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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Cement Association (JCA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS R 5203**:1995 is replaced with this Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Determination of the heat of hydration of cement — Solution method

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of **ISO 29582-1** published in 2009 without modification in the basic measuring principle, but with addition of unique contents of **JIS** that are: tolerances for the measurement of heat of solution of hydrated cement and solution conditions for respective types of cement.

The portions with continuous sidelines or dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JA. The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex JB.

1 Scope

This Standard specifies the testing method for heat of hydration of portland cement, portland blast-furnace slag cement, and portland fly-ash cement.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 29582-1 : 2009 *Methods of testing cement — Determination of the heat of hydration — Part 1 : Solution method* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS K 0050 *General rules for chemical analysis*

JIS K 8001 *General rule for test methods of reagents*

JIS K 8005 *Reference materials for volumetric analysis*

JIS K 8405 *Zinc oxide (Reagent)*

JIS K 8541 *Nitric acid (Reagent)*

JIS Z 8801-1 *Test sieves — Part 1 : Test sieves of metal wire cloth*

3 General requirements for test

3.1 Expression of measurement results

Round the measurement results to the digit specified in the relevant subclause.

3.2 Tolerances

In the measurement of thermal capacity, measurement of heat of solution of anhydrous cement and measurement of heat of solution of hydrated cement, when the difference between the results of two measurements is greater than the specified tolerance, carry out a third measurement, and report the mean of the two measurements the difference of which satisfies the tolerance.

If, among measurements including the third measurement, there are two pairs of measurements satisfying the tolerance, report the mean of all the three measurements. If, in the three measurements, there are no pair of measurements satisfying the tolerance, carry out the measurement from the start.

Tolerance for each measurement item shall be as specified in the relevant subclause.

4 Reagents and sample

4.1 Nitric acid (2 mol/L), of guaranteed grade specified in **JIS K 8541** or equivalent or better reagent, measured in the amount specified in Table 1, to which distilled water or ion-exchanged water is added to make 20 L.

Table 1 Amount of nitric acid weighed out

Density of nitric acid (g/ml)	Amount weighed out (ml)
1.42	2 550
1.40	2 760
1.38	2 980

After mixing the prepared nitric acid (2 mol/L) thoroughly and cooling it to room temperature, check if its concentration is 2.000 mol/L ± 0.004 mol/L according to either of the following methods **a**) or **b**). When the concentration of nitric acid (2 mol/L) is outside the range, make adjustment by dripping concentrated nitric acid or adding distilled water or ion-exchanged water, and check the concentration again. Carry out this operation until the concentration of nitric acid (2 mol/L) becomes within the predetermined range.

a) Heat sodium carbonate of the reference material for volumetric analysis specified in **JIS K 8005** at 600 °C ± 10 °C for 1 h and cool it. Immediately weigh out about 2 g of this material correctly to the nearest 0.000 1 g and transfer to a beaker. Add about 200 ml of distilled water or ion-exchanged water to dissolve the material. Add a few drops of methyl orange (1 g/L) as an indicator, and standardize it by dropping nitric acid solution through a burette.