ICS 91.100.10
CCS Q11

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 750-2024

Test method for autoclave expansion of cement

水泥压蒸安定性试验方法

Issued on: October 26, 2024 **Implemented on: May 1, 2025**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Table of Contents

Foreword

This document was issued on 26 October 2024 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 May 2025.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 750-2024 specifies the autoclave test for cement soundness. Soundness is the property that decides whether hardened concrete stays the size it was cast: free lime and free magnesia left in the clinker hydrate long after the cement has set, and because the hydration products occupy more volume than what they came from, the expansion happens inside concrete that is already rigid. The result is cracking that appears months or years after placement, in a structure that met every strength requirement. Magnesia is the dangerous one, because it hydrates so slowly that no ordinary test reveals it in useful time - which is what the autoclave is for: steam under pressure forces in days what would otherwise take years. This document gives the method and principle of the cement autoclave soundness test and specifies the instruments and equipment, the materials, the test conditions, the moulding and curing of specimens, the measurement of specimen

length, the autoclave cycle and the treatment of results. Under ICS 91.100.10 and CCS Q11, it is a basic acceptance test, written for cement works laboratories, for the concrete producers and contractors who verify incoming cement, and for the quality supervision authorities.

This Document gives the method and principle of cement autoclave stability test; and stipulates

the instruments, equipment, materials, test conditions, specimen molding and maintenance, specimen length measurement, specimen autoclave and result calculation and evaluation.

This Document is applicable to the determination of autoclave stability of hardened cement paste. Among them, the test method of 25 mmx25 mmx280 mm specimen is the reference method; and the test method of 25 mmx25 mmx146 mm specimen is the substitute method.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates

indicated are applicable to this Document; for the undated documents, only the latest version

(including all the amendments) is applicable to this Document.

GB/T 1346 Standard test method for water requirement for normal consistency, setting time, and soundness of the portland cement

GB/T 6682 Water for analytical laboratory use - Specification and test methods

GB/T 17671 Test method of cement mortar strength (ISO method)

3 Terms and Definitions

For the purposes of this Document, the following terms and definitions apply.

4 Method Principle

Under saturated water vapor conditions, the temperature and pressure are increased to hydrate

most of the periclase and free calcium oxide in the cement in a short period of time.

5 Instruments and Equipment

5.1 Cement mortar mixer

It shall meet the requirements of JC/T 681.

5.3 Nail head

It shall meet the requirements of JC/T 603.

5.4 Tamping rod

It shall meet the requirements of JC/T 603; the bottom surface of the square tamping rod shall

be covered with a rubber layer.

5.5 Autoclave

5.6 Temperature measuring device

The measuring range shall be no less than 250 degrees C; and the graduation value shall be no greater

than 1 degrees C.

5.7 Curing box

The temperature shall be maintained at 20 degrees C +/-1 degrees C; and the relative humidity shall be no less

than 90%.

5.8 Comparator

It shall meet the requirements of JC/T 603.Automatic measuring equipment that meets the requirements may also be used. When in use, the comparator shall be consistent with the laboratory temperature.

6 Materials

6.1 Cement sample

The cement sample shall pass through a 0.9 mm square hole sieve and be mixed evenly.

6.3 Water for autoclaving

Use Grade-3 water in accordance with GB/T 6682.

7 Test Conditions

7.1 Molding laboratory

The temperature of the laboratory shall be maintained at 20 degrees C +/- 2 degrees C, and the relative humidity

should be no less than 50%.

7.2 Autoclave laboratory

It shall be equipped with ventilation equipment and tap water source, and shall not be shared

with other tests.

8 Molding and Curing of Specimens

8.1 Preparation of test mold

Before the test, apply a thin layer of engine oil to the inner cavity of the test mold; and install

the nail head into the round holes at both ends of the mold cavity. The exposed part of the nail

head shall not be stained with engine oil.

8.3 Molding of the test specimen

Wearing rubber gloves, mix the prepared cement paste thoroughly and evenly; and then load it

into the two cavities of the prepared test mold in two layers according to the following steps.

8.4 Curing and demolding

Put the formed specimen together with the test mold in a moisture curing box for curing for 24

h+/-30 min and demolding; counting from the time when the cement is mixed with water.

9 Measurement of Specimen Length

9.1 Dial indicator calibration

Before measuring, use the calibration rod to calibrate the base length reading of the comparator

dial indicator. After the measurement is completed, measure the calibration rod reading again.

If the change exceeds +/-0.01 mm, recalibrate the dial indicator.

.....