masonry Structures" GB 50203 and "Code for Acceptance of Constructional Quality of Concrete Structures" GB 50204; and the structural earthquake resistance design shall meet the relevant requirements of the current national standard "Code for Seismic Design of Buildings" GB 50011.

1.0.5

The masonry structure design shall not only comply with this code, but also those in the current relevant ones of the nation.

2.1.1 Masonry structure

Structure that wall and column built with block and mortar are used as the main loaded members of the building. It is the general term of brick masonry, block masonry and stone masonry structure.

2.1.2 Reinforced masonry structure

Structure that the reinforced masonry is used as the main loaded member of the building. It is the general term of mesh-reinforced masonry column, horizontal reinforced masonry wall, brick masonry and reinforced concrete layer or composite masonry column (wall) of reinforced mortar layer, composite wall of brick masonry and structural reinforced concrete column and reinforced concrete masonry shear wall structure.

2.1.3 Reinforced concrete masonry shear wall structure

Building structure composed of reinforced concrete masonry shear wall bearing vertical and horizontal action and concrete floor and roof.

2.1.4 Fired common brick

Roasted solid brick which takes coal gangue, shale, flyash or clay as the major raw materials, including fired coal gangue brick, fired shale brick, fired flyash brick, fired clay brick, etc.

2.1.5 Fired perforated brick

Fired brick that takes coal gangue, shale, flyash or clay as the major raw materials, with void ratio not greater than 35%, with small and more holes, and is mainly used for bearing position.

2.1.6 Autoclaved sand-lime brick

Solid brick which takes limy materials such as lime and siliceous materials such as sand as the major raw materials and is formed through blank preparation, pressing exhaust forming and autoclave curing.

2.1.7 Autoclaved flyash-lime brick

Solid brick which takes limy materials such as lime, slaked lime (carbide slag) or cement and siliceous materials such as flyash as well as aggregates (sand, etc.) as the major raw materials, adds an adequate amount of gypsum, and is formed through blank preparation, pressing exhaust forming and autoclave curing.

2.1.8 Concrete small hollow block

Hollow block which is made of ordinary concrete or light aggregate concrete, with a main dimension of 390mmx190mmx190mm and hollow ratio of 25%~50%, referred to as concrete block or masonry block.

2.1.9 Concrete brick

A perforated concrete half blind hole brick or solid brick which takes cement as cementitious material and sand, stone, etc. as the main aggregates and is made through mixing with water, forming and curing. The main dimensions of perforated bricks are 240mmx115mmx90mm, 240mmx190mmx90mm, 190mmx190mmx90mm, etc.; the main dimensions of solid bricks are 240mmx115mmx53mm, 240mmx115mmx90mm, etc.