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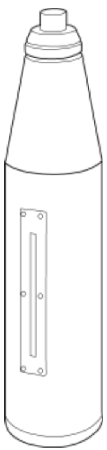
User Manual



Brick Rebound Hammer

Please read this manual carefully before using the product and keep it in a safe place.

Please read first

Thank you for choosing SISCO company's products, we will be happy to provide you with high quality products and fast service. Before using our products, please be sure to read the contents of this manual carefully.

1. The manual in the process of compiling the contents and data contained in the preparation of a correct and complete description, but does not guarantee that there are no errors or omissions, and will not assume any responsibility for any consequences arising therefrom.

2. We reserve the right to change the contents of the manual at any time without prior notice.

3. Our company will not be responsible for any possible loss caused by data deviation or incorrect test conclusions due to the failure of this instrument and related faults.

4. The use of this instrument means that you have fully read and accurately understood all the terms of this note, and you have fully agreed to all the terms of this note.

5. In the sales and service process not directly involved by our company, the signed

The Company shall not be liable for any content of the agreement that is contrary to this statement.

Catalogs

1. Overview

Brick rebound meter is a spring-driven impact hammer and through the impact rod impact sintered ordinary brick masonry or sintered porous brick masonry brick surface generated by the instantaneous elastic deformation of the restoring force, so that the impact hammer driven pointer rebound and indicate the rebound distance, the rebound value as a common brick masonry sintered brick masonry or sintered porous brick masonry brick compressive strength related to one of the indicators to determine the compressive strength of bricks and the standard.

Because the rebound meter lightweight, flexible, inexpensive, do not need power, easy to grasp, very suitable for on-site construction sites and small and medium-sized brick factories to use, to ensure that the quality of the brick factory to provide a proven standard testing instruments. zc4 rebound meter is in accordance with the national standard of the People's Republic of China “masonry engineering field testing technical standards” (GB/T50315-2011) production, its main indicators are:

1. Nominal kinetic energy 0.735J

2. Bouncing hammer impact length 75±0.3 mm

3. Pointer slider friction 0.5±0.1N

4. Working length of the spring 61.5±0.3 mm

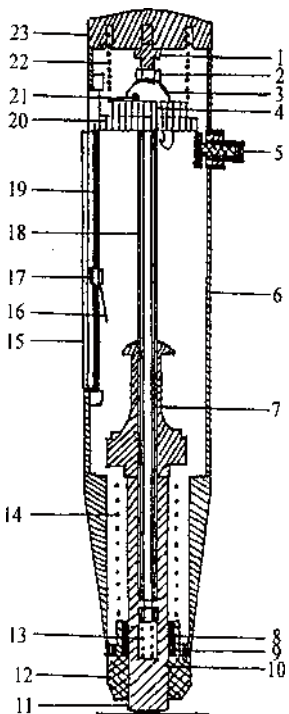
5. Ejector hammer decoupling position scale “100” line

6. Sphere radius of the end of the striking rod 25±lmm

7. Anvil on the rate value of 74 ± 2

2. Rebound meter structure

Figure 1 illustrates the longitudinal cross-section of the brick rebound meter after impact.



1 - Fastening Nut
2 - Zeroing Screw
3 - Hook
4- Hook pin
5 - Button
6 - Housing
7 - Ejector Hammer
8 - Spring Seat
9 - Clamp Ring
10 - Sealing Felt Ring
11- Popping Rod
12 - Block Cap
13- Buffer Compression Spring
14 - Popping Tension Spring
15 - Scale
16 - Pointer Plate
17 - Pointer Block
18 - Center Guide Bar
19 - Pointer Shaft
20 - Guide Flange
21 - Hook Compression Spring
22 - Compression Spring
23 - Tail Cap

3. Operation, maintenance and calibration of rebound instrument

Ⅰ Operation

(1) Hold the striking rod against the surface of the brick sample, press the instrument gently to release the button, release the pressure to extend the striking rod, and hook up the striking hammer.

(2) So that the axis of the rebound instrument is always perpendicular to the brick samples on the surface of the measurement point and slowly and uniformly apply pressure, to be struck by the hammer decoupling impact of the striking rod, the striking hammer rebound to drive the pointer backward to move to a certain position, the pointer block on the value of the engraved line on the scale to indicate a certain value that is the rebound value.

(3) So that the instrument continues to be held on the surface of the brick samples for readings and record the value of the rebound. If the conditions are not conducive to reading, you can press the button, lock the movement, the instrument will be moved to it to read.

(4) Gradually depressurize the instrument so that the ejector rod extends from inside the instrument for the next use.

Ⅱ Maintenance

The rebound instrument should be routinely maintained under any of the following circumstances:

(1) Hit more than 2000 times;
(2) When there is doubt about the detection value;
(3) Steel anvil rate is not qualified;

Conventional maintenance methods should meet the following requirements:

(1) Unscrew the front cover and the tail cover, take off the ring and the pressure spring, make the hammer decoupling and take out the movement, then remove the striking rod (take out the buffer pressure spring inside) and the three pieces (striking hammer, striking tension spring and tension spring seat);
(2) With gasoline or kerosene to clean the movement parts, especially the center guide bar, ejector hammer and ejector rod of the inner hole and impact surface, after cleaning in the center guide bar on a thin layer of watch oil or sewing machine oil, other parts are not smeared with oil;
(3) Clean the inner wall of the case, remove the scale, check the needle friction should be 0.5 ± 0.1N;.
(4) Shall not rotate the tail cover has been positioned on the tightening of the zero screw;
(5) No homemade or replacement parts;
(6) After maintenance should be required to rate the test, rate should be 74 ± 27, rate anvil should be consistent with the national metrological verification regulations “concrete rebound meter” (JJG817-2011) provisions.

Ⅲ Verification

Under any of the following circumstances, the rebound instrument shall be sent to the verification unit recognized by the competent authority for verification, and the qualified rebound instrument shall have a verification certificate;

(1) Before the new rebound instrument is used;
(2) Exceed the validity period of verification (validity period is half a year);
(3) After routine maintenance, the rate is not qualified;
(4) Suffer serious impact or other damage.

4. Testing techniques

Ⅰ General provisions

Sintered brick rebound method is applicable to presume the compressive strength of bricks in sintered ordinary brick masonry or sintered porous brick masonry, and is also applicable to detect the strength of lightweight aggregate concrete and other lightweight materials. It is not suitable for presuming the compressive strength of bricks in sintered common brick masonry or sintered porous brick masonry whose surfaces have been weathered or subjected to frost damage or environmental erosion.

Ten test areas should be randomly selected in each test cell. The area of each test area should not be less than 1.0m2, in which 10 randomly selected bricks with strips facing outward should be used as 10 test positions for rebound testing. The distance between the selected bricks and the edge of the brick wall should not be greater than 250mm.

Ⅱ Test Steps

(1) The tested brick should be a complete brick with qualified appearance. Brick surface should be dry, clean, flat, there should be no finish layer, stucco layer, if necessary, the grinding wheel can be used to remove surface debris, and should be smoothed surface, while the brush should be brushed to remove dust.

(2) In each brick on the measurement surface should be uniformly arranged 5 popping points. Selection of the bullet point should avoid defects on the surface of the brick. The distance between two adjacent points should not be less than 20mm, the impact point from the edge of the brick should not be less than 20mm, each point should only be bounced once, the rebound value readings should be estimated to 1. Test, the rebound instrument should be in a horizontal state, its axis should be perpendicular to the surface of the brick.

Ⅲ Data analysis

(1) The rebound value of a single test position, should be taken as the average of the rebound value of the 5 impact points.
(2) The jth position of the ith measurement area of the compressive strength of the conversion value, should be calculated according to the following formula:

① Sintered ordinary brick:

$$f_{1ij}=2\times10^{-2}R^{2}-0.45R+1.25$$

② Sintered porous bricks:

$$f_{1ij}=1.7\times10^{-3}R^{2.48}$$

In the formula:

f_{1ij}— Converted compressive strength (MPa) of the jth position in the i-th measurement area

R - the average rebound value of the jth measurement site in the ith measurement area.

(3) The average compressive strength of bricks in the test area should be calculated according to the following formula:

$$f_{1i}=\frac{1}{10}\sum_{j=1}^{n_1} f_{1ij}$$

(4) The reference basis of this manual is the national standard "Technical Standard for On-site Inspection of Masonry Engineering" (GB/T50315-2011). The national uniform strength measurement curve can be used for the detection of sintered ordinary brick and sintered porous brick with strength of 6MPa~ 30MPa. When the strength range of the national unified strength measurement curve of this standard is exceeded, it should be verified and used, or a special strength measurement curve should be developed.

5. Strength presumption

1. The discordations and statistical outliers in the test data should be detected and eliminated according to the relevant Grubbs test method or Dixon test method in GB/T4884 of the current national standard "Statistical Processing of Data and Interpretation of Normal Sample Outliers Judgment and Treatment". The detection level α should be 0.05, the elimination level α should be 0.01, and the discordant value should not be arbitrarily omitted. If the reason for the outlier is found technically or physically, it should be eliminated. If no technical or physical cause is found, it should not be removed.
2. According to the various testing methods of the national standard "Technical Standards for On-site Testing of Masonry Engineering" (GB/T50315-2011), the test strength value f_{ij} of each test point should be given, as well as the average strength value of each test area, and the average strength f_i of the test area f_i should be taken as the representative value.
3. The average strength, standard deviation and coefficient of variation of each detection unit shall be calculated according to the following formula:

$$f_{1.m}=\frac{1}{n_2}\sum_{i=1}^{n_2} f_{1i}$$

$$s=\sqrt{\frac{\sum_{i=1}^{n_2}(f_{1.m}-f_{1i})^2}{n_2-1}}$$

$$\delta=\frac{s}{f_{1.m}}$$

In the formula:

$f_{1.m}$ — Average strength of the same test unit (MPa).

n — The number of test areas of the same test unit;

f_{1i} — The strength representative value of the measured area (MPa).

S — The strength standard deviation (MPa) calculated according to n2 test areas of the same detection unit;

δ — Coefficient of strength variation of the same detection unit

(4) Existing masonry works, each test unit of brick compressive strength level, shall meet the following requirements:

① When the coefficient of variation δ<0.21, the brick compressive strength grade of each test unit should be calculated according to the average compressive strength $f_{1,m}$ and standard compressive strengtf $f_{1,m}$, in Table 5.4-1 and Table 5.4-2. The standard value of brick compressive strength of each test unit shall be calculated according to the following:

$$f_{1.k} = f_{1.m} - 1.8s$$

In the formula:

$f_{1,k}$ a standard value of brick compressive strength of the same test unit (MPa).

2, when the coefficient of variation δ> 0.21, should be in accordance with Table 5.4-1, Table 5.4-2 in the compressive strength of the average value of $f_{1,m}$, the minimum value of the compressive strength of the unit of measurement $f_{1,min}$ presumed that the brick compressive strength level of each test area.

Table 5.4-1 Calculation of compressive strength grade of sintered ordinary bricks

Compressive strength presumed grade	Average compressive strength	Coefficient of variation δ ≤ 0.21	Coefficient of variation δ > 0.21
		Standard Compressive Strength $f_{1k} \geqslant$	Minimum Compressive Strength $f_{1,min} \geqslant$
MU25	25.0	18.0	22.0
MU20	20.0	14.0	16.0
MU15	15.0	10.0	12.0
MU10	10.0	6.5	7.5
MU7.5	7.5	5.0	5.5

Table 5.4-2 Calculation of compressive strength grade of sintered porous brick

Compressive strength presumed grade	Average compressive strength	Coefficient of variation δ ≤ 0.21	Coefficient of variation δ > 0.21
		Standard Compressive Strength $f_{1k} \geqslant$	Minimum Compressive Strength $f_{1,min} \geqslant$
MU30	30.0	22.0	25.0
MU25	25.0	18.0	22.0
MU20	20.0	14.0	16.0
MU15	15.0	10.0	12.0
MU10	10.0	6.5	7.5
MU7.5	7.5	5.0	5.5

Appendix I

Conversion value of compressive strength of brick in test area

Average rebound value	Common brick	Perforated brick	Average rebound value	Common brick	Perforated brick
28.4	—	6.8	32.2	7.5	9.3
28.6	—	7.0	32.4	7.7	9.5
28.8	—	7.1	32.6	7.8	9.6
29.0	—	7.2	32.8	8.0	9.8
29.2	—	7.3	33.0	8.2	9.9
29.4	—	7.4	33.2	8.4	10.1
29.6	—	7.6	33.4	8.5	10.2
29.8	—	7.7	33.6	8.7	10.4
30.0	—	7.8	33.8	8.9	10.5
30.2	—	8.0	34.0	9.1	10.7
30.4	6.1	8.1	34.2	9.3	10.8
30.6	6.2	8.2	34.4	9.4	11.0
30.8	6.4	8.4	34.6	9.6	11.2
31.0	6.5	8.5	34.8	9.8	11.3
31.2	6.7	8.6	35.0	10.0	11.5
31.4	6.8	8.8	35.2	10.2	11.6
31.6	7.0	8.9	35.4	10.4	11.8
31.8	7.2	9.0	35.6	10.6	12.0
32.0	7.3	9.2	35.8	10.8	12.1

Average rebound value	Common brick	Perforated brick	Average rebound value	Common brick	Perforated brick
36.0	11.0	12.3	40.2	15.5	16.2
36.2	11.2	12.5	40.4	15.7	16.4
36.4	11.4	12.6	40.6	15.9	16.6
36.6	11.6	12.8	40.8	16.2	16.8
36.8	11.8	13.0	41.0	16.4	17.0
37.0	12.0	13.2	41.2	16.7	17.2
37.2	12.2	13.3	41.4	16.9	17.4
37.4	12.4	13.5	41.6	17.1	17.6
37.6	12.6	13.7	41.8	17.4	17.8
37.8	12.8	13.9	42.0	17.6	18.0
38.0	13.0	14.1	42.2	17.9	18.2
38.2	13.2	14.3	42.4	18.1	18.5
38.4	13.5	14.4	42.6	18.4	18.7
38.6	13.7	14.6	42.8	18.6	18.9
38.8	13.9	14.8	43.0	18.9	19.1
39.0	14.1	15.0	43.2	19.1	19.3
39.2	14.3	15.2	43.4	19.4	19.6
39.4	14.6	15.4	43.6	19.6	19.8
39.6	14.8	15.6	43.8	19.9	20.0
39.8	15.0	15.8	44.0	20.2	20.2
40.0	15.2	16.0	44.2	20.4	20.5

Average rebound value	Common brick	Perforated brick	Average rebound value	Common brick	Perforated brick
44.4	20.7	20.7	48.2	26.0	25.4
44.6	21.0	20.9	48.4	26.3	25.6
44.8	21.2	21.2	48.6	26.6	25.9
45.0	21.5	21.4	48.8	26.9	26.2
45.2	21.8	21.6	49.0	27.2	26.4
45.4	22.0	21.9	49.2	27.5	26.7
45.6	22.3	22.1	49.4	27.8	27.0
45.8	22.6	22.4	49.6	28.1	27.2
46.0	22.9	22.6	49.8	28.4	27.5
46.2	23.1	22.8	50.0	28.8	27.8
46.4	23.4	23.1	50.2	29.1	28.1
46.6	23.7	23.3	50.4	29.4	28.3
46.8	24.0	23.6	50.6	29.7	28.6
47.0	24.3	23.8	50.8	30.0	28.9
47.2	24.6	24.1	51.0	—	29.2
47.4	24.9	24.3	51.2	—	29.5
47.6	25.1	24.6	51.4		29.8
47.8	25.4	24.9	51.6	—	30.0
48.0	25.7	25.1	—	—	—