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National Standards of the People's Republic of China

GB/T 8239-2014
Replace GB 8239-1997

Normal concrete small block

普通混凝土小型砌块

(English Translation)

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Standardization Administration of the People's Republic of China

Foreword

SAC/TC 285 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard is drafted in accordance with the rules given in the GB/T 1.1-2009 *Directives for standardization - Part 1: structure and drafting of standards*.

This standard replaces the GB 8239-1997 *Normal concrete small block* in whole. In addition to a number of editorial changes, the following technical deviations have been made with respect to the GB 8239-1997 *Normal concrete small block*.

-- Add content of the solid block.
-- Add the terms and definitions in chapter 3.
-- Cancel the classification in the original standard according to dimension deviation and appearance quality, instead of hollow rate and usage of the block.
-- Cancel the MU3.5 strength grade of the block and add MU25, MU30, MU35 and MU40(4.1.2 in 1997 and 4.2 in this edition). Reclassify the strength grade according to the hollow rate and usage of the block.
-- Modify the requirement of dimension deviation, appearance quality and frost resistance (6.1.4, 6.2, 6.6 in 1997 and 6.1, 6.2, 6.8 in this edition).
-- Cancel the impermeability and add the absorption rate and linear drying shrinkage (6.5 in 1997 and 6.6, 6.7 in this edition).
-- Add the radionuclide limits for block(6.11 in this edition).

This standard was proposed by China building materials association.

This standard was prepared by SAC/TC National wall roofing and road building materials(SAC/TC 285).

This Standard was proposed by China Building Material Industry Federation.

This standard was prepared by SAC/TC 285 National Technical Committee 285 on Wall & Roof and Paving Building Materials of Standardization Administration of China.

The previous editions of standard are as follows:
-- GB 8239-1987, GB 8239-1997.

Normal concrete small block

1 Scope

This standard specifies the terms and definitions, dimension, types, grades and marking, raw materials, technical requirements, test methods, test rules, product certificates, stacking and transportation, etc of the normal small ordinary concrete block.

This standard is applicable to the normal small ordinary concrete block (hereinafter referred to as block) for industrial and civil construction.

2 Normative reference documents

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated reference, the latest edition of the referenced document (including any amendments) applies.
GB 175 *Common portland cement*
GB/T 1596 *Fly ash used for cement and concrete*
GB/T 4111 *Test methods for the concrete block and brick*
GB 6566 *Limit of radionuclide in building materials*
GB 8076 *Concrete admixtures*
GB/T 14684 *Sand for construction*
GB/T 14685 *Pebble and crushed stone for construction*
GB/T 18046 *Ground granulated blast furnace slag used for cement and concrete*
GB/T 18968 *Terms of wall materials*
GB/T 25176 *Recycled fine aggregate for concrete and mortar*
GB/T 25177 *Recycled coarse aggregate for concrete*
GB 50176 *Code for thermal design of civil buildings*
JGJ 63 *Standard of water for concrete*
YBJ 20584 *Technical conditions for heavy blast furnace slag and gravel for concrete*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 18968 and following apply.

3.1
normal concrete small block
small block being made of cement, mineral admixture, sand, stone and water, and other raw materials, through mixing, vibration molding, curing and other processes, including hollow and solid masonry block

3.2
main shape block

the block is a right-angle hexahedron which length is 400mm minus the thickness of vertical mortar joint in masonry and height are 200mm minus the horizontal and the side surface is closed and intact

3.3
auxiliary block
special shape and size block used in conjunction with the main block, is divided into hollow and solid, including all kinds of special-shaped blocks, such as ring beam block, one end-open block, 7 inch length block, half block, etc

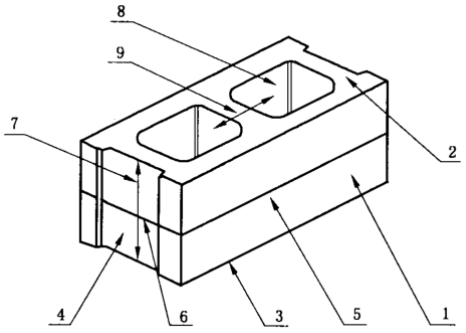
3.4
blocks without mortar
blocks being connected with each other by tongue-and-groove structure without masonry mortar in the process of masonrying the block into wall

4 Dimension, classification, grade and marking

4.1 Dimension

4.1.1 The name of each part of the main type block

The name of each part of the main type block see figure 1.



Instructions:
1——side face
2——bottom face
3——top face
4——end surface
5——length
6——width
7——height
8——shell
8——rib

Figure 1 The name of each part of the main type block

4.1.2 The shape of the block should be a right angle hexahedron. The commonly used block dimension see table 1.

Table 1 Dimension of the block Unit: mm

Length	Width	Height
390	90,120,140,190,240,290	90,140,190
Note: Other dimensions are determined by negotiation between the supply and demand parties. The block type thin mortar joint can be adjusted accordingly.		

4.2 Classification

4.2.1 Block is divided into hollow (hollow rate ≥25%, code name H) and solid (hollow rate <25%, code name S) according to the hollow rate.

4.2.2 Based on the structure and stress of the masonry wall in use, the block is divided into load-bearing structure block (code name L, load-bearing block for short) and non-load-bearing structure block (code name N, non-load-bearing block for short).

4.2.3 The commonly used auxiliary block codes are half block—50, 7 inch length block—70, ring beam block—U and block with cleaning hole—W.

4.3 Grade

The block classification based on the compressive strength sees Table 2.

Table 2 Strength grade of the block Unit: MPa

Classification	Load-bearing block(L)	Non-load-bearing block(N)
Hollow block(H)	7.5,10.0,15.0,20.0,25.0	5.0,7.5,10.0
Solid block(S)	15.0,20.0,25.0,30.0,35.0,40.0	10.0,15.0,20.0

4.4 Marking

Block marking shall be in the following order: block type, dimension, strength grade (MU) and standard code.

For example:

a) Dimension 390mm×190mm×190mm, strength grade MU15.0, solid block for load-bearing, the mark is: LS 390×190×190 MU15.0 GB/T 8239-2014.

b) Dimension 395mm×190mm×194mm, strength grade MU5.0, hollow block for non-load-bearing, the mark is: NH 395×190×194 MU5.0 GB/T 8239-2014.

c) Dimension 190mm×190mm×190mm, strength grade MU15.0, half block for load-bearing, the mark is: LH 190×190×190 MU15.0 GB/T 8239-2014.

5 Raw material

5.1 Cement

It shall meet the requirements of GB 175.

5.2 Aggregate

5.2.1 Fine aggregate

It shall meet the requirements of GB/T 14684; recycled fine aggregate shall meet the requirements of GB/T 25176.

5.2.2 Coarse aggregate

The rubble and pebble shall meet the requirements of GB/T 14684; the recycled coarse aggregate shall meet the requirements of GB/T 25177; the heavy slag shall meet the requirements of YBJ 20584. The maximum particle size of coarse aggregate shall not be greater than 10mm.

5.3 Fly ash

It shall meet the requirements of GB/T 1596.

5.4 Granulated blast furnace slag powder

It shall meet the requirements of GB/T 18046.

5.5 Water

It shall meet the requirements of JGJ 63.

5.6 Additive

It shall meet the requirements of GB 8076.

5.7 Other materials

Other raw materials shall meet the requirements of the relevant standards and shall not be harmful to the durability of the block, the environment and the human body.

6 Technical requirements

6.1 Dimension deviation

The allowable dimension deviation of the block shall meet the requirements in Table 3.For thin mortar joint block, the allowable height deviation shall be controlled in the +1 mm to -2 mm.

Table 3 Allowable dimension deviation Unit: mm

Item	Index
Length	±2
Width	±2
Height	+3,-2
Note: The allowable dimension deviation of the block without mortar shall be given by the enterprise according to the characteristics of the block. Dimension deviation shall not affect the performance of masonry and wall.	

6.2 Appearance quality

The appearance quality of the block shall meet the requirements in Table 4.

Table 4 Appearance quality

Item			Index
Warping		≤	2 mm
Chipping and arris effected	Number	≤	1
	The maximum size of the projection size in three directions	≤	20 mm
Total projected dimensions of crack extension.		≤	30 mm

6.3 Hollow rate

The hollow rate of hollow block(H) shall not be less than 25%, and the hollow rate of solid

block(S) shall be less than 25%.

6.4 Shell and rib thickness

6.4.1 The minimum shell thickness of the load-bearing hollow block shall not be less than 30mm, and the minimum rib thickness shall not be less than 25mm.

6.4.2 The minimum shell and rib thickness of the non load-bearing hollow block shall not be less than 20mm.

6.5 Strength grade

The Strength grade of the block shall meet the requirements in Table 5.

Table 5 Strength grade

Unit: MPa

Strength grade	Compressive strength	
	Mean value ≥	Minimum value of the single block ≥
MU5.0	5.0	4.0
MU7.5	7.5	6.0
MU10	10.0	8.0
MU15	45.0	12.0
MU20	20.0	16.0
MU25	25.0	20.0
MU30	30.0	24.0
MU35	35.0	28.0
MU40	40.0	32.0

6.6 Water absorption

The water absorption of the type L shall not be exceed 10%, and the type N shall not be exceed 14%.

6.7 Linear drying shrinkage

The linear drying shrinkage of the type L shall not be exceed 0.45mm/m, and the type N shall not be exceed 0.65mm/m.

6.8 Frost resistance

The frost resistance of block shall meet the requirements in Table 6.

Table 6 Frost resistance

Working condition	Index	Mass loss rate	Strength loss rate
Hot summer and warm winter region	D15	Mean value≤5%. Maximum value of the single block ≤10%.	Mean value≤20%. Maximum value of the single block≤30%.
Hot summer and cold winter region	D25		
Cold region	D35		
Severe cold region	D50		
Note: The working conditions shall conform to GB 50176.			

6.9 Carbonation coefficient

The carbonation coefficient of block shall not be less than 0.85.

6.10 Softening coefficient

The Softening coefficient of block shall not be less than 0.85.

6.11 Radionuclide limits

The radionuclide limits shall meet the requirements of GB 6566.

7 Test Methods

The test method of radionuclide limit is in accordance with GB 6566, and that of other performance are in accordance with GB/T 4111. When it is unable to get the complete rectangular hexahedron specimens with closed hole for compression from the auxiliary block, the test method of compression strength is in accordance with GB/T 4111, Annex B. For block with a length less than 290mm, the gange length of the hand-held strain gauge is 150mm when measuring the linear drying shrinkage value.

8 Inspection rule

8.1 Inspection classification

Testing category is divided into delivery inspection and type inspection.

8.1.1 Delivery inspection

Test items include appearance quality, dimension deviation, minimum shell and rib thickness, strength grade.

8.1.2 Type inspection

Test items include all items required in chapter 6 of this standard. In any of the following conditions, type inspection shall be performed.

a) When new product launch or product identification.
b) After official manufacturing, raw materials, ratio and production process changes.
c) It shall be performed annually upon normal manufacturing.
d) Resume production after suspension for more than 3 months.
e) When the delivery inspection results are quite different from those of the last type inspection

8.2 Batch rule

Block shall be inspected in batches according to specifications, types, ages and strength grades. For block made from the same raw material, with same specification, age, strength grade and process, 500m^3 and no more than 30,000 pieces are as a batch. Blocks less than 500m^3 and no more than 30,000 pieces produced per week are regarded as a batch.

8.3 Sampling rule

8.3.1 For dimension deviation and appearance quality test, 32 samples are extracted from each inspection batch by random.

8.3.2 Samples of other inspection items are extracted from the batches with dimension deviation and appearance quality qualified by random. The sampling quantity sees Table 7.

Table 7 Sampling quantity Unit: block

Test Item	Sampling quantity	
	(H/B≥0.6)	(H/B<0.6)
Hollow rate	3	3
Shell and rib thickness	3	3
Strength grade	5	10
Water absorption	3	3
Linear drying shrinkage	3	3
Frost resistance	10	20
Carbonation coefficient	12	22
Softening coefficient	10	20
Radionuclide limits	3	3
Note: (H/B) refer to the ratio between the pressure height(H) and the minimum horizontal size(B) of the sample in actual use.		

8.4 Judgment rule

8.4.1 If the dimension deviation and appearance quality of the inspected block comply with the corresponding indexes in Table 3 and 4, the block is determined to be qualified, otherwise, it is unqualified.

8.4.2 If the number of unqualified blocks of dimension deviation and appearance quality is no more than 7 out of 32 blocks inspected, the batch of blocks is determined to be qualified, otherwise, it is unqualified.

8.4.3 When test results of all items meet the technical requirements in chapter 6 of this standard, the batch of blocks is determined to conform to the corresponding grade, otherwise, it is unqualified.

9 Product certificate, stack and transportation

9.1 The block shall leave the factory after 28 days of curing.

9.2 Upon delivery of the blocks, the product certificate shall be provided and content including:

a) Enterprise name and brand;

b) Lot number and block quantity;

c) Product marking and production date;

d) The delivery testing report and type test report within validity period.

9.3 Block shall be stacked separately according to the same mark and shall not be mixed. More than 10% of blocks should be marked with identification.

9.4 In the process of stacking, transportation and masonry block, there should take rain-proof measures, and film packaging should be used.

9.5 When loading and unloading, the products shall be handled gently to avoid collision and breaking. Tipping bucket is prohibited.

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