

Translated English of Chinese Standard: GB/T5072-2008

www.ChineseStandard.net

Sales@ChineseStandard.net

GB

ICS 81.080

Q 40

NATIONAL STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 5072-2008

Replacing GB/T 5072.1-1998, GB/T 5072.2-2004, GB/T 3997.2-1998

Refractories –

Determination of cold compressive strength

耐火材料 常温耐压强度试验方法

(ISO 8895:2004, ISO 10059-1:1992 & ISO 10059-2:2003, MOD)

GB/T 5072-2008 How to BUY & immediately GET a full-copy of this standard?

1. www.ChineseStandard.net;
2. Search --> Add to Cart --> Checkout (3-steps);
3. No action is required - Full-copy of this standard will be automatically & immediately delivered to your EMAIL address in 0~25 minutes.
4. Support: Sales@ChineseStandard.net. Wayne, Sales manager

Issued on: June 26, 2008

Implemented on: April 01, 2009

**Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China;
Standardization Administration of the PRC.**

Table of contents

Foreword.....	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Principles.....	6
5 Equipment and materials.....	6
6 Method 1 - Dense shaped refractory products compressive strength test method without packing (Arbitration method).....	8
7 Method 2 - Dense refractory materials compressive strength test method with packing	10
8 Method 3 - Insulating refractory material compressive strength test methods	12
9 Result calculation	14
10 Test report.....	15
Appendix A (Informative) Clause number comparison between this standard AND ISO 8895, ISO 10059-1 and ISO 10059-2.....	16
Appendix B (Informative) The technical differences between this standard and ISO 8895, ISO 10059-1 and ISO 10059-2 AND their causes	17

Foreword

This standard, through modification, adopts ISO 8895:2004 “Shaped insulating refractory products - Determination of cold crushing strength”, ISO 10059-1:1992 “Dense shaped refractory products - Determination of cold compressive strength - Part 1: Referee test without packing” (English), AND ISO 10059-2:2003 “Dense shaped refractory products - Determination of cold compressive strength - Part 2: Test with packing” (English).

This standard was redrafted in accordance with ISO 8895:2004, ISO 10059-1:1992 and ISO 10059-2:2003. Appendix A provides a list of the clause number differences between this standard and the ISO standard. Appendix B provides the technical differences and causes between this standard and ISO standards. The relevant technical differences have been identified by a vertical single line in the margins of the clauses covered by the standard.

This standard is, from the technical content, exactly same as ISO 8895:2004, ISO 10059-1:1992 and ISO 10059-2:2003. The main differences between this standard and the above standards are as follows:

- COMBINE the contents of ISO 8895:2004, ISO 10059-1:1992 and ISO 10059-2:2003 and COMPILE the standard in chapters;
- EXTEND the scope of application from the shaped refractory products into refractory materials;
- MODIFY the reference to the corresponding international standards into the corresponding Chinese standards;
- ADD the information of unshaped refractory materials;
- ADD Appendix A and Appendix B.

This standard replaces GB/T 5072.1-1998 “Dense, shaped refractory products - Determination of cold compressive strength - Part 1: Referee test without packing”, GB/T 5072.2-2004 “Dense, shaped refractory products - Determination of cold compressive strength - Part 1: Test with packing” and GB/T 3997.2-1998 “Shaped insulating refractory products - Determination of cold crushing strength”.

As compared with GB/T 5072, the main changes of this standard are as follows:

- COMBINE some contents of GB/T 5072.1-1998, GB/T 5072.2-2004, GB/T 3997.2-1998, YB/T 5118-1993 and YB/T 5201-1993 and COMPILE the standard in chapters;

Refractories –

Determination of cold compressive strength

1 Scope

This standard specifies the definition, principle, equipment, sample, test procedure, result calculation and so on of the determination of cold compressive strength of refractories.

This standard is applicable to the determination of cold compressive strength of dense and insulating refractory materials.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 10325 Shaped refractory products - Rule of acceptance, sampling and inspection

3 Terms and definitions

The following terms and definitions apply to this standard:

3.1

Cold compressive strength

It refers to the ultimate pressure bearable by the refractory material per unit area under normal temperature before being damaged if the pressure is applied in accordance with the specified conditions.

3.2

Dense shaped refractory product

It refers to the refractory products of a specific size with the true porosity of less than 45%.

3.3

Shaped insulating refractory product

It refers to the refractory products with the true porosity of not less than 45%.

3.4

Unshaped refractory

It refers to the bulk refractory materials mixed by aggregate, fine powder and binder. If necessary, it may add the admixtures.

4 Principles

Under specified conditions, APPLY load to the a test specimen of known size at a constant pressing rate, until the test specimen is broken or compressed to 90% of its original size; RECORD the maximum load. Based on the maximum load bearable by the test specimen AND the average compressive cross-sectional area, CALCULATE the cold compressive strength.

5 Equipment and materials

5.1 Mechanical or hydraulic pressure testing machine

It is equipped with the device which can determine the pressure applied to the test specimen, with the indication error within $\pm 2\%$. The testing machine shall be capable of applying a uniform stress at a specified rate. The measurement range of the testing machine shall ensure that the maximum stress applied to the test specimen is greater than 10% of the measurement range.

The pressing plate of the testing machine shall comply with the following requirements:

- a) Rockwell hardness 58 HRC ~ 62 HRC;
- b) The flatness error of the surface contact with the sample is 0.03 mm;
- c) The surface roughness (average roughness value Ra) is $0.8\ \mu\text{m}$ ~ $3.2\ \mu\text{m}$ (average roughness making reference to the plane grinding standard, measured by touching or naked eye observation).

5.5 Liner plate, which is the thickness of 3 mm ~ 7 mm non-corrugated paperboard or cardboard.

5.6 The triangular plate.

5.7 Feeler gauge.

5.8 Steel ruler.

6 Method 1 - Dense shaped refractory products compressive strength test method without packing (Arbitration method)

6.1 Test specimens

6.1.1 The test specimen shall be a cylinder with a diameter of $50\text{ mm} \pm 0.5\text{ mm}$ and a height of $50\text{ mm} \pm 0.5\text{ mm}$. If the size of the test specimen cannot meet this requirement, it may also use the cylinder with a diameter of $36\text{ mm} \pm 0.3\text{ mm}$ and a height of $36\text{ mm} \pm 0.3\text{ mm}$.

6.1.2 The test specimen shall be drilled from the formed compressive surface of the product. When preparing the sample, it shall record the original location of the test specimen in the product. The test specimen with cracks or apparent defects shall be recorded AND discarded.

The compressive surface at both ends of the cylindrical test specimen shall be ground flat AND kept parallel. To ensure the flatness of the upper and lower compressive surfaces of the test specimen, consecutively PRESS each end surface onto the horizontal plate backed by carbon paper and hard filter paper (0.15 mm thickness) at the pressure force of $3\text{ kN} \pm 1\text{ kN}$; if the pressing mark is incomplete or not clear, it shall be re-ground (Figure 2 ~ Figure 5).

Note: It may use the steel ruler to support the surface inspection; it is not allowed to use fire mud to smear the surface.

6.1.3 The parallelism of the test specimen shall be checked by measuring the height of 4 points. The measurement points are located at two diametrically opposite ends perpendicular to each other. The difference between the height of any two measurement points shall not exceed 0.2 mm.

6.1.4 PLACE the test specimen on a flat surface; USE the square edge of the triangle plate to check the perpendicularity of the test specimen at the 4

This method is used for daily quality control BUT not used to test the true value of cold compressive strength; it shall use the method 1 of this standard to test the true value of the cold compressive strength.

Note 1: This method cannot directly compare the test results of different size samples.

Note 2: The test results of this method cannot be directly compared with those of method 1 of this standard.

7.2 Test specimens

7.2.1 When the sample is a standard brick or the volume of the sample is $\leq 2000 \text{ cm}^3$, it shall take 1 test specimen from each sample; when the sample volume is relatively large, it may take 2 test specimens.

Note: The number of samples shall be consistent with the sampling plan, AND it is recommended to take at least 5 test specimens.

7.2.2 The dimensions of test specimen are as follows:

- a) A cylinder with a diameter of $50 \text{ mm} \pm 2 \text{ mm}$ and a height of $50 \text{ mm} \pm 2 \text{ mm}$;
- b) A cube with a length of $50 \text{ mm} \pm 2 \text{ mm}$;
- c) A cube with a length of $65 \text{ mm} \pm 2 \text{ mm}$ OR $75 \text{ mm} \pm 2 \text{ mm}$;
- d) Half block of standard brick;
- e) As for the unshaped materials, it is a cube with a length of $40 \text{ mm} \pm 2 \text{ mm}$ OR $65 \text{ mm} \pm 2 \text{ mm}$ (it may also use the bending strength to test the last 2 half test specimens).

If the size of the test specimen cannot meet the above requirements, USE as large a cylinder (height equal to diameter) or a cube as possible.

7.2.3 The test specimen shall be cut or drilled from the compressive surface of the product to ensure that the pressure application direction during the test is consistent with the direction of forming pressure application (except in special cases). The test specimens with cracks or obvious imperfections shall be recorded and discarded. As for the unshaped materials, USE the sides of the test specimen as the upper and lower pressure application surfaces.

7.2.4 The test specimen shall be cut or drilled from the product. The compressive surface of the test specimen shall be as parallel as possible AND perpendicular to the direction of compression as far as possible.

compressive strength test methods

8.1 Test specimens

8.1.1 The number of samples (bricks or prefabricated blocks) shall be determined in accordance with GB/T 10325 or other schemes as agreed upon by the parties concerned.

8.1.2 From each brick of standard size, PREPARE one block of test specimen.

Note: The number of test specimen as prepared from the large scale sample shall be agreed upon by the parties concerned. In order to facilitate statistical processing, the number of test specimen prepared from each sample shall be the same.

8.1.3 Each test specimen is usually one half of a standard brick, i.e. 114 mm × 114 mm × 76 (75 mm) OR 114 mm × 114 mm × 64 (65 mm).

The molding, curing, drying and roasting of the unshaped material test specimens shall be conducted in accordance with relevant regulations.

8.1.4 As for the products of special shapes, dry CUT the test specimen in accordance with any sizes as specified in 8.1.3.

Note: If possible, it shall indicate the load application direction AND the relationship with the test specimen compressive forming direction in the test report.

8.1.5 The flatness error of the compressive surface of the test specimen shall be within 0.5 mm. USE steel ruler and 0.5 mm feeler to check the two diagonal lines intersected on the compressive surface of each test specimen, in order to check whether the flatness of the test specimen meets the requirements.

8.1.6 The compressive surfaces of each test specimen shall be parallel with each other. In between the 4 edges of the compressive surface, MAKE 4 height measurements, AND the deviation between the measurement values shall not exceed 1 mm.

8.1.7 The vertical error between the 4 sides of the test specimen and its bottom shall be within 1 mm. The inspection method is to put the test specimen on one side; at the center point of the 4 bottoms, place one triangular plate, AND the gap between the vertical edge of the triangle plate and the test specimen shall not exceed 1 mm.

8.2 Test procedures

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

----- The End -----